Appendix A
Restoration and Revegetation Plans for the Ruby Pipeline Project

Restoration and Revegetation Plan:
Wyoming

RUBY PIPELINE LLC

FERC Docket No. CP09-54-000

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List of Abbreviations and Acronyms

BLM	Bureau of Land Management
FERC	Federal Energy Regulatory Commission
FEIS	Final Environmental Impact Statement
KFO	Kemmerer Field Office
MP	milepost
NRCS	National Resources Conservation Service
OHV	off-highway vehicle
Plan	Restoration and Revegetation Plan
POD	Plan of Development
Project	Ruby Pipeline Project
RMP	Resource Management Plan
ROW	right-of-way
Ruby	Ruby Pipeline, LLC
USDA	U.S. Department of Agriculture
WGFD	Wyoming Game and Fish Department

1.0 Introduction

The Ruby Pipeline Project (Project), proposed by Ruby Pipeline, LLC (Ruby), is composed of approximately 675.2 miles of 42-inch diameter natural gas pipeline, along with associated compression and measurement facilities, located between Opal, Wyoming and Malin, Oregon (see Figure 1). An approximately 2.6-mile lateral would also be constructed north to the Malin Hub in Klamath County, Oregon. The Project right-of-way (ROW) will traverse four states: Wyoming, Utah, Nevada, and Oregon. In addition to the existing King Compressor Station at Opal, Wyoming, Ruby proposes to install four new compressor stations for the Project: one located near the Opal Hub, one in western Utah, one near the mid-point of the Project north of Elko, Nevada, and one northwest of Winnemucca, Nevada. Ruby will utilize a 115-foot-wide nominal construction ROW for installation of both the mainline and the lateral. A state-specific restoration and revegetation plan (Plan) is being developed for each of the four states crossed by the Project.

Federal lands that will be crossed include the Wyoming Bureau of Land Management (BLM) Kemmerer Field Office (KFO). The focus of this Plan is federal lands. The Plan will also be applicable to privately owned lands pending approval by landowners.

Ruby sought input from specialists from the KFO and Wyoming Game and Fish Department (WGFD) in the development of this Plan.

This Plan utilizes restoration methods developed for other large-diameter pipeline projects that were approved by the Federal Energy Regulatory Commission (FERC) (Dames and Moore 1990; E & E 2007). Ruby has adapted and updated the Plan by incorporating recent technical standards and published long-term restoration monitoring information associated with similar habitats (E & E 2002, 2007). The Plan also incorporates Ruby's Noxious and Invasive Weed Control Plan and Upland Erosion Control, Revegetation, and Maintenance Plan*,* Appendices H and D, respectively, in the Plan of Development (POD).

The BLM POD for the Project will include additional reclamation measures for visually sensitive areas and off-highway vehicle (OHV) control, as identified by the BLM during its review of this Plan. These measures include serrating the ROW's edge with shrubs and trees to break up the perception of a straight line. Additional landowner or other land management agency requirements, as well as any special conditions or recommendations of FERC in the Final Environmental Impact Statement (FEIS), are incorporated into this Plan.

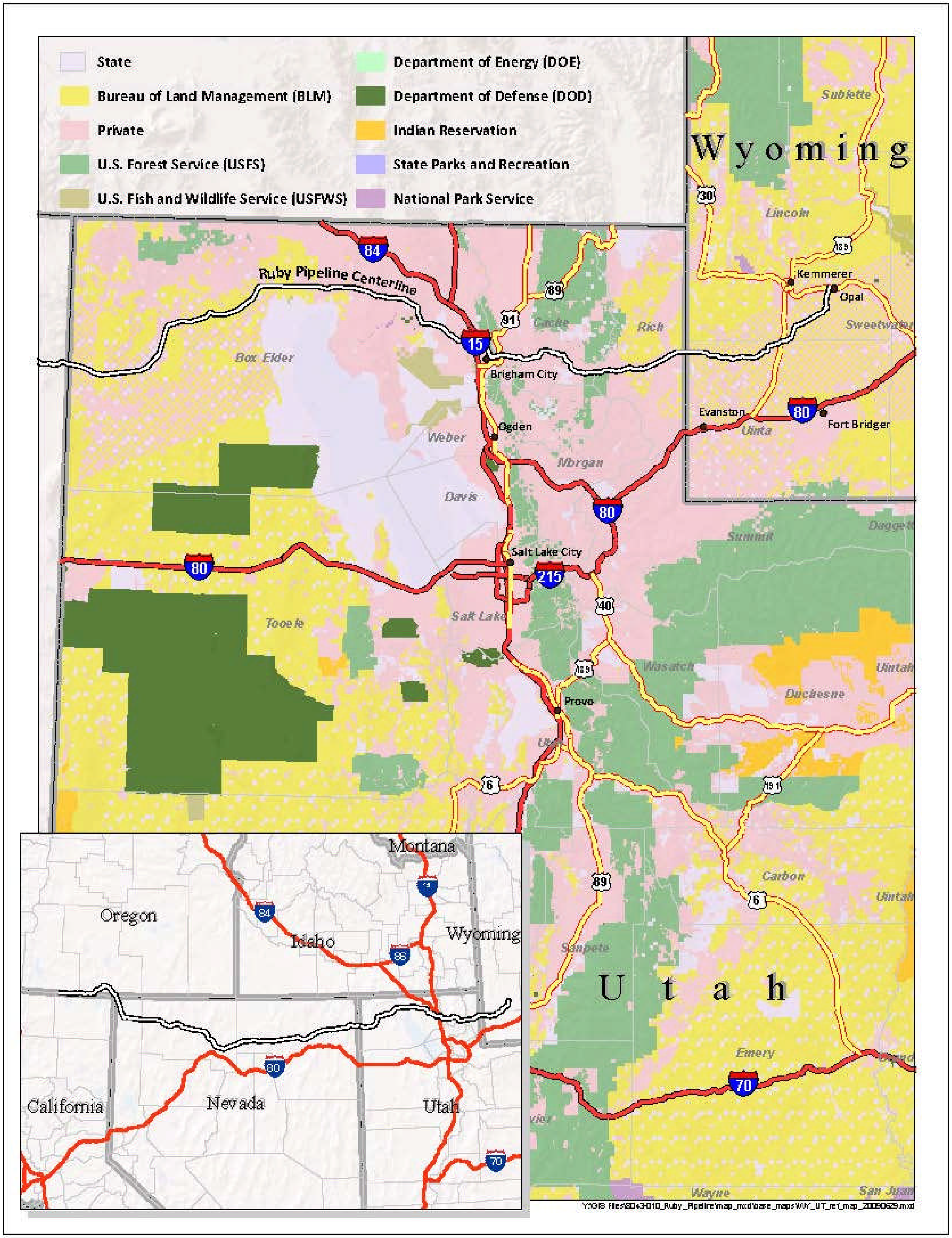

Figure 1 Ruby Pipeline Proposed Route through Wyoming and Utah

2.0 Purpose

Plan describes the processes and measures that will be implemented following pipeline construction to mitigate impacts to upland habitats from the Project in Lincoln and Uinta counties, Wyoming. Riparian and wetland restoration for Wyoming is described in the Plan of Development (POD), Appendix Q.

This Plan is applicable to the ROW, extra workspaces (POD Section 4.1.5), and sections of access roads (POD Section 4.1.4) that require restoration. No eligible or unevaluated cultural site would be disturbed during restoration without a data recovery (mitigation) plan. Revegetation criteria standards are presented to judge plant establishment success. The Plan does not address Ruby's compensatory or off-site mitigation efforts, as they will be fully described in a separate plan (greater sage-grouse and pygmy rabbit conservation plan, Appendix S, POD). Construction of the Project would affect approximately 1,283 acres of land in Wyoming.

3.0 Plan Goals and Objectives

The Project has established short- and long-term restoration and revegetation goals that are in compliance with the BLM Wyoming State Office reclamation policy (Instruction Memorandum No. WY-2009-002, dated: March 31, 2009). Short- and long-term restoration goals apply to the ROW, extra workspaces, and access roads.

The short-term goal of pipeline ROW restoration is to stabilize soils through achieving the objectives of terrain re-contouring, spreading stockpiled topsoil, strategically placing erosion control devices, establishing temporary vegetation cover, and abating noxious and invasive weed establishment. ROW restoration would commence upon pipeline trench closure. Re-contouring of the ROW would occur to blend with adjacent terrain not disturbed by the Project. Erosion control devices, such as water bars and/or certified weed-free straw bales or wattles, would be strategically placed to limit and/or direct overland water flow. Herbicide control of noxious or invasive weeds may be necessary following BLM regulations and timing.

The long-term restoration goal is to establish a permanent vegetation cover with similar species densities and compositions of adjacent lands undisturbed by the Project in accordance with 18 CFR 380.15 (http://www.gpoaccess.gov/CFR/) and FERC revegetation guidelines (http://www.ferc.gov/industries/gas/enviro/uplndctl.pdf). Additionally, KFO has stated that disturbance within the "Sage" Sage-Grouse Core Reproduction Area1 crossed by the ROW will be revegetated and restored within five years after pipeline construction (BLM IM No. WY-2009-002). The Governor of Wyoming has established greater sage-grouse core management areas for protection of habitat from surface disturbance and activities in these areas must comply with the Executive Order (State of Wyoming, Executive Order 2008-2, August 1, 2008).

Establishment of a permanent plant cover is essential to restore sage-grouse and pygmy rabbit habitats and provide resiliency to resist invasive annual grasses and forbs. The long-term goal will be achieved through maintaining or adding new or existing erosion control devices, continuing noxious and invasive weed abatement, minimizing livestock grazing, minimizing OHV travel, and implementing a monitoring program. Long-term restoration efforts will be deemed complete with successful establishment of the perennial plant cover. Determination of ROW restoration success will be the responsibility of the appropriate agency that administers the land with monitoring data provided by Ruby (see Section 6.0). Ruby will negotiate with private landowners regarding restoration requirements for their land.

1 (http://gf.state.wy.us/wildlife/wildlife_management/sagegrouse/gov_sagegrousecoreareas)

Specific conservation, avoidance, and minimization actions that Ruby will implement during construction are outlined in the Greater Sage-Grouse and Pygmy Rabbit Conservation Measures Plan (Appendix S, POD) and are detailed into this restoration and revegetation plan.

Ruby's restoration efforts will meet short- and long-term goals by implementing the following measures:

- Pre-treating the ROW with approved herbicides in applicable areas for noxious and invasive weeds prior to pipeline construction;
- Minimize weed dispersal by following appropriate methods of abatement (Siegel and Donaldson 2003);
- Using proper soil management techniques including stripping, stockpiling, and reapplying topsoil to establish surface conditions that would enhance development of diverse, stable, and self-generating plant communities;
- Establishing stable surface and drainage conditions and the use of erosion control devices should minimize soil erosion and sedimentation;
- Re-establishing terrain compatible with the surrounding landscape;
- Establishing a permanent plant cover of native shrubs, grasses, and forbs along the ROW, extra workspaces, and access roads;
- Not planting any seeds from plants that are listed as noxious or invasive weeds by Wyoming or on the U.S. Department of Agriculture (USDA) federal list (PLANTS website) will be planted;
- Using KFO- or landowner-approved seed mixes (which also includes container-grown sagebrush seedlings) that are correlated with Natural Resources Conservation Service (NRCS) ecological sites and pipeline mileposts (MPs) (see Attachment A);
- Monitoring during the construction and operation phases to ensure the achievement of both short- and long-term restoration goals and objectives;
- Minimizing construction impacts along the route by, where practical and safe, limiting ROW width to avoid impacts to native vegetation, sage-grouse leks, and pygmy rabbit habitat; and
- Where longer-term impacts occur to certain sensitive environments and habitats, Ruby will work with the KFO, WGFD, and landowners to develop a plan for compensatory mitigation to offset ROW impacts. The plan would include proposed types of mitigation to be performed and areas to receive the treatments. The need for an appropriate level of National Environmental Policy Act (NEPA) analysis will be determined in consultation with federal agencies.

4.0 Restoration Schedule

The Project is scheduled to begin June 1, 2010. The FEIS was issued January 2010. The FERC Certificate of Public Convenience and Necessity and the BLM Record of Decision for the selected route must be issued before construction begins. The POD presents specific information regarding construction procedures and timing. Pipeline construction is projected to be completed March 2011. Restoration on a given pipeline segment will be initiated upon trench closure.

Restoration will include cleaning up, backfilling, surface grading, topsoiling, installing erosion control devices, preparing the seedbed, and establishing a permanent plant cover. Areas that will not be seeded with within 14 days following final grading because of seasonal limitations, slopes greater than 10 percent, erosive soils, or aesthetically sensitive areas will be seeded with a sterile annual grass or slender wheatgrass (*Elymus trachycaulus*) immediately after seedbed preparation in accordance with KFO and BLM State of Wyoming Reclamation Policy. The seeding or transplanting of native plants to establish permanent vegetation cover will occur during late fall to early winter to take advantage of winter and spring precipitation (Monsen 2000, 2005; Plummer 1977). The temporary plant cover will be incorporated into the soil before the permanent plant cover is seeded.

5.0 Restoration Process

The restoration process includes steps to satisfy short- and long-term goals described in Section 3. The Plan incorporates lessons learned from the Kern Expansion Project restoration effort (E & E 2002, 2007) and the experiences of subject-matter experts in arid and semi-arid land restoration (Plummer 1977; Institute for Land Rehabilitation 1978; Wallace et al. 1980; Monsen 2000, 2005; EDAW 2002; Monsen et al. 2004; and Sheley et al. 2008; Bainbridge 2007). Considerable information is also available through the BLM's Great Basin Restoration Initiative projects (BLM 1999, 2000), which are applicable to Wyoming.

5.1 Revegetation Study Plots

The Project will establish revegetation study plots along the ROW to identify ways to improve the success of vegetation establishment in sagebrush-steppe and salt-desert shrub vegetation. Plant establishment in these vegetation types is challenging due to limited and unpredictable precipitation and invasive annual weeds out-competing desirable plants (Monsen 2000). Potential areas for study plots include the "Sage" Sage-Grouse Core Reproduction Area, Wyoming which the ROW will cross (Figures 2 and 3). Examples of treatments include the use of a KFO-approved herbicide to control annual grasses; quick-establishing seed mixes to combat invasive weeds; and mycorrhizal soil inoculation. The focus of the research would be to improve sage-grouse, pygmy rabbit, and big game habitat by increasing forbs through the restoration process. The study plots would be selected following clean-up and established and seeded in conjunction with ROW revegetation efforts.

5.2 Restoration Approach

This Plan is applicable to the ROW, extra workspaces, and access roads in Wyoming. Reference to the ROW restoration is inclusive of extra workspaces and access roads. Measures implemented to ensure successful restoration include complete ROW topsoil removal and stockpiling during construction, cleanup, backfilling, appropriate surface re-contouring, soil erosion control, seedbed preparation, application of KFO-approved seed mixes, plant establishment, weed abatement, and monitoring. Seed sources will include commercial vendors and local collections. Container-grown sagebrush seedlings will be transplanted in specific locations as agreed upon with the KFO and WGFD. Shrub seeds will be purchased from commercial vendors and/or collected from local sources. Shrubs to be grown in containers for transplanting at appropriate sites include shrubs such as low sagebrush, Wyoming sagebrush, and big sagebrush. ROW alignments in visually sensitive areas will have uneven or serrated edges by either leaving shrubs in place when clearing or planting shrub groupings after cleanup.

5.2.1 ROW Clearing, Grading, and Topsoil Removal

Initial construction activities include surveying and staking the construction ROW, removal of vegetation and topsoil, and grading the ROW for safe construction passage, as described in the FEIS (Section 2.3) and POD (Section 5). Dense stands of noxious and invasive weeds identified during 2009 biological field surveys will be pretreated with KFO-approved or landowner-approved herbicides before vegetation clearing begins. ROW surveying and staking will identify the width of excavation and blade work, including cut and fill locations. The ROW vegetation will be removed along with the topsoil and stockpiled.

In selected areas of high-quality habitat, as agreed upon by Ruby and KFO where: (1) existing access roads to the ROW are numerous (one per mile or more) for a distance of one to five miles, and (2) the terrain is relatively level, the width of the ROW may be decreased from 115 feet to 90 feet with the allowance of one-way traffic only. These areas will be based on safety and constructability and upon Ruby's discussions with the appropriate land management agency or landowner.

In some areas, parallel access roads physically adjacent to the Project ROW, not used by the public, and not under county or state jurisdiction, may be used as the working side passing lane, decreasing the amount of habitat disturbed by 10 to 15 feet (POD Section 5). In Wyoming, these reaches extend from MP 3.1 to the Utah border. Their use will depend on safety and constructability requirements, as well as local use of the road and the road's alignment compared to the ROW. The pipeline cannot be bent or contoured to follow the road. In selected areas of high-quality visually sensitive areas, the ROW will have an uneven edge accomplished by either leaving shrubs in place when clearing or planting shrubs into the ROW following cleanup.

Topsoil thickness varies throughout the ROW depending on soil type. Environmental inspectors will identify topsoil thickness for removal and stockpiling. The topsoil and vegetation mixture from the entire ROW will be stripped and stockpiled separately from the subsoil stockpile. Certified weed-free erosion control blankets, straw bales, wood fiber, or straw wattles will be used as appropriate to limit erosion. Topsoil-vegetation mixture and subsoils will be replaced in the proper order during backfilling and final grading operations. The topsoil-vegetation mixture should provide plant propagules to support plant re-establishment along the ROW in addition to the seed mixtures and container-grown seedlings. Vegetation in the topsoil mixture will serve as a mulch.

Surface rocks, where present and where useful for restoration, will be windrowed adjacent to the topsoil stockpile. After seeding, the rock will be separated from the topsoil and then placed on the construction ROW, in a manner that visually blends with the adjacent undisturbed area for use as erosion control (rock) mulch, or for OHV control if requested by

KFO or the landowner. Salvaged rock will be used to re-create rock outcrops and rock faces to the extent possible. Excess rock, including rock excavated to the surface in active agricultural lands, will be removed and disposed of at a landowner or KFO-approved location.

During construction of the Project, all vehicle travel will be within the identified (approved) construction ROW and workspaces and on approved access roads. Cross-country vehicle travel outside the approved construction ROW and workspaces or on non-approved, existing access roads will not be allowed.

5.2.2 Right-of-Way, Extra Workspaces, and Access Road Restoration

Restoration of the ROW will involve backfilling to the excavated trenchline, restoring pre-existing terrain contours, replacing stockpiled subsoils and the topsoil/vegetation mixture, installing erosion control devices, preparing the seedbed, and seeding. ROW restoration will begin within 20 days after pipeline trench closure and final cleanup. In visually sensitive areas, the ROW alignment will have an uneven edge by either leaving shrubs in place when clearing or randomly seeding/planting clumps of shrubs along the ROW perimeter.

Extra workspace restoration will follow similar steps as ROW restoration, including contouring, preparing the seedbed, and seeding (POD Section 4.1.4). Restoration would occur within a few days after the extra workspace is no longer needed. The appropriate seed mix will correspond with the surrounding vegetation type.

Ruby has designated certain roads to access the ROW for pipeline construction (Figure 2, POD Section 4.1.4). Access roads will be reclaimed according to FKO and landowner directions. The KFO has requested that all improved roads on public lands be returned to their original status after they are no longer needed. Access road restoration will include grading, preparing the seed bed, and seeding. The appropriate seed mix will correspond with the surrounding vegetation type. Restoration will occur within a few days after a road is no longer needed.

Backfilling

Backfilling of subsoil materials will be required after the pipeline is aligned in the trench and packed with screened subsoil or other appropriate materials. The excavated subsoils will be used to backfill the trench. Excessive ditch spoil will be feathered and blended across the construction corridor, creating a roughened surface to capture precipitation, decrease erosion, and provide safe sites for plant establishment.

Compacted Soils

Compacted soils would typically be associated with the ROW travel lane, pipe laydown locations, and access roads. Subsoil decompaction will occur as necessary to reduce soil bulk density. Areas that have a soil bulk density at least 25 percent greater than comparable non-disturbed soils outside of the ROW will be treated. Identified locations will be decompacted to a minimum depth of 6-12 inches prior to surface soil replacement. "Soil ripping" will occur along contours to minimize soil erosion and facilitate soil-water retention to aid revegetation. Extra workspaces and access roads will also be ripped to reduce soil compaction.

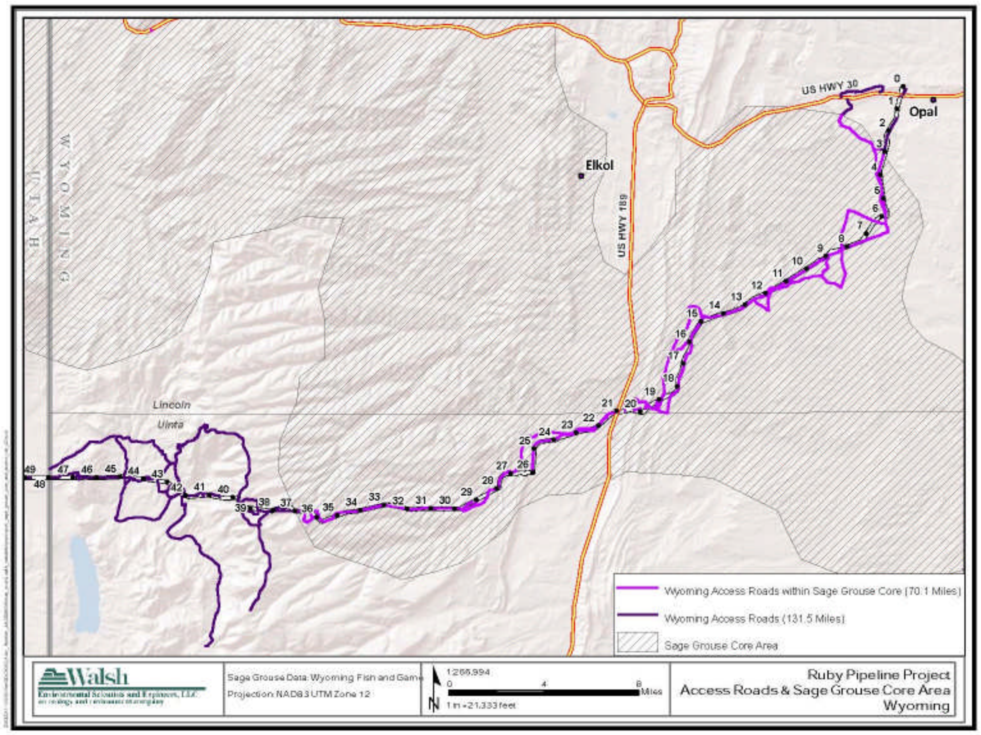

Figure 2 Wyoming ROW Access Roads

Terrain Contouring

The ROW, extra workspaces, and access roads will be contoured to blend within the surrounding landscape. Contouring will emphasize restoration of existing drainage and landform patterns, to the extent practicable.

Topsoil and Vegetation Mixture Replacement

The stockpiled topsoil-vegetation mixture will be spread over the ROW after recontouring is completed. The topsoil and vegetation mixture will provide seeds, vegetative propagules, and soil microbiota to facilitate plant establishment.

Mulch

A mulch cover minimizes soil erosion, conserves soil moisture, and moderates surface temperatures to improve the chances of seedling establishment (Sheley et al. 2008). KFO has requested that crimped straw mulch not be generally used along the ROW (K. Lamborn, KFO, telephone conversation, February 10, 2010). However, to protect erodible soils, limited mulching materials such as certified weed-free straw, woodchips, soil tackifiers, and fabrics may be needed in localized areas such as steep slopes. These materials would be used with KFO or landowner approval. The vegetation scrapped from the ROW along with topsoil will serve as a mulch after it is re-spread over the ROW. The vegetation will be applied at a rate so that approximately 25 percent of bare soil of an area will be observed.

Soil Erosion Control

Soil erosion control will occur through vegetation, certified weed-free mulch, soil tackifiers, and water control devices (Institute for Land Rehabilitation 1978; Sheley et al. 2008). Ruby will establish a permanent plant cover as quickly as possible following construction. Mulch, erosion control blankets, soil tackifiers, and water bars (slope breakers) will be used as appropriate and approved by KFO. Water bars will likely be implemented often for controlling soil erosion since Ruby has found them to be effective, cost efficient, and low maintenance.

Water bars or slope breakers are earth-berms established to control the flow of surface water (University of Minnesota Extension 1998). Water bars will be installed in all areas, except agricultural and pasture land and lawns, using spacing recommendations obtained from the local soil conservation authority or land management agency. In the absence of recommendations, Ruby will use the minimum spacing requirements outlined in Ruby's Upland Erosion Control and Revegetation, and Maintenance Plan (Appendix D, POD). Additionally, permanent water bars may extend slightly (about four feet) beyond the edge of the construction ROW to effectively drain water off the disturbed area. Where slope breakers extend beyond the edge of the construction ROW, they are subject to compliance with all applicable survey requirements.

Water bars will consist of a one-foot-high berm with an upslope swale. Water bars will be reseeded. They will be gently angled downslope to divert stormwater runoff to a stable upland discharge point or to a "j" hook created at the outfall point.

The purposes of water bars are to:

- Decrease overland water velocities through disturbed lands by reducing slope lengths;
- Remove water from the disturbed area in a controlled manner and at frequent intervals to reduce its erosive power;
- Direct water into a stabilized location to minimize surface scour;
- Maximize water infiltration along the Project ROW; and
- Slow water flow across the ROW to help maintain soil moisture for restoration efforts.

Noxious and Invasive Weed Abatement

Noxious and invasive weeds will reduce the success of ROW revegetation through competition for soil water, nutrients, space, and sunlight. Crews from the 2009 biological field survey identified areas where noxious and invasive weeds occur within the ROW (Biological Resources Conservation Measures Plan, Appendix I, POD). Noxious and invasive weed control will occur prior to topsoil and vegetation removal. The Noxious and Invasive Weed Control Plan (Appendix H, POD) will be followed for weed abatement.

Cheatgrass, medusahead ryegrass, and annual mustards are anticipated to be the prevailing weeds impacting revegetation success (Shaw and Monsen 2000). The Project will use KFO- or landowner-approved herbicides to reduce annual weed presence and competition before seeding (Sheley et al. 2008). Application rates will follow the manufacturer's recommendations and will be approved by KFO or the landowner. A Pesticide Use Permit will be secured from KFO and Lincoln or Uinta County prior to any application.

5.2.3 Revegetation

Vegetation types within the Project area vary according to soil types, topography, climatic conditions, and land management practices. Three KFO-identified seed mixes will be used to accommodate the varying vegetation and soils types along the ROW. Other resources include the USDA-NRCS Plants Database (http://plants.usda.gov) and VegSpec (http://vegspec.nrcs.usda.gov/vegSpec/index.jsp), a decision support system for planning revegetation projects. Considerable information concerning revegetation techniques is also available through the Native Seed Network (http://www.nativeseednetwork.org).

The proposed seed mixtures were designed to be compatible with the dominant vegetation and land uses currently found along the proposed ROW. All disturbed areas will be seeded using the location-specific species and seeding rates for the various vegetation types found along the ROW. Seed will be obtained from commercial vendors or collected locally by seed collectors.

The criteria used for selecting the seed mix were based on the following:

- Erosion-control capability,
- NRCS ecological site descriptions,
- Sage-grouse and pygmy rabbit habitat requirements,
- Land use,
- Availability of seed,
- Wildlife habitat value,
- Livestock management, and
- Restoration of traditional food and medicine gathered by Native Americans.

Seeds will be tested for purity and viability, and certified as weed free to ensure compliance with local, state, and federal seed requirements (Monsen 2000).

Seedbed Preparation

In selected areas, seedbed preparation will consist of decompacting, recontouring, and topsoil replacement, as described in Section 5.2.2, above. The soil surface will be left in a roughened condition to enhance soil water infiltration and seedling establishment by providing "safe sites" for seed germination (Monsen 2000, 2005). The seedbed will be firm but not compacted, nor will it have a crusted surface.

Seed Mixes

The pipeline will cross sagebrush-steppe vegetation, mountain big sagebrush, and salt-desert shrub vegetation types. Native seeds mixes will be used to restore vegetation on public lands, to the extent possible and according to KFO policy. The seed mix for private lands will be based on previous or adjacent land uses and approved by the landowner.

Re-establishing vegetation in arid and semi-arid sagebrush-steppe and salt-desert shrub vegetation types can be more challenging than other vegetation types because of unpredictable precipitation and noxious or invasive weed competition (Monsen 2000). Proper seedbed preparation, mulch, adapted seed mixes, mycorrhizal fungi inoculation, seeding during the late fall and early winter, and weed abatement are all ways to improve the chances of successful plant establishment (Institute for Land Rehabilitation 1978; Monsen 2000, 2005; Plummer 1977; Sheley et al. 2008). These steps are necessary to establish vegetation cover within five years in the "Sage" Sage-Grouse Core Breeding Area, as required by BLM (IM WY-2009-002).

The seed mixes are based on the various vegetation types that the ROW will cross (Figure 3) and NRCS ecological site descriptions that are available for parts of the ROW (Attachment A). The BLM seed mixes will be applied on private lands unless the landowner specifies another seed mix.

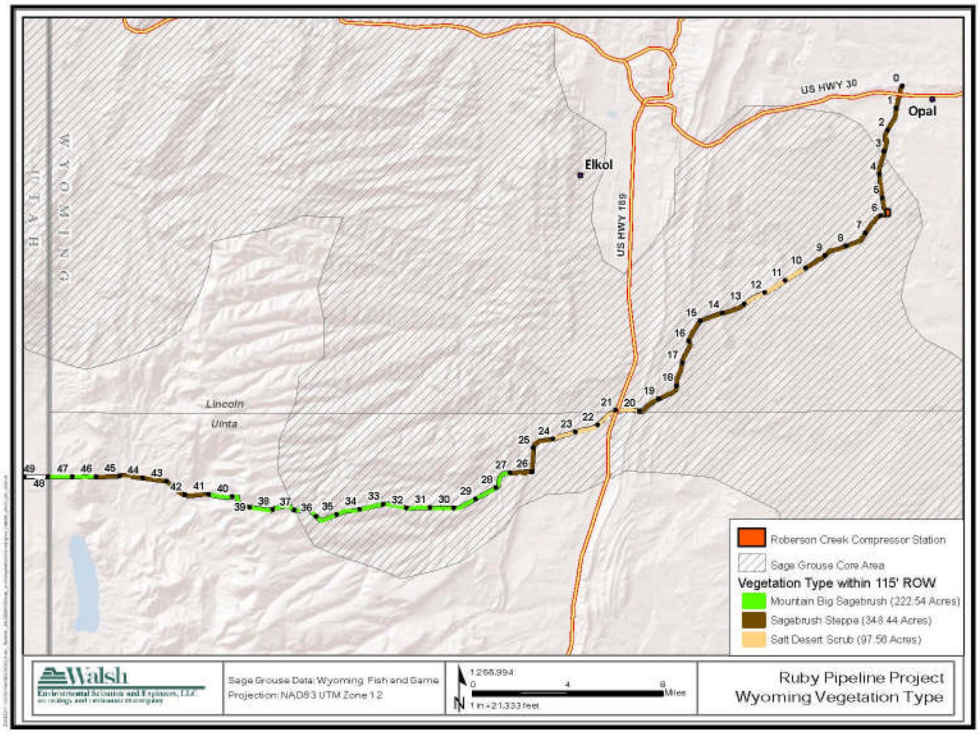

Figure 3 Vegetation map of the Ruby Pipeline in Lincoln and Uinta Counties

Tables 5.2-1, 5.2-2, and 5.2-3 present the seeding mixes for the salt-desert shrub, sagebrush steppe, and mountain big sagebrush vegetation types, respectively.

Table 5.2-1 Seed Mix for Salt-Desert Shrub Vegetation Type MP 10–13, 20–24

Species	Cultivar	Pure Live Seed Pounds per Acre
Western wheatgrass	Rosana	2.0
Indian ricegrass	Nexpar	2.0
Thickspike wheatgrass	Critana	1.0
Slender wheatgrass		1.0
Fourwing saltbush		2.0
Gardner’s saltbush		1.0
Winterfat		1.0

Table 5.2-1 Seed Mix for Salt-Desert Shrub Vegetation Type MP 10–13, 20–24

Species	Cultivar	Pure Live Seed Pounds per Acre
Common yarrow		0.5
Scarlet globemallow		0.5
TOTAL		**11.0**

Table 5.2-2 Seed Mix for Sagebrush Steppe Vegetation Type (including Low Sagebrush, Wyoming Big Sagebrush, and Basin Big Sagebrush Plant Communities) MP 0–10, 13–20, 24–27, 41–45, 48

Species	Cultivar	Pure Live Seed Pounds per Acre
Bluebunch wheatgrass	Goldar	4.0
Basin wildrye	Magnar	2.0
Thickspike wheatgrass	Critana	1.0
Western wheatgrass	Rosana	1.0
Indian ricegrass	Nespar	2.0
Needle-and-thread		2.0
Wyoming big sagebrush		2.0
Winterfat		0.25
Scarlet globemallow		0.25
Fourwing saltbush		**1.0**
Lewis' flax		**0.15**
Yarrow		**0.05**
TOTAL		**15.7**

Table 5.2-3 Seed Mix for Mountain Big Sagebrush Plant Community MP 28–40, 46–47

Species	Cultivar	Pure Live Seed Pounds per Acre
Bluebunch wheatgrass	Goldar	4.0
Basin wildrye	Magnar	2.0
Thickspike wheatgrass	Critana	1.0
Western wheatgrass	Rosana	1.0
Indian ricegrass	Nespar	2.0
Needle-and-thread		2.0
Mountain big sagebrush		2.0
Winterfat		0.25
Scarlet globemallow		0.25
Fourwing saltbush		1.0
Lewis' flax		0.15
TOTAL		**15.65**

Ruby will built the Roberson Creek Compressor Station (30.8 acres) in Lincoln County at MP 5.7. Table 5.2-4 presents a grass seed mix that will be used for buffer strips for water run-off quality control measures at the downstream edges of the compound. The standard seed mix appropriate for MP 5-6 will be applied to other areas in the compound that may require reseeding.

Table 5.2-4 Seed Mix for Roberson Creek Compressor Station Buffer Strips

Species	Cultivar	Pure Live Seed Pounds per Acre
Inland saltgrass	VNS	3
Thickspike wheatgrass	Critana	2
Idaho fescue	Joseph	2
Sheep fescue	Covar	2
Western wheatgrass	Rosana	3
Bluebunch wheatgrass	VNS	3
Sandberg bluegrass	Sherman	2
Alkali sacaton	VNS	2
Sand dropseed	VNS	1
TOTAL		**20.0**

Sagebrush Container-Grown Seedlings

Sagebrush seedlings per KFO requirements will be planted in habitats occupied by pygmy rabbits and within two miles of active leks. Density of seedlings will be 0.2 per square or 800 sagebrush seedlings per acre. To approximate natural islands that would help reseed adjacent sites, Ruby will plant small blocks of no more than 200 sagebrush seedlings at 328-foot (100 meter) intervals in sagebrush vegetation types. This equates to about 12 blocks per mile or 2,400 plants per mile of ROW or three acres of seedlings per mile of ROW. The taxon of the transplanted sagebrush seedlings will correspond to the sagebrush plant community. The seedlings will be watered-in as planted. DriWater pacs will be placed with the transplants according to manufacture instructions. Container-grown plants will be inoculated with AM 120 to help establish soil mycorrhizal. Seedling will be protected from grazing with Vexar (photodegradeable) tubing held in place with bamboo stakes.

Seeding Methods

The NRCS guidelines for seeding native plants in arid and semi-arid rangelands will be followed (Dreesen no date). These guidelines call for at least 20–40 pure live seeds per square foot for drilled seed. The number of pure live seed per square foot would be doubled for broadcast seedings.

The main purpose of all seeding methods is to place the seed in direct contact with the soil at average depths of 0.5 inch, but not exceeding a depth of one inch, to cover the seed with soil, and to firm the soil around the seed to eliminate air pockets. Some methods of seeding are more effective at seed placement than others. The type of terrain has an impact on the type of seeding method that is practicable; therefore, the exact method of seeding will be flexible. Seeding will be used in all areas that have replaced topsoil or surface fines, which will include all disturbed areas except exposed rock faces.

Direct (drill) seeding places seed into the soil at a uniform depth but can be normally used on slopes less than 15 percent. Local terrain and soil rockiness may also limit direct seeding. Depth bands will be used on the drilling equipment with consideration of drill row spacing. While drill seeding is the best method for seed placement, broadcast seeding will also provide effective seed placement where slope does not permit drill seeding. Broadcast seeding followed by harrowing can be as effective as direct seeding in covering the seed with soil.

Broadcast seeding may be accomplished with (1) a hand-operated, cyclone-type seeder; (2) a mechanical broadcast seeder attached to the imprinting device; or (3) a specially designed blower. This method distributes the seed on top of the surface without mulch. The seeds must be covered by raking or dragging a chain or harrow over the seedbed. Imprinting with straw punch treatment also may be used to place seed in the soil. The cyclone-type seeder can be used on any slope that can be reached by foot; however, the blow seeder is limited by equipment access.

Hydroseeding and hydromulching use water with a slurry of seed, mulch, and tackifier, if required by the KFO, which are sprayed over the restored topsoil surface. Hydroseeding alone sprays only the seed on the soil surface. This method often does not allow good soil-to-seed contact, leaves seed exposed to desiccating wind and temperatures, and increases seed loss by rodent and avian foraging. Both methods allow seeding and mulching of steep slopes if equipment has access to the area. Hydroseeding or mulching is useful to seed steep terrain with equipment access.

Seeding and Transplanting Timing

Seeds must be planted at the correct time. The seeding window is from September 15 to January 31. The optimum seeding window for sagebrush is September 15 to December 31; sagebrush establishment decreases if planted in January. Container-grown sagebrush seedlings will be transplanted from March 15 to April 30.

Soil Amendments and Weed Control

Soil amendments consist of fertilizers, wood or straw mulches, tackifying agents, or soil stabilizing emulsions. Ruby does not anticipate the need for application of fertilizers as part of its post-construction restoration activities because elevated levels of soil nitrogen may encourage weedy plant colonization (Sheley et al. 2008). Mycorrhizal fungi will be used to inoculate the soil to aid shrub establishment. Application of the mycorrhizal propagules will be in accordance with manufacturer's recommendations.

Ruby may use pre-emergent herbicide to minimize annual germination of weeds such as cheatgrass, medusahead rye, halogeton, and mustards, which will allow time for the perennial herbaceous species to become established (Shaw and Monsen 2000). Appropriate application rates will be determined by BLM or private landowner.

5.3 Little Round Mountain South Lek

From approximately MP 11.9 to 12.4, the ROW will cross through the no-surface-disturbance buffer (lek buffer) that extends 0.25 mile from the perimeter of the Little Round Mountain South Lek (Figure 3). Because the ROW will pass through the lek buffer and in accordance with the sage-grouse and pygmy rabbit conservation agreement (POD, Appendix S), KFO requires that Ruby inter-plant sagebrush seedlings within existing stands of crested wheatgrass on the Kern River ROW. The ROW from MP 9.2 to 15.2 will be planted with sagebrush seedlings at a density of 800 sagebrush seedlings per acre. Seedling species will correspond that of the sagebrush growing in adjacent areas to the ROW. The container-grown sagebrush seedlings will be transplanted from March 15 to April 30. Because crested wheatgrass is a strong competitor with other plant species, it will be necessary to remove plants within a two-foot radius (Pellant and Lysne 2005). An appropriate herbicide approved by the KFO will be used to reduce plant competition. Any vegetation growing within the two-foot radius will be treated annually as needed with an appropriate herbicide until the sagebrush plants are approximately the same size as sagebrush plants in the surrounding area. The Ruby ROW will be seeded with the appropriate seed mix, which is approximately 55.2 and 31.8 acres of sagebrush steppe and salt-desert shrub vegetation types, respectively (Attachment A).

Two no-surface-disturbance lek buffers are presented in Figure 3 to accommodate the BLM KFO Resources Management Plan (RMP) situation. The KFO is operating under the current RMP, which was amended by Maintenance Action #10-4, dated June 13, 2005, and specified that no surface disturbance will occur within 0.25 mile of a sage-grouse lek perimeter. However, the proposed RMP and Final Environmental Impact Statement (FEIS) for the KFO Planning Area dated August 2008—which has not been approved—states that no surface disturbance will occur within 0.6 mile of a sage-grouse lek perimeter. The 0.60-mile lek buffer will be effective once the proposed RMP/FEIS is approved.

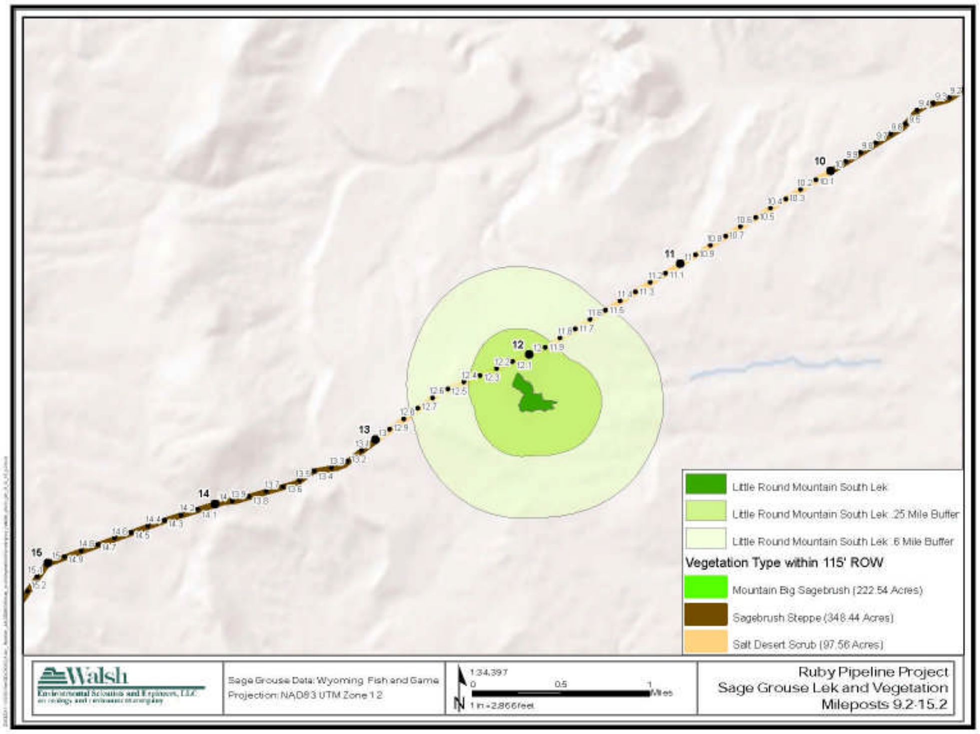

Figure 4 Proposed Ruby Route through the 0.25- and 0.60-Mile No-Surface-Disturbance Buffer from the Perimeter of the Little Round Mountain South Lek

5.4 Erodible Soils Restoration Treatment

Erodible soils have been identified in the Project area (see FEIS Section 4.2.1). Erodible soils may require additional restorative inputs to minimize wind and water erosion. The objective will be to rapidly stabilize erodible soils through the establishment of erosion control measures including a vegetation cover. Erosion control measures will include one or more techniques, such as a sterile annual grass or slender wheatgrass (6–8 pounds pure live seed per acre) per BLM policy, certified weed-free straw bales or wattles, fiber mats on highly erosive surfaces and steep slopes, silt fencing, water bars, soil tackifier, and/or wetting compounds to decrease erosion. Appropriate restoration action will commence immediately after trench closure.

6.0 Restoration Monitoring and Maintenance

The purpose of post-rehabilitation monitoring is to evaluate long-term soil stability, vegetative cover and density, habitat quality, and noxious and invasive weed densities. Restoration monitoring for the Ruby ROW will include both qualitative and quantitative analysis. Monitoring will occur for a minimum five years.

The primary objectives of monitoring are presented below.

- Assess the effectiveness of temporary and permanent erosion-control structures (e.g., slope breakers) to ensure the stability of the ROW and extra workspaces and to ensure that runoff is naturally controlled in place, with no accelerated erosion or wash-outs. Locations where additional remedial work may be required should be apparent and will be identified by MP. The monitoring of the ROW for significant and/or new erosion or third-party damage is an element of Ruby's routine aerial surveillance that will be conducted throughout the life of the pipeline. It is anticipated that any active erosion will be apparent during the first two years following restoration or after the first runoff event.
- Monitor and assess, through quantitative analysis, the success of the reseeding and transplanting efforts for years 1 through 5. Vegetation sampling plots will be used to measure plant density, cover, bare ground, and plant litter, in comparison with adjacent areas undisturbed by the Project.
- Monitor the survival of special plantings for visual restoration, if applicable, and the extent to which the restored ROW blends in with the adjacent undisturbed areas.
- Monitor the survival of special plantings for visual restoration, if applicable, and the extent to which the restored ROW blends in with the adjacent undisturbed areas.
- Monitor and assess targeted weeds in accordance with the Noxious and Invasive Weed Control Plan (Appendix H, POD). Newly established weed colonies will be reported to the KFO immediately. Identify places where other vegetation control may be needed. Note that with the exception of noxious and invasive weed control, vegetation maintenance, including mowing of non-agricultural lands or tree removal, is not anticipated. Ruby may selectively remove trees and large shrubs that could limit aerial surveillance or whose roots pose a risk to the integrity of the buried pipe.
- Monitor and identify other disturbances that may hinder reclamation success, such as excessive livestock grazing or unauthorized OHV travel. Determine ways to take corrective actions in consultation with the KFO and WGFD.
- Ruby will fund WGFD restoration Project oversight positions. The purpose of the positions will be to monitor post-construction reclamation and plant establishment,

unauthorized OHV activity, and excessive livestock grazing. Ruby will work with the WGFD to determine the appropriate level of funding. The position would be funded for a predetermined number of years, the cost and number of years of which would be agreed upon by Ruby and the WGFD.

6.1 Revegetation Performance Criteria

Upland revegetation of non-agriculture land will generally be considered successful when vegetation within the restored ROW supports non-noxious plants that are similar in forb, graminoid, and woody plant density and cover to those growing on adjacent lands undisturbed by the Project. Vegetation and erosion monitoring will occur for a minimum of five years. Additional monitoring will occur as necessary and agreed upon by Ruby and the KFO. Determination of ROW acreage restoration success will be the responsibility of the KFO based on monitoring data provided by Ruby.

Where initial reclamation and plant establishment efforts fail to make progress towards meeting plant establishment standards after year 3, reseeding may be necessary on portions of the ROW. Ruby will re-seed areas where initial plant establishment efforts fail. The KFO will be consulted with regards to any proposed changes in seeding mixes and application methods on federal lands. If successful plant establishment is not achieved within 10 years, appropriate compensatory mitigation will be discussed with the KFO.

A quantitative vegetative monitoring program will document the reclamation progress in the ROW. The KFO will be invited to participate in the selection of the monitoring and control plots. Monitoring plots will be established randomly within different vegetation types along the ROW and control plots on adjacent lands undisturbed by the Project. The monitoring and control plots will be similar in aspect, slope, and soils and approximately one acre in size. The control plots will have similar dimensions as the ROW monitoring plots and be established in undisturbed vegetation adjacent to the ROW. Global positioning system coordinates will located all plots within and outside the ROW.

Vegetation will be monitored by using a quadrant sampling (1 x 1 meters in size) method to assess species cover and density in the monitoring and control plots (Brower and Zar 1977, 69–73; Elzinga et al. 1998, 170–172). Approximately 25 quadrants will be randomly placed each in the monitoring and control plots to measure species density and cover. A one-tailed independent-sample t-test will compare total grass, forb, and woody plant density and cover between the monitoring and control plots.

Revegetation would be considered successful when ROW herbaceous and woody plant cover is 80 percent of herbaceous plant cover in the control plots. The degree of soil erosion and weed establishment will be judged in the reference and control plots using respective indicators from the rangeland health assessment procedures (Pellant et al. 2000). Negligible disturbance to soil, vegetation, and cultural resources within the ROW or control plots will occur during sampling. Sampling crews will be instructed not to disturb any cultural artifacts discovered while monitoring vegetation and soils.

6.2 Remedial Action and Maintenance

Ruby will address identified erosion problems as soon as practical based on evaluation of conditions outside the permanent ROW against the original erosion control work. Additional erosion control work will be performed as needed. It is also noted that temporary erosion control structures, such as straw bale or sediment barriers, will be removed when sites are deemed stable and restoration is determined to be successful.

Reseeding or replanting efforts, including supplemental mulching, if necessary, will occur in agreement with the landowner or KFO in any area where monitoring identifies a restoration failure, particularly where accompanied by observed increases in water or wind erosion or excessive OHV use. Noxious weed control is also included in maintenance and would be performed in accordance with Ruby's Noxious Weed Control Plan (Appendix H, POD).

6.3 Reporting

Ruby will document its observations of restoration success following the field inspections and will provide summary reports to the KFO, WGFD, and FERC. Areas that need remedial action will also be identified by MP and will include a description of additional erosion controls or restoration work anticipated. Reports, including a summary of corrective actions proposed, will be submitted within three months of identifying these conditions. Areas where control applications for noxious weeds are needed will also be reported.

7.0 Off-Highway Vehicle and Livestock Grazing Control

7.1 Restoration Treatments for Off-Highway Vehicle Access

The KFO, WGFD, and private landowners have expressed concern that the restored ROW will be used for unauthorized OHV travel, which could hinder reclamation efforts and promote erosion. To discourage OHV use of the ROW, Ruby will use the following deterrents, in consultation with KFO and WGFD:

- Leave the ROW surface in a roughened condition, especially within 200 feet from entryways such as roads;
- Establish "keep off" signs with an explanation at entryways onto the ROW;
- Install rock barriers, earthen berms, or other barricades at existing authorized OHV routes that cross the ROW;
- Work closely with the KFO and private landowners, grazing lessees, local law enforcement personnel, and adjacent landowners to monitor and eliminate unauthorized access to the ROW; and
- Maintain, repair, or replace countermeasures during the life of the Project.

7.2 Livestock Grazing Control

The Project will traverse livestock grazing allotments on BLM land. Succulent grass and forb growth could attract livestock. Excessive grazing may cause plant establishment efforts to fail. The following management practices for livestock grazing will be implemented.

- Leave the ROW surface in a roughened condition.
- Include low palatable plant species in the seed mix such as sagebrush and western yarrow.
- Negotiate with allotment permittees the need to limit livestock grazing in the ROW by implementing one or more of the following in areas where grazing becomes problematic: herding or placing salt licks and/or protein blocks one mile from the ROW, deferring grazing for three years, closing pastures, utilizing seasonal deferments, fencing, and/or reducing stocking preference. Ruby may compensate permittees if reduced stocking preference or pasture closures occur.

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A. Ecological Site Occurrence and Descriptive Information along the ROW in Wyoming

Table A-1 Wyoming NRCS Ecological Sites by Milepost Along the Right-of-Way. [1]

Mile-Post	Soil Mapping Unit	NRCS ID (Preliminary)	Precip. (Mean Annual)	Ecological Site Name	Dominant Graminoid	Dominant Forb	Dominant Shrub	Slope	Elevation (ft.)	County	BLM Provided Seed Mix
1		R034AY122 WY	7–9"	Gravelly	*Pseudoroegneria spicata Hesperostipa comata Achnatherum hymenoides*	*Achillea millefolium Antennaria rosea Arenaria sp.*	*Krascheninnikovia lanata Artemisia frigida Artemisia tridentata*	5–30%	6,000–7,200	Lincoln	Sagebrush steppe
2	265 C-2	RO34XY258 WY	10–14"	Shallow Clayey	*Pascopyrum smithii, Poa fendleriana, Elymus elymoides*	*Achillea milfolium, Allium textile, Sphaeralcea coccinea*	*Artemisia arbuscula ssp. longiloba, Atriplex gardneri, Krascheninnikovia lanata*	Range, 0–60%	6,500–7,500	Lincoln	Sagebrush steppe
3	265 C-1	RO34XY258 WY	10–14"	Shallow Clayey	*Pascopyrum smithii, Poa fendleriana, Elymus elymoides*	*Achillea milfolium, Allium textile, Sphaeralcea coccinea*	*Artemisia arbuscula ssp. longiloba, Atriplex gardneri, Krascheninnikovia lanata*	Range, 0–60%	6,500–7,500	Lincoln	Sagebrush steppe
4	-	Ecological site description not available	NA		Sagebrush steppe vegetation based on the E&E June 2009 field survey					Lincoln	Sagebrush steppe
5	-	Ecological site description not available			Sagebrush steppe vegetation based on the E&E June 2009 field survey					Lincoln	Sagebrush steppe

Table A-1 Wyoming NRCS Ecological Sites by Milepost Along the Right-of-Way. [1]

Mile-Post	Soil Mapping Unit	NRCS ID (Preliminary)	Precip. (Mean Annual)	Ecological Site Name	Dominant Graminoid	Dominant Forb	Dominant Shrub	Slope	Elevation (ft.)	County	BLM Provided Seed Mix
6	161 E-1	Ecological site description not available			Sagebrush steppe vegetation based on the E&E June 2009 field survey					Lincoln	Sagebrush steppe
7	-	Ecological site description not available			Sagebrush steppe vegetation based on the E&E June 2009 field survey					Lincoln	Sagebrush steppe
8	-	Ecological site description not available			Sagebrush steppe vegetation based on the E&E June 2009 field survey					Lincoln	Sagebrush steppe
9	-	Ecological site description not available			Sagebrush steppe vegetation based on the E&E June 2009 field survey					Lincoln	Sagebrush steppe
10	-	Ecological site description not available			Salt desert shrub vegetation based on the E&E June 2009 field survey					Lincoln	Salt-desert Shrub

Table A-1 Wyoming NRCS Ecological Sites by Milepost Along the Right-of-Way. [1]

Mile-Post	Soil Mapping Unit	NRCS ID (Preliminary)	Precip. (Mean Annual)	Ecological Site Name	Dominant Graminoid	Dominant Forb	Dominant Shrub	Slope	Elevation (ft.)	County	BLM Provided Seed Mix
11	-	Ecological site description not available			Salt desert shrub vegetation based on the E&E June 2009 field survey					Lincoln	Salt-desert Shrub
12	-	Ecological site description not available			Salt-desert shrub vegetation based on the E&E June 2009 field survey					Lincoln	Salt-desert Shrub
13	-	Ecological site description not available			Grassland vegetation based on the E&E June 2009 field survey					Lincoln	Sagebrush Steppe
14	-	Ecological site description not available			Grassland vegetation based on the E&E June 2009 field survey					Lincoln	Sagebrush Steppe
15	-	Ecological site description not available			Grassland vegetation based on the E&E June 2009 field survey					Lincoln	Sagebrush Steppe
16	-	Ecological site description not available			Sagebrush steppe vegetation based on the E&E June 2009 field survey					Lincoln	Sagebrush steppe

Table A-1 Wyoming NRCS Ecological Sites by Milepost Along the Right-of-Way. [1]

Mile-Post	Soil Mapping Unit	NRCS ID (Preliminary)	Precip. (Mean Annual)	Ecological Site Name	Dominant Graminoid	Dominant Forb	Dominant Shrub	Slope	Elevation (ft.)	County	BLM Provided Seed Mix
17	-	Ecological site description not available			Sagebrush steppe vegetation based on the E&E June 2009 field survey					Lincoln	Sagebrush Steppe
18	-	Ecological site description not available			Sagebrush steppe vegetation based on the E&E June 2009 field survey					Lincoln	Sagebrush steppe
19	-	Ecological site description not available			Sagebrush steppe vegetation based on the E&E June 2009 field survey					Lincoln	Sagebrush steppe
20	-	Ecological site description not available			Salt desert shrub vegetation based on the E&E June 2009 field survey					Lincoln	Salt-desert Shrub
21	-	Ecological site description not available			Salt desert shrub vegetation based on the E&E June 2009 field survey					Lincoln	Salt-desert Shrub

Table A-1 Wyoming NRCS Ecological Sites by Milepost Along the Right-of-Way. [1]

Mile-Post	Soil Mapping Unit	NRCS ID (Preliminary)	Precip. (Mean Annual)	Ecological Site Name	Dominant Graminoid	Dominant Forb	Dominant Shrub	Slope	Elevation (ft.)	County	BLM Provided Seed Mix
22	144	RO34AY144 WY	7–9"	Saline Upland	*Elymus elymoides, Acmnatherum hymenoides, Hesperostipa comata*	*Astragalus sp., Erigeron sp., Oenothera caespitosa*	*Atriplex gardneri, Picrothamnus desertorum, Artemisia pedatifida*	Range, 1–25% Average, 1–10%	6,000–7,200	Uinta	Salt-desert Shrub
23	144	RO34AY144 WY	7–9"	Saline Upland	*Elymus elymoides, Acmnatherum hymenoides, Hesperostipa comata*	*Astragalus sp., Erigeron sp., Oenothera caespitosa*	*Atriplex gardneri, Picrothamnus desertorum, Artemisia pedatifida*	Range, 1–25% Average, 1–10%	6,000–7,200	Uinta	Salt-desert Shrub
24	140	Ecological site description not available			Sagebrush steppe vegetation based on the E&E June 2009 field survey					Uinta	Sagebrush steppe
25	140	Ecological site description not available			Sagebrush steppe vegetation based on the E&E June 2009 field survey					Uinta	Sagebrush steppe
26	140	Ecological site description not available			Sagebrush steppe vegetation based on the E&E June 2009 field survey					Uinta	Sagebrush steppe

Table A-1 Wyoming NRCS Ecological Sites by Milepost Along the Right-of-Way. [1]

Mile-Post	Soil Mapping Unit	NRCS ID (Preliminary)	Precip. (Mean Annual)	Ecological Site Name	Dominant Graminoid	Dominant Forb	Dominant Shrub	Slope	Elevation (ft.)	County	BLM Provided Seed Mix
27	103	RO34AY222 WY	10–14"	Loamy	*Pascopyrum smithii, Pseudoroegneria spicata, Achnatherum lettermanii*	*Achillia millfolium, Antennaria rosea, Glycyrrhiza lepidota*	*Artemisia tridentata, Chrysothamnus viscidiflorus, Krascheninnokovia lanata*	Range, 0–30%	6,500–7,500	Uinta	Sagebrush Steppe
28	140	RO34AY144 WY								Uinta	Mountain big sagebrush
29	211	RO47XA430 UT	14–25"	Mountain Loam (Mountain Big Sagebrush)	*Acnatherum nelsonii, Hesperostipa comata, Pascopyrum smithii*	*Balsamorhiza sagittata, Crepis acuminata*	*Artemisia tridentata ssp. vaseyana, Eriogonum microthecum*	Range, 3–30%	7,000–9,500	Uinta	Mountain big sagebrush
30	225 211	Ecological site description not available			Sagebrush steppe vegetation based on the E&E June 2009 field survey					Uinta	Mountain big sagebrush
31	226 211	Ecological site description not available			Sagebrush steppe vegetation based on the E&E June 2009 field survey					Uinta	Mountain big sagebrush

Table A-1 Wyoming NRCS Ecological Sites by Milepost Along the Right-of-Way. [1]

Mile-Post	Soil Mapping Unit	NRCS ID (Preliminary)	Precip. (Mean Annual)	Ecological Site Name	Dominant Graminoid	Dominant Forb	Dominant Shrub	Slope	Elevation (ft.)	County	BLM Provided Seed Mix
32	226 211	Ecological site description not available			Sagebrush steppe vegetation based on the E&E June 2009 field survey					Uinta	Mountain big sagebrush
33	226 211	Ecological site description not available			Sagebrush steppe vegetation based on the E&E June 2009 field survey					Uinta	Mountain big sagebrush
34	226 211	Ecological site description not available			Sagebrush steppe vegetation based on the E&E June 2009 field survey					Uinta	Mountain big sagebrush
35	226 211	Ecological site description not available			Sagebrush steppe vegetation based on the E&E June 2009 field survey					Uinta	Mountain big sagebrush
36	-	Ecological site description not available			Sagebrush steppe vegetation based on the E&E June 2009 field survey					Uinta	Mountain big sagebrush

Table A-1 Wyoming NRCS Ecological Sites by Milepost Along the Right-of-Way. [1]

Mile-Post	Soil Mapping Unit	NRCS ID (Preliminary)	Precip. (Mean Annual)	Ecological Site Name	Dominant Graminoid	Dominant Forb	Dominant Shrub	Slope	Elevation (ft.)	County	BLM Provided Seed Mix
37	-	Ecological site description not available			Sagebrush steppe vegetation based on the E&E June 2009 field survey					Uinta	Mountain big sagebrush
38	-	Ecological site description not available			Sagebrush steppe vegetation based on the E&E June 2009 field survey					Uinta	Mountain big sagebrush
39	-	Ecological site description not available			Sagebrush steppe vegetation based on the E&E June 2009 field survey					Uinta	Mountain big sagebrush
40	212	RO47XC460 UT	14-20"	Mountain Stony Loam (Browse)	*Carex geyeri, Poa nevadensis, Pseudoroegneria spicata*	*Balsamorhiza sagittata*	*Amelanchier utahensis, Artemisia tridentata ssp. vaseyana, Cercocarpus montanus*	Range, 9–60%	6,800–9,400	Uinta	Mountain big sagebrush
41	106	RO34AY222 WY	10–14"	Loamy	*Pascopyrum smithii, Pseudoroegneria spicata, Achnatherum lettermanii*	*Achillia millfolium, Antennaria rosea, Glycyrrhiza lepidota*	*Artemisia tridentata, Chrysothamnus viscidiflorus, Krascheninnokovia lanata*	Range, 0–30%	6,500–7,500	Uinta	Sagebrush steppe

Table A-1 Wyoming NRCS Ecological Sites by Milepost Along the Right-of-Way. [1]

Mile-Post	Soil Mapping Unit	NRCS ID (Preliminary)	Precip. (Mean Annual)	Ecological Site Name	Dominant Graminoid	Dominant Forb	Dominant Shrub	Slope	Elevation (ft.)	County	BLM Provided Seed Mix
42	106	RO34AY222 WY	10–14"	Loamy	*Pascopyrum smithii, Pseudoroegneria spicata, Achnatherum lettermanii*	*Achillia millfolium, Antennaria rosea, Glycyrrhiza lepidota*	*Artemisia tridentata, Chrysothamnus viscidiflorus, Krascheninnokovia lanata*	Range, 0–30%	6,500–7,500	Uinta	Sagebrush Steppe
43	54	RO34AY256 WY	10–14"	Shallow Breaks	*Pseudoroegneria spicata Poa secunda Achnatherum hymenoides*	*Achillea millefolium Allium textile Antennaria rosea*	*Juniperus scopulorum Artemisia tridentata Artemisia nova*	1–70%	6,500–7,500	Uinta	Sagebrush Steppe
44	106 (104)	RO34AY222 WY	10–14"	Loamy	*Pascopyrum smithii, Pseudoroegneria spicata, Achnatherum lettermanii*	*Achillia millfolium, Antennaria rosea, Glycyrrhiza lepidota*	*Artemisia tridentata Chrysothamnus viscidiflorus, Krascheninnokovia lanata*	Range, 0–30%	6,500–7,500	Uinta	Sagebrush Steppe
45	202	RO47XA325 UT	12–16"	Upland Loamy Shale (Low Sagebrush)	*Acnatherum lettermanii, Elymus elymoides, Poa fendleriana*	*Aster occidentalis, Linum perenne, Phlox hoodii*	*Artemisia arbuscula ssp. arbuscula, Chrysothamnus viscidiflorus ssp. viscidiflorus, Eriogonum microthecum*	Range, 10–30%	6,200–7,700	Uinta	Sagebrush Steppe
46	102	RO47XC310 UT	9–14"	Upland Loam (Mountain big sagebrush)	*Herperostipa comata, Pascopyrum smithii, Poa nevadensis*	*Achillia millfolium, Allium acuminatum, Antennaria microphylla*	*Artemisia tridentata ssp. vaseyana, Purshia tridentata*	Range, 2–15%	6,200–8,000	Uinta	Mountain big sagebrush

Table A-1 Wyoming NRCS Ecological Sites by Milepost Along the Right-of-Way. [1]

Mile-Post	Soil Mapping Unit	NRCS ID (Preliminary)	Precip. (Mean Annual)	Ecological Site Name	Dominant Graminoid	Dominant Forb	Dominant Shrub	Slope	Elevation (ft.)	County	BLM Provided Seed Mix
47	102	RO47XC310 UT	9–14"	Upland Loam (Mountain big sagebrush)	*Herperostipa comata, Pascopyrum smithii, Poa nevadensis*	*Achillia millfolium, Allium acuminatum, Antennaria microphylla*	*Artemisia tridentata ssp. vaseyana, Purshia tridentata*	Range, 2–15%	6,200–8,000	Uinta	Mountain big sagebrush
48	202	RO47XA325 UT	12–16"	Upland Loamy Shale (Low Sagebrush)	*Acnatherum lettermanii, Elymus elymoides, Poa fendleriana*	*Aster occidentalis, Linum perenne, Phlox hoodii*	*Artemisia arbuscula ssp. arbuscula, Chrysothamnus viscidiflorus ssp. viscidiflorus, Eriogonum microthecum*	Range, 10–30%	6,200–7,700	Uinta	Sagebrush Steppe

[1] NRCS ecological site descriptions were not available for all mileposts. Therefore, vegetation types for mileposts lacking NRCS ecological site descriptions were based on the Ruby 2009 biological field survey. The Ruby biological field survey did not collect data on dominant graminoid, dominant forb, dominate shrub, precipitation, slope, and elevation as would be reported in a NRCS ecological site description.

Restoration and Revegetation Plan: Utah

RUBY PIPELINE LLC

FERC Docket No. CP09-54-000

June 2010

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List of Abbreviations and Acronyms

BSC	biological soil crust
BLM	Bureau of Land Management
FERC	Federal Energy Regulatory Commission
FEIS	Final Environmental Impact Statement
MP	milepost
NEPA	National Environmental Policy Act
NRCS	National Resource Conservation Service
OHV	off-highway vehicle
Plan	Restoration and Revegetation Plan
POD	Plan of Development
Project	Ruby Pipeline Project
ROW	right-of-way
Ruby	Ruby Pipeline, LLC
USDA	U.S. Department of Agriculture
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
UDWR	Utah Division of Wildlife Resources

1.0 Introduction

The Ruby Pipeline Project (Project), proposed by Ruby Pipeline, LLC (Ruby), is composed of approximately 675.2 miles of 42-inch diameter natural gas pipeline, along with associated compression and measurement facilities, located between Opal, Wyoming, and Malin, Oregon (see Figure 1). The Project would include an approximately 2.6-mile lateral, to be constructed north to the Malin Hub in Klamath County, Oregon. The Project right-of-way (ROW) would traverse four states: Wyoming, Utah, Nevada, and Oregon In addition to the existing King Compressor Station at Opal, Wyoming, Ruby proposes to install four new compressor stations for the Project: one located near the Opal Hub, one in western Utah, one near the mid-point of the Project north of Elko, Nevada, and one northwest of Winnemucca, Nevada.

Ruby would utilize a 115-foot-wide nominal construction ROW for installation of both the mainline and the lateral. A state-specific restoration and revegetation plan (Plan) is being developed for each of the states crossed by the Project. This plan is for Utah from milepost (MP) 48 to 233.

Federal lands that will be crossed include the Utah Bureau of Land Management (BLM), West Desert District; and U.S. Forest Service (USFS), Uinta-Wasatch-Cache National Forest. The focus of this Plan is federal lands. The Plan also applies to privately owned lands pending approval by landowners.

Ruby compiled a technical team to provide input on the Plans for each state. Ruby sought input from revegetation specialists from the BLM, USFS and Utah Division of Wildlife Resources (UDWR) in the development of this Plan.

This Plan utilizes restoration methods developed for other large-diameter pipeline projects that were approved by the Federal Energy Regulatory Commission (FERC) (Dames and Moore 1990; E & E 2007). Ruby has adapted and updated the Plan by incorporating recent technical standards and published long-term restoration monitoring information associated with similar habitats (E & E 2002, 2007). The Plan also incorporates Ruby's *Noxious and Invasive Weed Control Plan* and *Upland Erosion Control, Revegetation, and Maintenance Plan,* Appendices H and D, respectively, to the Plan of Development (POD).

Appendix P of the POD includes additional reclamation measures for specific visually sensitive areas and off-highway vehicle (OHV) control, as identified by the BLM and USFS during their review of this Plan. These measures include, but are not limited to, serrating the ROW's edge leaving shrubs and trees along the ROW edge to break up the perception of a straight line. Additional landowner or other land management agency requirements, as well as the special conditions and recommendations that FERC included in the Final Environmental Impact Statement (FEIS), will be incorporated into this Plan.

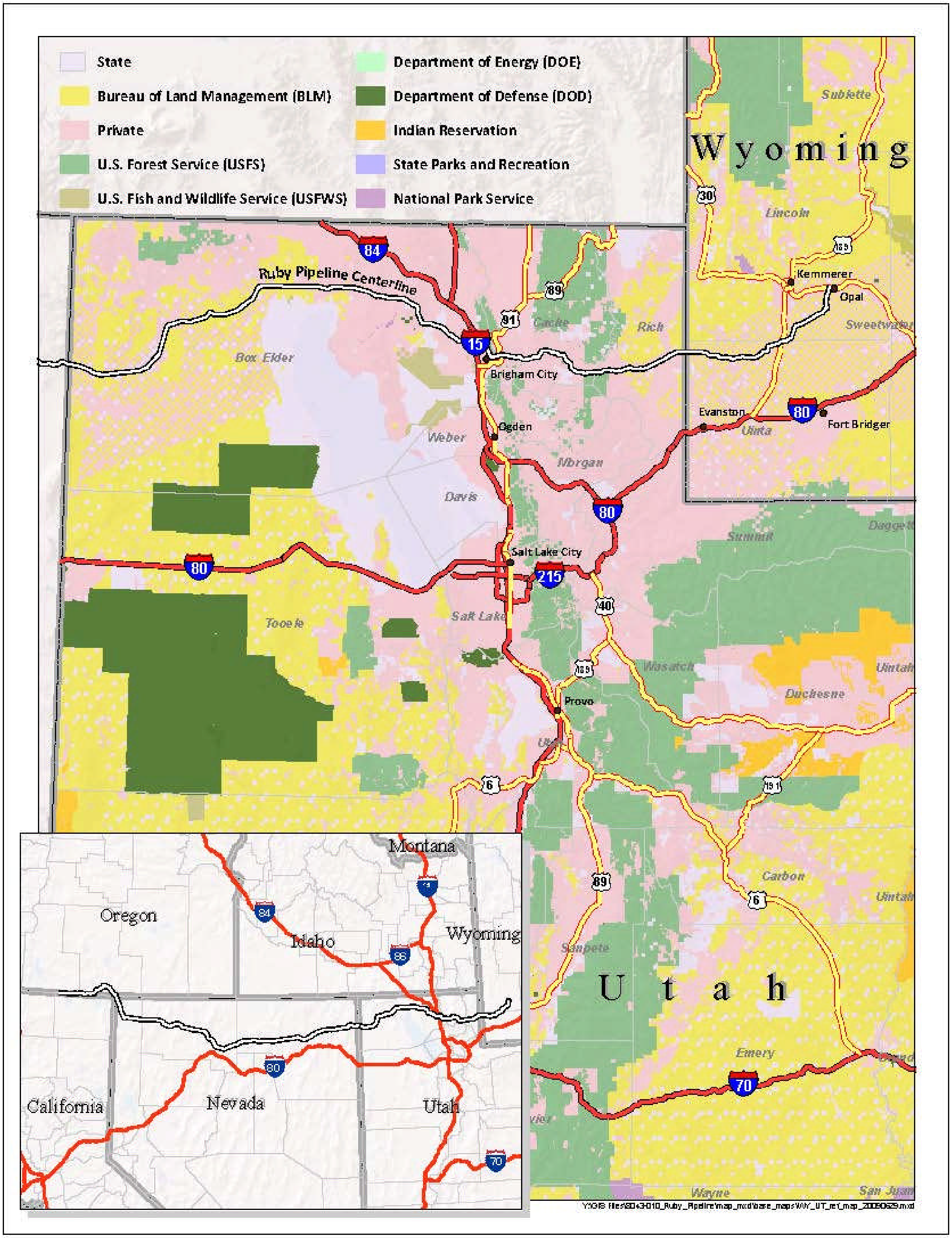

Figure 1 Ruby Pipeline Proposed Route in Utah

2.0 Purpose

The Plan describes the restoration and revegetation processes and measures that will be implemented following pipeline construction to mitigate impacts to habitats crossed by the Project in Rich, Cache, and Box Elder counties. This Plan applies to the ROW, extra workspaces, and sections of access roads that require restoration. No eligible or unevaluated cultural sites would be disturbed during restoration without a data recovery (mitigation) plan. Revegetation criteria standards are presented in Section 6.1 to judge plant establishment success. Installation of the Project would affect approximately 4,854 acres in Utah.

3.0 Plan Goals and Objectives

The short-term goal of pipeline ROW restoration is to stabilize soils by re-contouring the terrain, spreading stockpiled topsoil, strategically placing erosion control devices, establishing temporary vegetation cover as needed, and abating noxious and invasive weed establishment. ROW restoration would commence upon pipeline trench closure. The ROW will be recontoured to blend with adjacent undisturbed terrain. Erosion control devices such as water bars and/or Utah certified weed-free straw bales or wattles would be strategically placed to limit and/or direct overland water flow. Herbicide control of noxious or invasive weeds may be necessary following BLM or USFS regulations and timing.

Ruby's long-term restoration goal is to establish a perennial vegetation cover with species densities and compositions similar to those of adjacent lands undisturbed by the Project, in accordance with 18 CFR § 380.15 and FERC guidelines. Establishment of a perennial plant cover is essential to provide resiliency to resist invasive annual grasses and forbs and soil erosion control. The long-term goal would be achieved through maintaining or adding new or existing erosion control devices, continuing noxious and invasive weed abatement, minimizing livestock grazing, minimizing OHV travel, and implementing a monitoring program. Long-term restoration efforts would be deemed complete with successful establishment of the perennial plant cover. Determination of ROW restoration success would rest with the appropriate agencies (e.g. FERC, BLM, UDNR).

To meet short- and long-term restoration goals, Ruby would implement the following measures.

- Apply soil management techniques, including mowing the ROW vegetation, to provide construction vehicle access. Mowing or brush hogging will occur on relatively level terrain. Steep terrain will need to be contoured to create a safe working space. Mowed plant materials will be stockpiled for later use as mulch. Topsoil over the trench and areas where mowing does not occur will be removed, stockpiled, and redistributed on the trench. Soil management is targeted to enhance development of diverse, stable, and self-generating plant communities.
- Pre-treat the ROW with approved herbicides in applicable areas for noxious and invasive weeds abatement prior to pipeline construction.
- Minimize weed dispersal by following appropriate methods of abatement (Siegel and Donaldson 2003).
- Re-establish terrain to make it compatible with the surrounding landscape.
- Establish stable surface, drainage conditions, and erosion control devices to minimize soil erosion and sedimentation.

- Use native plant species for revegetation, unless it is determined that: (1) suitable native species are not available, (2) the natural biological diversity of the proposed action would not be diminished, (3) exotic and naturalized species can be confined within the proposed management area, or (4) analysis of the site indicate that native species are unable to compete with noxious and invasive weeds.
- Use seeds approved by the U.S. Department of Agriculture (USDA).Use no seeds from plants that are listed as noxious or invasive weeds by states or on the USDA federal list (PLANTS website).
- Monitor during the construction and operation phases to ensure the achievement of both short- and long-term restoration goals and objectives.
- Minimize construction impacts along the route by avoiding impacts to native vegetation, sage-grouse leks, and pygmy rabbit colonies, where it is practical and safe to do so.

4.0 Restoration Schedule

Construction on the Project is scheduled to begin late first quarter or early second quarter 2010. The main text of the POD will present specific information regarding construction procedures and timing. Pipeline construction is planned to be completed by March 1, 2011.

Restoration will include cleaning up, subsoil backfilling, surface grading, topsoiling, installing erosion control devices, preparing the seedbed, and establishing a native, perennial plant cover. Areas that will not be seeded within 14 days because of seasonal limitations, slopes greater than 10 percent, erosive soils, or aesthetically sensitive areas will be seeded with a sterile annual grass or slender wheatgrass immediately after seedbed preparation in accordance with Utah BLM West Desert District policy or Ruby will request an extension from the appropriate agency (e.g. FERC, BLM). The seeding or transplanting of native plants to establish the permanent vegetation cover will occur during late fall to early winter to take advantage of winter and spring precipitation (Monsen 2000, 2005; Plummer 1977). The temporary plant cover will be incorporated into the soil before the permanent plant cover is seeded.

5.0 Restoration Process

The restoration process includes steps to satisfy short- and long-term goals described in Section 3. This Plan incorporates lessons learned from the Kern Expansion Project restoration effort (E & E 2002, 2007) and the experiences of subject-matter experts in arid and semi-arid land restoration (Plummer 1977; Institute for Land Rehabilitation 1978; Wallace et al. 1980; Monsen 2000, 2005; EDAW 2002; Monsen et al. 2004; Sheley et al. 2008; and Bainbridge 2007). Considerable information is also available through the BLM's Great Basin Restoration Initiative projects (BLM 1999, 2000), which are applicable to the Utah ROW. Additionally, there is considerable information concerning revegetation techniques through the Native Seed Network (http://www.nativeseednetwork.org).

5.1 Restoration Study Plots

The Project will establish restoration study plots along the ROW to identify ways to improve the success of vegetation establishment in sagebrush-steppe and salt-desert shrub vegetation. Plant establishment in these vegetation types is challenging due to limited and unpredictable precipitation and invasive annual weeds out-competing desirable plants (Monsen 2000). Potential areas for study plots include the Hogup area and Terrace Basin. The focus of the research would be to improve sage-grouse, pygmy rabbit, and big game habitat by improving revegetation success through enhanced seed mixes, biological soil crust regeneration, and weed abatement. The study plots would be selected following clean-up and established and seeded in the fall of 2010. Federal and state agencies will be involved with Ruby in site selection and monitoring.

5.2 Restoration Treatments

This Plan is applicable to the ROWs, extra workspaces, and access roads in Utah. Reference to the ROW restoration is inclusive of extra workspaces and access roads. Measures implemented to ensure successful restoration include topsoil and subsoil management, cleanup, backfilling, appropriate surface re-contouring, soil erosion control, seedbed preparation, application of ecological site-specific seed mixes, plant establishment, weed abatement, and monitoring. Plants will be established mainly by seed from local sources, as available. Container-grown plants will be transplanted in locations such as key sage-grouse habitats where successful establishment may be expected (i.e., ecological sites with more than 10 inches of annual precipitation and soils deeper than six inches). Container-grown shrubs will be also planted to restore pygmy habitat around colonies identified on the ROW. Seeds will be purchased from commercial seed sources. Shrubs will be grown in containers for transplanting and would include shrubs such as little sagebrush, Wyoming sagebrush, basin big sagebrush, bitterbrush, rabbitbrush, and Utah serviceberry.

ROW alignments will have uneven or serrated edges by either leaving shrubs in place when clearing or planting shrub groupings after cleanup. Small water catchment basins will be established around each transplanted shrub.

5.2.1 Clearing, Grading, and Topsoil Removal

Initial construction activities include surveying and staking the construction ROW, mowing or brush hogging vegetation, and grading the ROW for safe construction passage, as described in the FEIS and POD. Mowed vegetation will be stockpiled to use as mulch after reseeding. The topsoil from the ditch-line areas not mowed because of terrain slope will be stockpiled. Dense stands of noxious and invasive weeds identified during 2009 field surveys conducted by Ecology and Environment, Inc., will be pretreated with an herbicide approved by the land management agency or landowner, as appropriate, before vegetation clearing begins.

Topsoil methods are discussed in Section 5.0 of the POD. Surface rocks, where present and useful for restoration, will be windrowed adjacent to the soil stockpiles. After backfilling and topsoiling, the rock will be placed on the construction ROW or in non-agricultural lands, in a manner that visually blends with the adjacent undisturbed area for use as erosion control (rock) mulch, or for OHV control if requested by the land management agency or the landowner. Rock will also be used to restore cliff faces or rock outcrops to retain the natural and visual character of the area. Such restoration on public land will be determined by the BLM or USFS. All excess rock, including rock excavated to the surface in active agricultural lands, will be removed and disposed of at a landowner- or agency-approved location.

During construction of the Project, all vehicle travel will be confined to the identified (approved) construction ROW and workspaces and approved access roads. Cross-country vehicle travel outside the approved construction ROW and workspaces or on non-approved, existing access roads will not be allowed.

5.2.2 Right-of-Way, Temporary Extra Workspaces, and Access Road Restoration

Restoration of the ROW will involve backfilling to the excavated trenchline, replacing subsoils, restoring pre-existing terrain contours, and distributing the topsoil of the ditchline, installing erosion control devices, preparing the seedbed, and seeding. ROW restoration will begin within 20 days after pipeline trench closure and final cleanup. ROW alignment will have an uneven edge by either leaving shrubs in place when clearing or randomly seeding/planting clumps of shrubs along the ROW perimeter (Visual Resources Plan, POD Appendix P).

Extra workspace restoration will follow similar steps as ROW restoration, including contouring, preparing the seedbed, and seeding. This restoration would occur within a few days after the area is no longer needed. The seed mix will be compatible with the surrounding vegetation.

Access roads will be reclaimed according to landowner directions. The BLM and UDWR have requested that all improved roads on public lands be returned to their original status after the road is no longer needed. Access road restoration would include removing previously added gravel, grading, preparing the seed bed, and seeding as appropriate. Road restoration will occur within a few days after the road is no longer needed. The seed mix will be compatible with the surrounding vegetation.

Backfilling

Backfilling of subsoil materials will be required after the pipeline is aligned in the trench and padded with screened subsoil or other appropriate materials. The excavated subsoils will be used to backfill the trench. To avoid settling of surface soils below the contours of adjacent lands, the backfill material will be mounded. Excessive ditch spoil will be feathered and blended across the construction corridor, creating a roughened surface to capture precipitation, decrease erosion, and provide safe sites for plant establishment.

Soil Decompaction

Compacted soils would typically be associated with the ROW travel lane, pipe laydown locations, and access roads. Subsoil will be decompacted as necessary to reduce soil bulk density. Identified locations will be decompacted to a minimum depth of 6–12 inches prior to surface soil replacement. “Soil ripping” will be performed along contours to minimize soil erosion and facilitate soil-water retention to aid revegetation. As needed, extra workspaces and access roads will also be ripped to reduce soil compaction.

Soils in western Box Elder County, Utah, may require compaction rather than decompaction following disturbance, especially in greasewood vegetation types. This will be accomplished using compacting equipment and dust control and tackifying agents to control the loose soils.

Recontouring

The ROW, extra workspaces, and access roads will be contoured to blend within the surrounding landscape. Contouring will emphasize restoration of existing drainage and landform patterns, to the extent practicable.

Topsoil and Mowed-Vegetation Replacement

The topsoil and mowed vegetation will be respread over the ROW from areas where it was stockpiled after recontouring is completed. The topsoil and mowed vegetation will provide seeds, vegetative propagules, or soil microbiota to facilitate vegetation establishment on the ROW.

Mulch

A mulch cover minimizes soil erosion, conserves soil moisture, and moderates surface temperatures to improve the chances of seedling establishment (Sheley et al. 2008). The BLM and USFS have requested that crimped straw mulch not be used for restoration purposes. However, to protect erodible soils, limited mulching materials such as certified weed-free straw, woodchips, soil tackifiers, and fabrics may be needed in localized areas. Additionally, mowed vegetation will be respread over the ROW to provide a seed source as well as a natural mulch. Only coarsely chopped vegetation will be used as mulch and will be applied at a rate so that approximately 25 percent of bare soil will be observed. Adequate sunlight is necessary to re-establish biological soil crusts (Jayne Belnap, USGS, telephone communication, January 29, 2010).

Soil Erosion Control

Soil erosion in areas such as steep slopes and erodible soils will be controlled through vegetation establishment, mulch, soil tackifiers, erosion control matting, and water control devices (Institute for Land Rehabilitation 1978; Sheley et al. 2008). Ruby will establish a desirable plant cover as quickly as possible following construction. Mulch, erosion control blankets, fiber mats, soil tackifiers, and water bars (slope breakers) will be used as appropriate. Water bars will likely be implemented often for controlling soil erosion because Ruby has found them to be effective, cost-efficient, and low maintenance.

Water bars or slope breakers are earth-berms established to control the flow of surface water (University of Minnesota Extension 1998). Water bars will be installed in all areas, except agricultural and pasture land and lawns, using spacing recommendations obtained from the local soil conservation authority or land management agency. In the absence of recommendations, Ruby will use the minimum spacing requirements outlined in Ruby's Upland Erosion Control and Revegetation, and Maintenance Plan (POD, Appendix D). Permanent water bars may extend slightly (about 4 feet) beyond the edge of the construction ROW to effectively drain water off the disturbed area. Where slope breakers extend beyond the edge of the construction ROW, they are subject to compliance with all applicable survey requirements.

Water bars will consist of a one-foot-high berm with an upslope swale. Water bars will be reseeded. Water bars will be gently angled downslope to divert stormwater runoff to a stable upland discharge point or to a "j" hook created at the outfall point.

The purposes of water bars are:

- To decrease overland water velocities through disturbed lands by reducing slope lengths;

- To remove water from the disturbed area in a controlled manner and at frequent intervals to reduce its erosive power;
- To direct water into a stabilized location to minimize surface scour;
- To maximize water infiltration along the Project ROW; and
- To slow water flow across the ROW to help maintain soil moisture for restoration efforts.

Noxious and Invasive Weed Abatement

Noxious and invasive weeds will reduce the success of ROW revegetation through competition for soil water, nutrients, space, and sunlight. Field crews have identified areas where noxious and invasive weeds occur within the ROW. The Noxious and Invasive Weed Control Plan (Appendix H, POD) will be followed for weed abatement.

Playas

A playa is a usually dry and nearly level lake plain that occupies the lowest parts of closed depressions, such as those occurring on intermontane basin floors (NRCS 2010). Temporary flooding occurs primarily in response to precipitation-runoff events. Playa deposits are fine grained and may or may not have high water table and saline conditions. Playas accumulate standing water because of low water infiltration rates. They usually occur in salt-desert shrub vegetation types with plants adapted to alkaline and saline soils.

Playas occur in Utah from MP 150 to 171. The Project will avoid playas to the extent possible. The majority of the construction would occur in the early summer to late fall timeframe, which should help minimize the chance of crossing playas when significant water is present. Playas that are disturbed by the Project would be returned to their preconstruction condition, to the extent practicable, through soil compaction using heavy equipment. However, these soils may need sufficient water for compaction and the proper soil moisture is difficult to achieve. Where the hardpan has been punctured, the addition of bentonite clay to the subsurface or bentonite patches may be useful in certain types of playas to restore preconstruction soil infiltration and drainage rates if compaction is not possible. Playas will be revegetated with vegetation similar to that occurring in pre-disturbed conditions.

The approach to playa restoration will also apply to spring and seep areas to prevent interception of subsurface water into the pipeline trench.

Wildlife Shelters

Large shrubs and trees that were removed during ROW clearing operations and stockpiled will be used to construct wildlife shelters (http://www.aces.edu/ pubs/docs/A/ANR-0785/). These shelters could be constructed after reseeding and container-grown plant placement as a wildlife habitat enhancement measure. Structure size will vary depending on the size of the shrubs and trees but will be as large as possible depending on the plant material available. The BLM and Utah Department of Fish and Wildlife, along with the environmental inspector and environmental monitor, will help determine the size and locations.

Biological Soil Crusts

Biological soil crusts (BSCs) are a complex mixture of cyanobacteria, green algae, lichens, mosees, microfungi, and other bacteria that live within the top one to two inches of the soil surface (Belnap et al. 2001). Other names for BSCs are cryptogramic, cryptobiotic, microbiotic, or microphytic soil crusts. BSCs are important for soil-surface stabilization, nutrient recycling, water infiltration, and enhanced seed germination. Concentrations of BSCs occur on silt loam or very fine sandy loam soil textures and in Wyoming big sagebrush and shadscale plant communities. BSCs have been identified at MP 170, but they are probably more widespread in sagebrush steppe and salt-desert shrub habitat.

Appropriate topsoil management will facilitate the restoration of BSCs (Jayne Belnap, USGS, telephone communication, January 29, 2010). Areas where vegetation mowing occurs will leave the soil intact along the ROW. However, construction vehicles will disturb portions of the ROW. Pockets of undisturbed soil will provide a source of propagules to re-establish BSCs on surrounding disturbed soils. In areas where topsoiling will occur, the top two inches of soil will be stockpiled separately from the remaining topsoil. The two-inch topsoil layer will be spread over the ROW surface after the remaining topsoil is spread. This layer of topsoil provides the incolum for BSC organisms. Broadcast seeding will then be conducted. Irrigating the ROW after seeding will help stabilize the soil surface until cyanobacteria are established. Re-establishment of vegetation along the ROW will also facilitate BSC restoration (Belnap et al. 2001).

5.2.3 Revegetation

Vegetation types within the Project area vary according to soil types, topography, climatic conditions, and land management practices. Several seed mixes will be used to accommodate the varying conditions along the route. These mixes are based on input from the Salt Lake City District BLM, USFS, UDWR, and private landowners. Other resources include the USDA-Natural Resources Conservation Service (NRCS) Plants Database (http://plants.usda.gov) and VegSpec (http://vegspec.nrcs.usda.gov/vegSpec/index.jsp), a decision support system for planning revegetation projects.

The proposed seed mixtures were designed to be compatible with the dominant vegetation and land uses currently found along the ROW. All disturbed areas will be seeded using the location-specific species and seeding rates for the various vegetation types found along the Project ROW, unless otherwise directed by a private landowner. The criteria used for selecting the seed mix were based on the following:

- Erosion-control capability,
- Plant dominance of surrounding vegetation,

- Land use,
- Availability of seed,
- Wildlife habitat value,
- Livestock management, and
- Restoration of traditional food and medicine gathered by Native Americans.

Seeds will be tested for purity and viability and certified as weed free to ensure compliance with local, state, and federal seed requirements (Monsen 2000).

Seedbed Preparation

Seedbed preparation will consist of decompacting, recontouring, and topsoil replacement, as described in Section 5.2.2, above. The ground surface will be manipulated by equipment to leave the soil surface in a roughened condition to enhance soil-water infiltration and seedling establishment by providing “safe sites” for seed germination (Monsen 2000, 2005). The seedbed will be firm but not compacted.

Seed Mixes

Seven seed mixtures are recommended for application on BLM lands (Table 5.2-1 through Table 5.2-6). The seed mixes are recommended for specific vegetation types. Table 5.2-7 presents a seed mix that will be applied in areas specified by BLM to develop fuel-breaks for wildland fire management. Table 5.2-8 is the seed mix for USFS land. The seed mixes will be also applied on private lands according to the vegetation type that should occur at each MP based NRCS ecological site descriptions unless the landowner requests a different seed mix. The Native Seed Network (http://www.nativeseednetwork.org) will be used to help identify native seed sources required for the seed mixes.

Table 5.2-1 Basin Big Sagebrush Seed Mix: Milepost 48–59, 123–131, 143–148, 153–156.

Species	Cultivar	PLS Seeding Rate, lbs/acre
Canby bluegrass	Canbar	2.0
Intermediate wheatgrass	Greenar	3.0
Western wheatgrass	Rosana	2.0
Indian ricegrass	Rimrock	2.0
Basin wildrye	Continental (Trailhead)	2.0
Basin big sagebrush		2.0
Winterfat		0.5
Yarrow	Occidentalis	0.2
Lewis flax	Maple grove	0.2
Scarlet globemallow		0.1
TOTAL		**14.0**

Table 5.2-2. Mountain Big Sagebrush Seed Mix: Milepost 65–74, 76–105, 114, 132–142.

Species	Cultivar	PLS Seeding Rate, lbs/acre
Bluebunch wheatgrass	Anatone (P7)	2.0
Intermediate wheatgrass	Greenar	3.0
Western wheatgrass	Rosana	2.0
Muttongrass	Nezpar	2.0
Basin wildrye	Continental (Trailhead)	2.0
Mountain big sagebrush		2.0
Saskatoon serviceberry		0.5
Little sagebrush		0.5
Yarrow	Occidentalis	0.2
Lewis flax	Maple grove	0.2
Mule’s ear		0.1
TOTAL		**14.5**

Table 5.2-3 Wyoming Big Sagebrush Seed Mix: Milepost 175–181, 190–194, 201–203

Species	Cultivar	PLS Seeding Rate, lbs/acre
Indian ricegrass	Rimrock	3.0
Intermediate wheatgrass	Greenar	3.0
squirreltail	Toe Jam Creek	2.0
Needle and thread		3.0
Wyoming big sagebrush		2.0
Utah Serviceberry		0.5
Yarrow	Occidentalis	0.2
Lewis flax	Maple grove	0.2
Scarlet globemallow		0.1
TOTAL		14.0

Table 5.2-4 Shadscale Seed Mix: Milepost 149–152.5, 157.5–163, 198–200, 222–227

Species	**Cultivar**	**PLS Seeding Rate, lbs/acre**
Indian ricegrass	Rimrock	3.0
Intermediate wheatgrass	Greenar	3.0
squirreltail	Toe Jam Creek	2.0
Needle and thread		3.0
Galleta grass	Viva florets	2.0
Shadscale		2.0
Winterfat		0.5
Yarrow	Occidentalis	0.2
Scarlet globemallow		0.1
TOTAL		**16.0**

Table 5.2-5 Black Sagebrush Seed Mix: Milepost 60–64, 182–189, 195–197, 204–210, 212.8–217.2, 218.2–222, 228–233.

Species	Cultivar	PLS Seeding Rate, lbs/acre
Indian ricegrass	Rimrock	3.0
Intermediate wheatgrass	Greenar	3.0
squirreltail	Toe Jam Creek	2.0
Galleta grass	Viva florets	2.0
Shadscale		2.0
Black sagebrush		2.0
Yarrow	Occidentalis	0.2
TOTAL		**14.2**

Table 5.2-6 Greasewood Seed Mix: Milepost 110–112, 116–119, 164.5–174

Species	Cultivar	PLS Seeding Rate, lbs/acre
Indian ricegrass	Rimrock	3.0
Intermediate wheatgrass	Greenar	3.0
squirreltail	Toe Jam Creek	2.0
Basin wildrye	Continental (Trailhead)	3.0
Galleta grass	Viva florets	2.0
Greasewood		2.0
Winterfat		1.0
TOTAL		**16.0**

Table 5.2-7 Fuel Break Mix: Milepost 106–108

Species	Cultivar	PLS Seeding Rate, lbs/acre
Crested wheatgrass		3.0
Siberian wheatgrass		2.0
Forage kochia		1.0
Western or thickspike wheatgrass		2.0
Lewis flax		0.75
Yarrow or suitable native forb		0.25
TOTAL		**9.0**

The ROW will cross through USFS land at MP 75. The USFS has requested that the following grass mix be used (Table 5.2-8).

Table 5.2-8 USFS Seed Mix: Milepost 75

Species	Cultivar	PLS Seeding Rate, lbs/acre
Mountain brome	Granet	13.0
Slender wheatgrass	Pryor	7.0
Thickspike wheatgrass	Bannock	3.0
Mountain lupine		0.4
Lewis blue flax	Maple grove	0.3
White yarrow		0.3
Total		**24.0**

Tables 5.2-9 through 5.2-15 present seed mixes that have been specified by private landowners to be applied by Ruby onto their lands.

Table 5.2-9 Coldwater Ranch, Inc. seed mix: Milepost 80.35–83.4

Species	Cultivar	PLS Seeding Rate, lbs/acre
Smooth brome		4
Intermediate wheatgrass		4
Tall fescue		1
Ranger Alfalfa		1
Sainfoin		1
TOTAL		**11.0**

Table 5.2-10. Dee's Inc. Seed Mix: Milepost 87.95–91.04

Species	Cultivar	PLS Seeding Rate, lbs/acre
Smooth brome		4
Intermediate wheatgrass		4
Tall fescue		1
Ranger alfalfa		1
Sainfoin		1
TOTAL		**11.0**

Table 5.2-11 Noel J. Bess Family Trust Seed Mix: Milepost 96.1–100.86

Species	Cultivar	PLS Seeding Rate, lbs/acre
Luna pubescent wheatgrass		9
Hycrest wheatgrass		4
Eski sainfoin		3
Fleet meadow brome		3
Delar small burnet		1
TOTAL		**20.0**

Table 5.2-12 Blaine Richins Seed Mix: Milepost 107.4–107.7

Species	Cultivar	PLS Seeding Rate, lbs/acre
Intermediate wheatgrass		3
Meadow Brome		3
Tall Fescue		3
Orchardgrass		3
Perennial ryegrass		3
Total		**15.0**

Table 5.2-13 Clark A. Siddoway et al. Seed Mix: Milepost 109.77–109.94

Species	Cultivar	PLS Seeding Rate, lbs/acre
Meadow bromegrass		6.25
Tall fescue		6.25
Orchardgrass		5
Perennial ryegrass		5
White clover		5
TOTAL		**27.5**

Table 5.2-14 Frank Rees Limited Partnership Seed Mix: Milepost 139.83–143.0

Species	Cultivar	PLS Seeding Rate, lbs/acre
Crested wheatgrass		3.0
Intermediate wheatgrass		4.0
Siberian wheatgrass		1.0
Western wheatgrass		3.0
Forage kochia		1.0
Alfalfa		1.0
TOTAL		**13.0**

Table 5.2-15 Russell Boyer et al. Seed Mix: Milepost 161–165

Species	Cultivar	PLS Seeding Rate, lbs/acre
Crested wheatgrass		4.0
Intermediate wheatgrass		3.0
Siberan wheatgrass		2.0
Western wheatgrass		1.0
Forage kochai		1.0
TOTAL		**11.0**

Ruby will build the Wildcat Hills Compressor Station (28.3 acres) in west Box Elder County at MP 172.5. Table 5.2-16 presents a grass seed mix that will be used for buffer strips for run-off quality control measures at the downstream edges of the compound. The standard seed mix appropriate for MP 172 will be applied to other areas in the compound that may require reseeding.

Table 5.2-16 Wildcat Hills Compressor Station Water Quality Buffer Strip Seed Mix: MP 80–35-83.4

Species	Cultivar	PLS Seeding Rate, lbs/acre
Indian ricegrass		3
Blue grama		3
Western wheatgrass		5
Plains bluegrass		3
Inland saltgrass		7
Squirreltail		7
Sand dropseed		2
Russian wildrye		3
Thickspike wheatgrass		3
Total		**36**

Shrub Transplants

Shrubs such as little sagebrush, Wyoming sagebrush, basin big sagebrush, bitterbrush, and Utah serviceberry will be grown in containers and transplanted during late fall or early winter into specific areas of high-quality sagebrush habitat (agreed upon by Ruby and the BLM) that receives at least 10 inches of average annual precipitation and soils are at least six inches deep. Areas of known pygmy rabbit colonies on the ROW will be revegetated with container-grown shrubs in addition to the appropriate the seed mix. Planting density in the non-pygmy rabbit areas will be approximately 20 by 20 feet. Planting density for the pygmy rabbit colonies would be 3 feet by 3 feet. Cages will be placed around the transplants to limit livestock and wildlife grazing. The shrubs will be planted into a small basin approximately 24 inches in diameter and four inches deep to concentrate precipitation and surface runoff neat the plant roots. Transplants will be watered monthly during the first growing season, as practical. Container-grown plants will be inoculated with AM 120 to help establish soil mycorrhizal and planted with DriWater gel pacs according to manufacture recommendations.

Seeding Methods

The NRCS guidelines for seeding native plants in arid and semi-arid rangelands will be followed (Dreesen nd. These guidelines call for at least 20–40 pure live seeds per square foot for drilled seed. The number of pure live seed per square foot would be doubled for broadcast seeding.

The main purpose of all seeding methods is to place the seed in direct contact with the soil at average depths of 0.5 inch, but not exceeding a depth of one inch, to cover the seed with soil, and to firm the soil around the seed in order to eliminate air pockets. Some methods of seeding are more effective at seed placement than others. The type of terrain has an impact on the type of seeding method that is practicable; therefore, the exact method of seeding will be flexible. Seeding will occur in all areas disturbed by the Project except exposed rock faces and some wetlands.

Direct (drill) seeding places seed into the soil at a uniform depth but can be normally used only on slopes less than 15 percent. However, terrain and soil rockiness may also limit direct seeding. Depth bands will be used on the drilling equipment with consideration of drill row spacing. While drill seeding is the best method for seed placement, broadcast seeding followed by imprinting or straw punching will also provide effective seed placement where slope does not permit drill seeding.

Broadcast seeding will be used in areas where direct seeding is not possible because of steep slopes, soil rockiness, or terrain limitations. Broadcast seeding may be accomplished with (1) a hand-operated, cyclone-type seeder; (2) a mechanical broadcast seeder; or (3) a specially designed blower. The applicator could be attached to all-terrain vehicle or hand seeded. This method distributes the seed on top of the surface without mulch. If possible, it is best if the seed is covered with soil by raking or dragging a chain or harrow over the seedbed. The cyclone-type seeder can be used on any slope that can be reached by foot; however, the blow seeder is limited by equipment access.

Hydroseeding/hydromulching uses water with a slurry of seed, mulch, and tackifier, if required by land management agencies, which are sprayed over the restored topsoil surface. Hydroseeding alone sprays only the seed on the soil surface. This method often does not allow good soil-to-seed contact, leaves seed exposed to desiccating wind and temperatures, and increases seed loss by rodent and avian foraging. Both methods are limited by equipment access.

Seeding and Transplanting Timing

Seeds must be planted at the correct time. The seeding window is from September 15 to January 31. The optimum seeding window for sagebrush is September 15 to December 31;

sagebrush establishment decreases if planted in January. Container-grown sagebrush seedlings will be transplanted from March 15 to April 30.

Soil Amendments and Weed Control

Soil amendments consist of fertilizers, wood or straw mulches, tackifying agents, or soil stabilizing emulsions. Ruby does not anticipate the need for application of fertilizers as part of its post-construction restoration activities because elevated levels of soil nitrogen may encourage weedy plant colonization (Sheley et al. 2008). Mycorrhizal fungi will be used to inoculate the soil to aid shrub establishment; soil microorganisms should remain viable during stockpiling. Application of the mycorrhizal inoculums such as AM 120 will be conducted in accordance with manufacturer's recommendations.

Ruby may use pre-emergent herbicide to minimize annual germination of weeds such as cheatgrass, medusahead rye, halogeton, and mustards, which will allow time for the perennial herbaceous species to become established (Shaw and Monsen 2000). Appropriate application rates will be determined by the land management agency or landowner. Weed control would be in compliance with the Noxious and Invasive Weed Control Plan (POD, Appendix H).

5.3 Erodible Soil Restoration Treatment

Erodible soils have been identified in the Project area (see FEIS Section 4.2.1). Erodible soils may require additional restorative inputs to minimize wind and water erosion. The objective will be to rapidly stabilize erodible soils through the establishment of erosion control measures including a vegetation cover. Erosion control measures will include one or more techniques such as a sterile annual grass or slender wheatgrass (at 6–8 pound PLS) certified weed-free straw bales or wattles, fiber mats, silt fencing, water bars, soil tackifier, and/or wetting compounds to decrease erosion. The application of a sterile annual grass or slender wheatgrass will be approved by the BLM, UDNR, or the landowner, as applicable. Sterile annual grass will not be used on USFS land. Appropriate reclamation action will commence immediately following recontouring and replacement of topsoil.

6.0 Restoration Monitoring and Maintenance

The purpose of restoration monitoring is to evaluate the short- and long-term soil stability, plant cover and density, habitat quality, and levels of noxious and invasive weeds. Ruby will ensure that BLM, USFS, UDNR, and landowners have the opportunity to participate in designing and carrying out post-restoration monitoring. Restoration monitoring for the Ruby ROW would include both qualitative and quantitative analysis. Monitoring would occur for at least five years.

The primary objectives of monitoring are as follows.

- Assess the effectiveness of temporary and permanent erosion-control structures (e.g., slope breakers) to ensure the soil-surface stability of the ROW and extra workspaces and to ensure that runoff is naturally controlled in place, with no accelerated erosion or wash-outs. Locations where additional remedial work may be required should be apparent and will be identified by MP. The monitoring of the ROW for significant and/or new erosion or third-party damage is an element of Ruby's routine aerial surveillance that will be conducted throughout the life of the pipeline. It is anticipated that any active erosion will be apparent during the first two years following restoration or after the first runoff event.
- Monitor and assess, through quantitative analysis, the success of the reseeding and transplanting efforts for the first through the fifth year. Additional monitoring beyond the fifth year may be necessary, as agreed upon by Ruby and the BLM. Vegetation sampling plots will be used to measure plant density, plant cover, bare ground, and plant litter, in comparison with adjacent areas not disturbed by the Project (Brower and Zar 1977, Elzinga et al. 1998).
- Monitor the survival of special plantings for visual restoration, if applicable, and the extent to which the restored ROW blends in with the adjacent undisturbed areas.
- Monitor and assess targeted weeds in accordance with the Noxious and Invasive Weed Control Plan (Appendix H, POD). Newly established weed colonies will be reported to the appropriate BLM or USFS office immediately. Identify places where other vegetation control may be needed. Note that with the exception of noxious and invasive weed control, vegetation maintenance, including mowing of non-agricultural lands and general tree removal, is not anticipated. Ruby may, however, selectively remove trees and large shrubs that could limit aerial surveillance or whose roots pose a risk to the buried pipe.

- Monitor and identify other disturbances that may hinder revegetation success, such as excessive livestock grazing or unauthorized OHV travel. Determine ways to take corrective actions in consultation with BLM, USFS, and UDWR.
- Ruby will fund UDNR restoration project oversight position. The purpose of the position would be to monitor post-construction Project reclamation and plant establishment, unauthorized OHV activity, and excessive grazing. The position would be funded for a predetermined number of years, the cost and number of years of which would be agreed upon by Ruby and UDNR.

6.1 Revegetation Performance Criteria

Upland revegetation of non-agriculture land will generally be considered successful when vegetation within the restored ROW supports non-noxious plants that are similar in forb, graminoid, and woody plant cover to those growing on adjacent undisturbed lands. However, determination of upland and other area reclamation success on federal lands rests with BLM. Where initial restoration and revegetation efforts fail to meet plant establishment standards, reseeding may be necessary on plots and portions of the ROW that fail to meet objectives. Ruby will re-seed areas where initial plant establishment efforts fail. The BLM or USFS will be contacted with regards to any proposed changes in seeding mixes and application methods. If successful plant revegetation is not achieved within ten years, appropriate compensatory mitigation will be discussed with the BLM. Revegetation would be considered successful when ROW herbaceous and woody plant covers are 80 and 60 percent of herbaceous and woody plant covers in the control plots, respectively.

A quantitative vegetative monitoring program will document the restoration progress in the ROW. BLM will be invited to participate in the selection of the monitoring and control plots. Monitoring plots will be established randomly within the different vegetation types along the ROW and control plots on adjacent lands not disturbed by the Project. The monitoring and control plots will be similar in aspect, slope, and soils and approximately one acre in size. The control plots will have dimensions similar to the ROW monitoring plots and will be established in undisturbed vegetation adjacent to the ROW. Global positioning system coordinates will located all plots within and outside the ROW. A quadrant sampling (1 x 1 meter in size) method will be used to assess species cover in the monitoring and control plots (Brower and Zar 1977, Elzinga et al. 1998). Approximately 25 quadrants will be randomly placed each in the monitoring and control plots to measure species density and cover. A one-tailed independent-sample t-test will compare total grass, forb, and woody plant density and cover between the monitoring and control plots. Negligible disturbance to soil and vegetation will occur during sampling.

Vegetation and erosion monitoring will occur for a minimum of five years. Additional monitoring will occur as necessary and agreed upon by Ruby and the land managing agency or landowner. The vegetation plots will be assessed each year after initial seeding is completed. The degree of soil erosion, weed establishment, and BSC restoration will be judged using respective indicators from the rangeland health assessment procedures (Pellant et al. 2000).

Re-seeding segments of the ROW where plant establishment is not making satisfactory progression after two years may need to occur. Additional seeding may be necessary because of low precipitation, excessive livestock grazing or OHV activity, and/or soil limitations such a sandy soil texture. Ruby will consult with the BLM, USFS, or private landowner to determine whether a change in the seed mix, seeding application rate, or seeding procedures is warranted.

6.2 Remedial Action and Maintenance

Ruby will address identified erosion problems as soon as practical based on evaluation of conditions outside the permanent ROW compared to the original erosion control work. Additional erosion control work will be performed as needed. Temporary erosion control structures, such as straw bale and sediment barriers, would be removed when sites are deemed stable and revegetation is determined to be successful.

Reseeding or replanting efforts, including supplemental mulching, if necessary, will occur in agreement with the landowner or land management agency in any area where monitoring identifies a restoration failure, particularly where accompanied by observed increases in water or wind erosion or excessive OHV use. Noxious and invasive weed control is also included in maintenance and would be performed in accordance with Ruby's Noxious and Invasive Weed Control Plan (POD, Appendix H).

6.3 Reporting

Ruby will document its observations of restoration success following the field inspections and provide summary reports to the BLM, USFS, UDNR, and FERC. Areas that need remedial action will also be identified by MP and will include a description of additional erosion controls or restoration work anticipated. Reports, including a summary of corrective actions proposed, will be submitted within three months of identifying these conditions. Areas where control applications for noxious weeds are needed will also be reported.

7.0 Off-Highway Vehicle and Grazing Control

7.1 Restoration Treatments for Off-Highway Vehicle Access

The BLM, USFWS, UDWR, and private landowners have expressed concern that the reclaimed ROW will be used for unauthorized OHV travel, which could thwart restoration efforts and promote erosion. To discourage OHV use of the ROW, Ruby will use the following deterrents, in consultation with the BLM, USFS, UDWR, and private landowners.

- Leave the ROW surface in a roughened condition, especially within 200 feet from entryways such as roads.
- Establish “keep off” signs with an explanation at entryways onto the ROW.
- Install rock barriers, earthen berms, or other barricades at existing authorized OHV routes that cross the ROW.
- Work closely with the BLM and private landowners, grazing lessees, local law enforcement personnel, and adjacent landowners to monitor and eliminate unauthorized access to the ROW.
- Ruby will maintain, repair, or replace countermeasures during the life of the Project.

7.2 Livestock Control

The Project will cross through livestock grazing allotments on BLM land. Succulent grass growth could attract grazing animals. Excessive grazing may cause plant establishment efforts to fail. The following management practices for livestock grazing may be implemented.

- Leave the ROW surface in a roughened condition.
- Include low palatable plant species in the seed mix, such as sagebrush and western yarrow.
- Negotiate with allotment permittees the need to limit livestock grazing in the ROW by implementing one or more of the following measures in areas where grazing becomes problematic: herding or placing salt licks and/or protein blocks at a one-mile distance from the ROW, deferring grazing for three years, closing pastures, utilizing seasonal deferments, fencing problematic areas, and/or reducing stocking preference. Ruby may compensate permittees if reduced stocking preference or pasture closures occur.
- Ruby will work cooperatively with the BLM to appropriately install fencing or other methods to insure reclamation success.

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Attachment A. Ecological Site Occurrence and Descriptive Information along the ROW in Utah

Table A-1 Utah Ecological Sites by Milepost with assigned Seed Mix

MP (7/10/09)	County	NRCS ID	Annual Precip. (inches)	Ecological Site Name	Dominant Graminoid	Dominant Forb	Dominant Shrub	Slope (%)	Elevation (ft)	Seed Mix (Private Owner Specified Seed Mix)
48	Rich	R034XY212UT	Ecological site description not available				Basin Big Sagebrush based on LANDFIRE existing vegetation cover			Basin big sagebrush
49	Rich	R034XY212UT	Ecological site description not available				Basin Big Sagebrush based on LANDFIRE existing vegetation cover			Basin big sagebrush

Table A-1 Utah Ecological Sites by Milepost with assigned Seed Mix

MP (7/10/09)	County	NRCS ID	Annual Precip. (inches)	Ecological Site Name	Dominant Graminoid	Dominant Forb	Dominant Shrub	Slope (%)	Elevation (ft)	Seed Mix (Private Owner Specified Seed Mix)
50	Rich	R034XY212UT	Ecological site description not available				Basin Big Sagebrush based on LANDFIRE existing vegetation cover			Basin big sagebrush
51	Rich	R034XY212UT	Ecological site description not available				Basin Big Sagebrush based on LANDFIRE existing vegetation cover			Basin big sagebrush
52	Rich	R047XB008UT	Ecological site description not available				Basin Big Sagebrush based on LANDFIRE existing vegetation cover			Basin big sagebrush

Table A-1 Utah Ecological Sites by Milepost with assigned Seed Mix

MP (7/10/09)	County	NRCS ID	Annual Precip. (inches)	Ecological Site Name	Dominant Graminoid	Dominant Forb	Dominant Shrub	Slope (%)	Elevation (ft)	Seed Mix (Private Owner Specified Seed Mix)
53	Rich	No Data	Ecological site description not available				Basin Big Sagebrush based on LANDFIRE existing vegetation cover			Basin big sagebrush (MP 53.88–54–03 Rafter J. Ranch seed mix, owner seeded)
54	Rich	R034XY212UT	Ecological site description not available				Basin Big Sagebrush based on LANDFIRE existing vegetation cover			Basin big sagebrush (MP 53.88–54–03 Rafter J. Ranch seed mix, owner seeded)

Table A-1 Utah Ecological Sites by Milepost with assigned Seed Mix

MP (7/10/09)	County	NRCS ID	Annual Precip. (inches)	Ecological Site Name	Dominant Graminoid	Dominant Forb	Dominant Shrub	Slope (%)	Elevation (ft)	Seed Mix (Private Owner Specified Seed Mix)
55	Rich	No Data	Ecological site description not available				Basin Big Sagebrush based on LANDFIRE existing vegetation cover			Basin big sagebrush (MP 53.88–54–03 Rafter J. Ranch seed mix, owner seeded)
56	Rich	No Data	Ecological site description not available				Basin Big Sagebrush based on LANDFIRE existing vegetation cover			Basin big sagebrush
57	Rich	R025XY314UT	Ecological site description not available	Upland Loam	Thurber's needlegrass	Nevada onion	yellow rabbitbrush	0–20	5,000–7,500	Basin big sagebrush
					Idaho fescue	low pussytoes	slender buckwheat			
					bluebunch wheatgrass	Torrey's milkvetch	antelope bitterbrush			

Table A-1 Utah Ecological Sites by Milepost with assigned Seed Mix

MP (7/10/09)	County	NRCS ID	Annual Precip. (inches)	Ecological Site Name	Dominant Graminoid	Dominant Forb	Dominant Shrub	Slope (%)	Elevation (ft)	Seed Mix (Private Owner Specified Seed Mix)
58	Rich	R034XY212UT	Ecological site description not available							Basin big sagebrush
59	Rich	No Data	Ecological site description not available							Basin big sagebrush
60	Rich	R035XY242UT	8–12	Semidesert Stony Loam (Shad-scale)	Indian ricegrass	woolly locoweed	Bigelow sage	30–50	4,600–6,900	Black sagebrush
					James' galleta	cushion buckwheat	shadscale saltbush			
					purple threeawn	many-branched ipomopsis	Torrey's jointfir			
61	Rich	R047XB252UT	8–12	Semidesert Stony Loam (Black sagebrush)	Indian ricegrass	freckled milkvetch	black sagebrush	2–25	5,000–6,800	Black sagebrush
					blue grama	James' cryptantha	big sagebrush			

Table A-1 Utah Ecological Sites by Milepost with assigned Seed Mix

MP (7/10/09)	County	NRCS ID	Annual Precip. (inches)	Ecological Site Name	Dominant Graminoid	Dominant Forb	Dominant Shrub	Slope (%)	Elevation (ft)	Seed Mix (Private Owner Specified Seed Mix)
					squirreltail	redroot buckwheat	winterfat			
62	Rich	R047XB252UT	8–12	Semidesert Stony Loam (Black sagebrush)	Indian ricegrass	freckled milkvetch	black sagebrush	2–25	5,000–6,800	Black sagebrush
					blue grama	James' cryptantha	big sagebrush			
					squirreltail	redroot buckwheat	winterfat			
63	Rich	R047XB252UT	8–12	Semidesert Stony Loam (Black sagebrush)	Indian ricegrass	freckled milkvetch	black sagebrush	2–25	5,000–6,800	Black sagebrush
					blue grama	James' cryptantha	big sagebrush			
					squirreltail	redroot buckwheat	winterfat			
64	Rich	R047XB252UT	8–12	Semidesert Stony Loam (Black sagebrush)	Indian ricegrass	freckled milkvetch	black sagebrush	2–25	5,000–6,800	Black sagebrush
					blue grama	James' cryptantha	big sagebrush			
					squirreltail	redroot buckwheat	winterfat			

Table A-1 Utah Ecological Sites by Milepost with assigned Seed Mix

MP (7/10/09)	County	NRCS ID	Annual Precip. (inches)	Ecological Site Name	Dominant Graminoid	Dominant Forb	Dominant Shrub	Slope (%)	Elevation (ft)	Seed Mix (Private Owner Specified Seed Mix)
65	Rich	No Data	Ecological site description not available				Basin Big Sagebrush based on LANDFIRE existing vegetation cover			Mountain big sagebrush
66	Rich	R025XY314UT	12–17	Upland Loam	Thurber's needlegrass	Nevada onion	yellow rabbitbrush	0–20	5,000–7,500	Mountain big sagebrush
					Idaho fescue	low pussytoes	slender buckwheat			
					bluebunch wheatgrass	Torrey's milkvetch	antelope bitterbrush			
67	Rich	R047XA461UT	13–18	Mountain Stony Loam (Mountain Big Sagebrush)	Letterman's needlegrass	common yarrow	mountain big sagebrush	5–70	5,500–8,400	Mountain big sagebrush
					slender wheatgrass	tapertip onion	alderleaf mountain mahogany			
					bluebunch wheatgrass	white sagebrush	antelope bitterbrush			

Table A-1 Utah Ecological Sites by Milepost with assigned Seed Mix

MP (7/10/09)	County	NRCS ID	Annual Precip. (inches)	Ecological Site Name	Dominant Graminoid	Dominant Forb	Dominant Shrub	Slope (%)	Elevation (ft)	Seed Mix (Private Owner Specified Seed Mix)
68	Rich	R025XY314UT	12–17	Upland Loam	Thurber's needlegrass	Nevada onion	yellow rabbitbrush	0–20	5,000–7,500	Mountain big sagebrush
					Idaho fescue	low pussytoes	slender buckwheat			
					bluebunch wheatgrass	Torrey's milkvetch	antelope bitterbrush			
69	Rich	R025XY314UT	12–17	Upland Loam	Thurber's needlegrass	Nevada onion	yellow rabbitbrush	0–20	5,000–7,500	Mountain big sagebrush
					Idaho fescue	low pussytoes	slender buckwheat			
					bluebunch wheatgrass	Torrey's milkvetch	antelope bitterbrush			
70	Rich	No Data	Ecological site description not available				Aspen forest and woodland based on LANDFIRE existing vegetation cover			Mountain big sagebrush

Table A-1 Utah Ecological Sites by Milepost with assigned Seed Mix

MP (7/10/09)	County	NRCS ID	Annual Precip. (inches)	Ecological Site Name	Dominant Graminoid	Dominant Forb	Dominant Shrub	Slope (%)	Elevation (ft)	Seed Mix (Private Owner Specified Seed Mix)
71	Rich	No Data	Ecological site description not available				Aspen forest and woodland based on LANDFIRE existing vegetation cover			Mountain big sagebrush
72	Rich	R047XA508UT	25–35	High Mountain Loam (Aspen)	NA	NA	NA	15–60	6,200–10,400	Mountain big sagebrush
73	Rich	No Data	Ecological site description not available				Aspen mixed conifer based on LANDFIRE existing vegetation cover			Mountain big sagebrush

Table A-1 Utah Ecological Sites by Milepost with assigned Seed Mix

MP (7/10/09)	County	NRCS ID	Annual Precip. (inches)	Ecological Site Name	Dominant Graminoid	Dominant Forb	Dominant Shrub	Slope (%)	Elevation (ft)	Seed Mix (Private Owner Specified Seed Mix)
74	Cache	No Data	Ecological site description not available				Aspen forest and woodland based on LANDFIRE existing vegetation cover			Mountain big sagebrush
75	Cache	No Data	Ecological site description not available				Aspen forest and woodland based on LANDFIRE existing vegetation cover			USFS seed mix

Table A-1 Utah Ecological Sites by Milepost with assigned Seed Mix

MP (7/10/09)	County	NRCS ID	Annual Precip. (inches)	Ecological Site Name	Dominant Graminoid	Dominant Forb	Dominant Shrub	Slope (%)	Elevation (ft)	Seed Mix (Private Owner Specified Seed Mix)
76	Cache	No Data	Ecological site description not available				Aspen mixed conifer based on LANDFIRE existing vegetation cover			Mountain big sagebrush
77	Cache	R047XA508UT	25–35	High Mountain Loam (Aspen)	NA	NA	NA	15–60	6,200–10,400	Mountain big sagebrush
78	Cache	R047XA454UT	13–19	Mountain Stony Clay (Slender Wheat-grass)	slender wheatgrass	common yarrow	mountain big sagebrush	3–30	4,500–8,000	Mountain big sagebrush
					basin wildrye	mule-ears	antelope bitterbrush			
					bluebunch wheatgrass	silverleaf milkvetch	little sagebrush			
79	Cache	R047XA504UT	25–30	High Mountain	California brome	tailcup lupine	little sagebrush	3–30	5,300–7,200	Mountain big

Table A-1 Utah Ecological Sites by Milepost with assigned Seed Mix

MP (7/10/09)	County	NRCS ID	Annual Precip. (inches)	Ecological Site Name	Dominant Graminoid	Dominant Forb	Dominant Shrub	Slope (%)	Elevation (ft)	Seed Mix (Private Owner Specified Seed Mix)
				Clay (Slender Wheat-grass)	slender wheatgrass	mule-ears	mountain snowberry			sagebrush
					basin wildrye	common yarrow	Saskatoon serviceberry			
80	Cache	F047XA508UT	25–35	High Mountain Loam (Aspen)	NA	NA	NA	15–60	6,200–10,400	Mountain big sagebrush (MP 80.35–83.4 Coldwater Ranch, Inc. seed mix)
81	Cache	F047XA508UT	25–35	High Mountain Loam (Aspen)	NA	NA	NA		6,200–10,400	Mountain big sagebrush (MP 80.35–83.4 Coldwater Ranch, Inc. seed mix)
	Cache									

Table A-1 Utah Ecological Sites by Milepost with assigned Seed Mix

MP (7/10/09)	County	NRCS ID	Annual Precip. (inches)	Ecological Site Name	Dominant Graminoid	Dominant Forb	Dominant Shrub	Slope (%)	Elevation (ft)	Seed Mix (Private Owner Specified Seed Mix)
82	Cache	F047XA508UT	25–35	High Mountain Loam (Aspen)	NA	NA	NA	15–60	6,200–10,400	Mountain big sagebrush (MP 80.35–83.4 Coldwater Ranch, Inc. seed mix)
83	Cache	R047XA442UT	12–19	Mountain Shallow Loam (Low Sagebrush)	squirreltail	common yarrow	little sagebrush	30–60	6,000–8,500	Mountain big sagebrush (MP 80.35–83.4 Coldwater Ranch, Inc. seed mix)
					needle and thread	Torrey's cryptantha	Saskatoon serviceberry			
					muttongrass	shortstem buckwheat	mountain big sagebrush			
84	Cache	R047XA454UT	13–19	Mountain Stony Clay (Slender Wheatgrass)	slender wheatgrass	common yarrow	mountain big sagebrush	3–30	4,500–8,000	Mountain big sagebrush (Add forage Kochia at
					basin wildrye	mule-ears	antelope bitterbrush			

Table A-1 Utah Ecological Sites by Milepost with assigned Seed Mix

MP (7/10/09)	County	NRCS ID	Annual Precip. (inches)	Ecological Site Name	Dominant Graminoid	Dominant Forb	Dominant Shrub	Slope (%)	Elevation (ft)	Seed Mix (Private Owner Specified Seed Mix)
					bluebunch wheatgrass	silverleaf milkvetch	little sagebrush			3.0 lbs pls/acre)
85	Cache	No Data	Ecological site description not available				Aspen forest and woodland based on LANDFIRE existing vegetation cover			Mountain big sagebrush
86	Cache	F047XA508UT	25–35	High Mountain Loam (Aspen)	NA	NA	NA	15–60	6,200–10,400	Mountain big sagebrush

Table A-1 Utah Ecological Sites by Milepost with assigned Seed Mix

MP (7/10/09)	County	NRCS ID	Annual Precip. (inches)	Ecological Site Name	Dominant Graminoid	Dominant Forb	Dominant Shrub	Slope (%)	Elevation (ft)	Seed Mix (Private Owner Specified Seed Mix)
87	Cache	No Data		Ecological site description not available					Aspen Forest and woodland based on LANDFIRE existing vegetation cover	Mountain big sagebrush (MP 87.95–91.04 Dee's Inc. seed mix)
88	Cache	R047XA440UT	19–27	Mountain Shallow Loam (Curl-leaf Mountain Mahogany)	muttongrass	common yarrow	little sagebrush	30–70	5,200–8,500	Mountain big sagebrush (MP 87.95–91.04 Dee's Inc. seed mix)
					bluebunch wheatgrass	littleleaf pussytoes	curl-leaf mountain mahogany			
					Indian ricegrass	arrowleaf balsamroot	antelope bitterbrush			
89	Cache	R047XA440UT	19–27	Mountain Shallow Loam (Curl-leaf Mountain	muttongrass	common yarrow	little sagebrush	30–70	5,200–8,500	Mountain big sagebrush (MP 87.95–91.04 Dee's
					bluebunch wheatgrass	littleleaf pussytoes	curl-leaf mountain mahogany			

Table A-1 Utah Ecological Sites by Milepost with assigned Seed Mix

MP (7/10/09)	County	NRCS ID	Annual Precip. (inches)	Ecological Site Name	Dominant Graminoid	Dominant Forb	Dominant Shrub	Slope (%)	Elevation (ft)	Seed Mix (Private Owner Specified Seed Mix)
				Mahogany)	Indian ricegrass	arrowleaf balsamroot	antelope bitterbrush			Inc. seed mix)
90	Cache	R047XA440UT	19–27	Mountain Shallow Loam (Curl-leaf Mountain Mahogany)	muttongrass	common yarrow	little sagebrush	30–70	5,200–8,500	Mountain big sagebrush (MP 87.95–91.04 Dee's Inc. seed mix)
					bluebunch wheatgrass	littleleaf pussytoes	curl-leaf mountain mahogany			
					Indian ricegrass	arrowleaf balsamroot	antelope bitterbrush			
91	Cache	R047XA430UT	25–30	High Mountain Clay (Slender Wheatgrass)	basin wildrye	common yarrow	mountain big sagebrush	2–60	5,100–8,400	Mountain big sagebrush (MP 87.95–91.04 Dee's Inc. seed mix)
					bluebunch wheat-grass	white sagebrush	Saskatoon serviceberry			
					Indian ricegrass	silverleaf milkvetch	alderleaf mountain mahogany			

Table A-1 Utah Ecological Sites by Milepost with assigned Seed Mix

MP (7/10/09)	County	NRCS ID	Annual Precip. (inches)	Ecological Site Name	Dominant Graminoid	Dominant Forb	Dominant Shrub	Slope (%)	Elevation (ft)	Seed Mix (Private Owner Specified Seed Mix)
92	Cache	No Data	Ecological site description not available				Curl-leaf mtn mahogany woodland based on LANDFIRE existing vegetation cover			Mountain big sagebrush
93	Cache	No Data	Ecological site description not available				Pinyon-juniper woodland based on LANDFIRE existing vegetation cover			Mountain big sagebrush
94	Cache	R047XA454UT	13–19	Mountain Stony Clay (Slender	slender wheat-grass	common yarrow	mountain big sagebrush	3–30	4,500–8,000 ft.	Mountain big sagebrush

Table A-1 Utah Ecological Sites by Milepost with assigned Seed Mix

MP (7/10/09)	County	NRCS ID	Annual Precip. (inches)	Ecological Site Name	Dominant Graminoid	Dominant Forb	Dominant Shrub	Slope (%)	Elevation (ft)	Seed Mix (Private Owner Specified Seed Mix)
				Wheat-grass)	basin wildrye	mule-ears	antelope bitterbrush			
					bluebunch wheat-grass	silverleaf milkvetch	little sagebrush			
95	Cache	R047XA434UT	13–19	Mountain Loam (Shrub)	slender wheatgrass	nettleleafgiant hyssop	Saskatoon serviceberry	15–70	5,000–8,000	Mountain big sagebrush
					bluebunch wheat-grass	arrowleaf balsamroot	mountain big sagebrush			
					Letterman's needlegrass	tapertip hawksbeard	antelope bitterbrush			
96	Cache	R047XA434UT	13–19	Mountain Loam (Shrub)	slender wheatgrass	nettleleafgiant hyssop	Saskatoon serviceberry	15–70	5,000–8,000	Mountain big sagebrush (MP 96.1–100.85 Noel J. Bess Family Trust seed mix)
					bluebunch wheatgrass	arrowleaf balsamroot	mountain big sagebrush			
					Letterman's needlegrass	tapertip hawksbeard	antelope bitterbrush			
97	Cache	R047XA434UT	13–19	Mountain Loam	slender wheatgrass	nettleleafgiant hyssop	Saskatoon serviceberry	15–70	5,000–8,000	Mountain big

Table A-1 Utah Ecological Sites by Milepost with assigned Seed Mix

MP (7/10/09)	County	NRCS ID	Annual Precip. (inches)	Ecological Site Name	Dominant Graminoid	Dominant Forb	Dominant Shrub	Slope (%)	Elevation (ft)	Seed Mix (Private Owner Specified Seed Mix)
				(Shrub)	bluebunch wheatgrass	arrowleaf balsamroot	mountain big sagebrush			sagebrush (MP 96.1–100.85 Noel J. Bess Family Trust seed mix)
					Letterman's needlegrass	tapertip hawksbeard	antelope bitterbrush			
98	Cache	R047XA504UT	25–30	High Mountain Clay (Slender Wheatgrass)	California brome	tailcup lupine	little sagebrush	3–30	5,300–7,200	Mountain big sagebrush (MP 96.1–100.85 Noel J. Bess Family Trust seed mix)
					slender wheatgrass	mule-ears	mountain snowberry			
					basin wildrye	common yarrow	Saskatoon serviceberry			
99	Cache	R047XA461UT	13–18	Mountain Stony Loam (Mountain Big Sagebrush)	Letterman's needlegrass	common yarrow	mountain big sagebrush	5–70	5,500–8,400	Mountain big sagebrush (MP 96.1–100.85 Noel J. Bess
					slender wheatgrass	tapertip onion	alderleaf mountain mahogany			

Table A-1 Utah Ecological Sites by Milepost with assigned Seed Mix

MP (7/10/09)	County	NRCS ID	Annual Precip. (inches)	Ecological Site Name	Dominant Graminoid	Dominant Forb	Dominant Shrub	Slope (%)	Elevation (ft)	Seed Mix (Private Owner Specified Seed Mix)
					bluebunch wheatgrass	white sagebrush	antelope bitterbrush			Family Trust seed mix)
100	Cache	R047XA461UT	13–18	Mountain Stony Loam (Mountain Big Sagebrush)	Letterman's needlegrass	common yarrow	mountain big sagebrush	5–70	5,500–8,400	Mountain big sagebrush (MP 96.1–100.85 Noel J. Bess Family Trust seed mix)
					slender wheatgrass	tapertip onion	alderleaf mountain mahogany			
					bluebunch wheatgrass	white sagebrush	antelope bitterbrush			
101	Box Elder	R047XA446UT	17–24	Mountain Shallow Loam (Mountain Big Sagebrush)	Columbia needlegrass	common yarrow	mountain big sagebrush	3–70	5,200–8,500	Mountain big sagebrush
					squirreltail	silverleaf milkvetch	antelope bitterbrush			
					western wheatgrass	arrowleaf balsamroot	mountain snowberry			
102	Box Elder	R047XA430UT	25–30	High Mountain Clay	basin wildrye	common yarrow	mountain big sagebrush	2–60	5,100–8,400	Mountain big sagebrush

Table A-1 Utah Ecological Sites by Milepost with assigned Seed Mix

MP (7/10/09)	County	NRCS ID	Annual Precip. (inches)	Ecological Site Name	Dominant Graminoid	Dominant Forb	Dominant Shrub	Slope (%)	Elevation (ft)	Seed Mix (Private Owner Specified Seed Mix)
				(Slender Wheatgrass)	bluebunch wheatgrass	white sagebrush	Saskatoon serviceberry			
					Indian ricegrass	silverleaf milkvetch	alderleaf mountain mahogany			
103	Box Elder	R047XA430UT	25–30	High Mountain Clay (Slender Wheatgrass)	basin wildrye	common yarrow	mountain big sagebrush	2–60	5,100–8,400	Mountain big sagebrush
					bluebunch wheatgrass	white sagebrush	Saskatoon serviceberry			
					Indian ricegrass	silverleaf milkvetch	alderleaf mountain mahogany			
104	Box Elder	R047XA442UT	12–19	Mountain Shallow Loam (Low Sagebrush)	squirreltail	common yarrow	little sagebrush	30–60	6,000–8,500	Mountain big sagebrush
					needle and thread	Torrey's cryptantha	Saskatoon serviceberry			
					muttongrass	shortstem buckwheat	mountain big sagebrush			

Table A-1 Utah Ecological Sites by Milepost with assigned Seed Mix

MP (7/10/09)	County	NRCS ID	Annual Precip. (inches)	Ecological Site Name	Dominant Graminoid	Dominant Forb	Dominant Shrub	Slope (%)	Elevation (ft)	Seed Mix (Private Owner Specified Seed Mix)
105	Box Elder	R047XA442UT	12–19	Mountain Shallow Loam (Low Sagebrush)	squirreltail	common yarrow	little sagebrush	30–60	6,000–8,500	Mountain big sagebrush
					needle and thread	Torrey's cryptantha	Saskatoon serviceberry			
					muttongrass	shortstem buckwheat	mountain big sagebrush			
106	Box Elder	No Data	Ecological site description not available				Xeric mixed sagebrush shrubland based on LANDFIRE existing vegetation cover			Fuel Break

Table A-1 Utah Ecological Sites by Milepost with assigned Seed Mix

MP (7/10/09)	County	NRCS ID	Annual Precip. (inches)	Ecological Site Name	Dominant Graminoid	Dominant Forb	Dominant Shrub	Slope (%)	Elevation (ft)	Seed Mix (Private Owner Specified Seed Mix)
107	Box Elder	No Data	Ecological site description not available				Pinyon-juniper woodland based on LANDFIRE existing vegetation cover			Fuel Break (MP 107.4–107.7 Blaine Richins seed mix)
108	Box Elder	No Data	Ecological site description not available				Basin Big Sagebrush based on LANDFIRE existing vegetation cover			Fuel Break

Table A-1 Utah Ecological Sites by Milepost with assigned Seed Mix

MP (7/10/09)	County	NRCS ID	Annual Precip. (inches)	Ecological Site Name	Dominant Graminoid	Dominant Forb	Dominant Shrub	Slope (%)	Elevation (ft)	Seed Mix (Private Owner Specified Seed Mix)
109	Box Elder	No Data	Ecological site description not available				Agriculture-cultivated crop and irrigated pasture based on LANDFIRE existing vegetation cover			Landowner defined (MP 109.77–109.94 Clark A. Siddoway et al. seed mix)
110	Box Elder	No Data	Ecological site description not available				Agriculture-cultivated crop and irrigated pasture based on LANDFIRE existing vegetation cover			Greasewoo d

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MP (7/10/09)	County	NRCS ID	Annual Precip. (inches)	Ecological Site Name	Dominant Graminoid	Dominant Forb	Dominant Shrub	Slope (%)	Elevation (ft)	Seed Mix (Private Owner Specified Seed Mix)
111	Box Elder	R028AY024UT	8–14	Wet Saline Meadow	Nebraska sedge	silverweed cinquefoil	iodinebush	0–2	3,000–6,500	Greasewood
					clustered field sage	meadow milkvetch	whiteflower rabbitbrush			
					saltgrass	showy milkweed	yellow rabbitbrush			
112	Box Elder	R028AY132UT	5–8	Desert Flat (shadscale)	Indian ricegrass	scarlet globemallow	shadscale saltbush	0–3	4,200–4,800	Greasewood
					squirreltail	roundspike cryptantha	green molly			
					James' galleta	clasping pepperweed	trailing krameria			

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MP (7/10/09)	County	NRCS ID	Annual Precip. (inches)	Ecological Site Name	Dominant Graminoid	Dominant Forb	Dominant Shrub	Slope (%)	Elevation (ft)	Seed Mix (Private Owner Specified Seed Mix)
113	Box Elder	No Data	Ecological site description not available				Agriculture-cultivated crop and irrigated pasture based on LANDFIRE existing vegetation cover			Landowner defined
114	Box Elder	R028AY310UT	12–18	Upland Loam (Mountain Big Sagebrush)	Indian ricegrass	arrowleaf balsamroot	mountain big sagebrush	0–30	4,200–6,500	Mountain big sagebrush
					squirreltail	common yarrow	antelope bitterbrush			
					bluebunch wheatgrass	white sagebrush	basin big sagebrush			

Table A-1 Utah Ecological Sites by Milepost with assigned Seed Mix

<table>
<tr><th>MP (7/10/09)</th><th>County</th><th>NRCS ID</th><th>Annual Precip. (inches)</th><th>Ecological Site Name</th><th>Dominant Graminoid</th><th>Dominant Forb</th><th>Dominant Shrub</th><th>Slope (%)</th><th>Elevation (ft)</th><th>Seed Mix (Private Owner Specified Seed Mix)</th></tr>
<tr><td>115</td><td>Box Elder</td><td>No Data</td><td>Ecological site description not available</td><td></td><td></td><td></td><td>Agriculture-cultivated crop and irrigated pasture based on LANDFIRE existing vegetation cover</td><td></td><td></td><td></td></tr>
<tr><td rowspan="3">116</td><td rowspan="3">Box Elder</td><td rowspan="3">R028AY001UT</td><td rowspan="3">5–8</td><td rowspan="3">Alkali Bottom (Alkali Sacaton)</td><td>Douglas' sedge</td><td>silverscale saltbush</td><td>greasewood</td><td rowspan="3">0–3</td><td rowspan="3">4,250–5,900</td><td rowspan="3">Greasewood</td></tr>
<tr><td>saltgrass</td><td>fivehorn smotherweed</td><td>iodinebush</td></tr>
<tr><td>basin wildrye</td><td>fiddleleaf hawksbeard</td><td>basin big sagebrush</td></tr>
</table>

Table A-1 Utah Ecological Sites by Milepost with assigned Seed Mix

MP (7/10/09)	County	NRCS ID	Annual Precip. (inches)	Ecological Site Name	Dominant Graminoid	Dominant Forb	Dominant Shrub	Slope (%)	Elevation (ft)	Seed Mix (Private Owner Specified Seed Mix)
117	Box Elder	No Data	Ecological site description not available				Semi-desert grassland based on LANDFIRE existing vegetation cover			Greasewood
118	Box Elder	R028AY001UT	5–8	Alkali Bottom (Alkali Sacaton)	Douglas' sedge	silverscale saltbush	greasewood	0–3	4,250–5,900	Greasewood
					saltgrass	fivehorn smotherweed	iodinebush			
					basin wildrye	fiddleleaf hawksbeard	basin big sagebrush			
119	Box Elder	R028AY001UT	5–8	Alkali Bottom (Alkali Sacaton)	Douglas' sedge	silverscale saltbush	greasewood	0–3	4,250–5,900	Greasewood
					saltgrass	fivehorn smotherweed	iodinebush			
					basin wildrye	fiddleleaf hawksbeard	basin big sagebrush			

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MP (7/10/09)	County	NRCS ID	Annual Precip. (inches)	Ecological Site Name	Dominant Graminoid	Dominant Forb	Dominant Shrub	Slope (%)	Elevation (ft)	Seed Mix (Private Owner Specified Seed Mix)
120	Box Elder	No Data	Ecological site description not available				Agriculture-cultivated crop and irrigated pasture based on LANDFIRE existing vegetation cover			Landowner defined
121	Box Elder	No Data	Ecological site description not available				Agriculture-cultivated crop and irrigated pasture based on LANDFIRE existing vegetation cover			Landowner defined

Table A-1 Utah Ecological Sites by Milepost with assigned Seed Mix

MP (7/10/09)	County	NRCS ID	Annual Precip. (inches)	Ecological Site Name	Dominant Graminoid	Dominant Forb	Dominant Shrub	Slope (%)	Elevation (ft)	Seed Mix (Private Owner Specified Seed Mix)
122	Box Elder	R028AY309UT	Ecological site description not available				Agriculture-cultivated crop and irrigated pasture based on LANDFIRE existing vegetation cover			Landowner defined
123	Box Elder	No Data	Ecological site description not available				Basin big sagebrush shrubland based on LANDFIRE existing vegetation cover			Basin big sagebrush

Table A-1 Utah Ecological Sites by Milepost with assigned Seed Mix

MP (7/10/09)	County	NRCS ID	Annual Precip. (inches)	Ecological Site Name	Dominant Graminoid	Dominant Forb	Dominant Shrub	Slope (%)	Elevation (ft)	Seed Mix (Private Owner Specified Seed Mix)
124	Box Elder	No Data	Ecological site description not available				Basin big sagebrush shrubland based on LANDFIRE existing vegetation cover			Basin big sagebrush
125	Box Elder	R028AY025UT	Ecological site description not available				Agriculture-cultivated crop and irrigated pasture based on LANDFIRE existing vegetation cover			Basin big sagebrush

Table A-1 Utah Ecological Sites by Milepost with assigned Seed Mix

MP (7/10/09)	County	NRCS ID	Annual Precip. (inches)	Ecological Site Name	Dominant Graminoid	Dominant Forb	Dominant Shrub	Slope (%)	Elevation (ft)	Seed Mix (Private Owner Specified Seed Mix)
126	Box Elder	R028AY332UT	Ecological site description not available				Greasewood flat based on LANDFIRE existing vegetation cover			Basin big sagebrush
127	Box Elder	No Data	Ecological site description not available				Developed open space based on LANDFIRE existing vegetation cover			Basin big sagebrush
128	Box Elder	No Data	Ecological site description not available				Basin big sagebrush shrubland based on LANDFIRE existing vegetation cover			Basin big sagebrush

Table A-1 Utah Ecological Sites by Milepost with assigned Seed Mix

MP (7/10/09)	County	NRCS ID	Annual Precip. (inches)	Ecological Site Name	Dominant Graminoid	Dominant Forb	Dominant Shrub	Slope (%)	Elevation (ft)	Seed Mix (Private Owner Specified Seed Mix)
129	Box Elder	R047XA308UT	13–17	Upland Loam (Basin Big Sage-brush)	Indian ricegrass	common yarrow	mountain big sagebrush		4,800–7,400	Basin big sagebrush
					needle and thread	Arizona pricklypoppy	antelope bitterbrush			
					basin wildrye	white sagebrush	feather fingergrass			
130	Box Elder	No Data	Ecological site description not available				Agriculture-cultivated crop and irrigated pasture based on LANDFIRE existing vegetation cover			Landowner defined

Table A-1 Utah Ecological Sites by Milepost with assigned Seed Mix

MP (7/10/09)	County	NRCS ID	Annual Precip. (inches)	Ecological Site Name	Dominant Graminoid	Dominant Forb	Dominant Shrub	Slope (%)	Elevation (ft)	Seed Mix (Private Owner Specified Seed Mix)
131	Box Elder	No Data	Ecological site description not available				Basin big sagebrush shrubland based on LANDFIRE existing vegetation cover			Basin big sagebrush
132	Box Elder	No Data	Ecological site description not available				Agriculture-cultivated crop and irrigated pasture based on LANDFIRE existing vegetation cover			Mountain big sagebrush
133	Box Elder	R028AY310UT	12–18	Upland Loam (Mountain	Indian ricegrass	arrowleaf balsamroot	mountain big sagebrush	0–30	4,200–6,500	Mountain big sagebrush

Table A-1 Utah Ecological Sites by Milepost with assigned Seed Mix

MP (7/10/09)	County	NRCS ID	Annual Precip. (inches)	Ecological Site Name	Dominant Graminoid	Dominant Forb	Dominant Shrub	Slope (%)	Elevation (ft)	Seed Mix (Private Owner Specified Seed Mix)
				Big Sagebrush)	squirreltail	common yarrow	antelope bitterbrush			(MP 133.01–135.55 Arthur Louis Douglas seed mix; owner seeded)
					bluebunch wheatgrass	white sagebrush	basin big sagebrush			
134	Box Elder	R028AY338UT	12–18	Upland Stony Loam (Singleleaf Pinyon-Utah Juniper)	Indian ricegrass	tapertip hawksbeard	Utah Serviceberry	20–60	6,200–8,500	Mountain big sagebrush (MP 133.01–135.55 Arthur Louis Douglas seed mix)
					needle and thread	Utah milkvetch	black sagebrush			
					muttongrass	Wyoming Indian paintbrush	mountain big sagebrush			
135	Box Elder	R047XA308UT	13–17	Upland Loam (Basin Big	Indian ricegrass	common yarrow	mountain big sagebrush		4,800–7,400	Mountain big sagebrush

Table A-1 Utah Ecological Sites by Milepost with assigned Seed Mix

MP (7/10/09)	County	NRCS ID	Annual Precip. (inches)	Ecological Site Name	Dominant Graminoid	Dominant Forb	Dominant Shrub	Slope (%)	Elevation (ft)	Seed Mix (Private Owner Specified Seed Mix)
				Sage-brush)	needle and thread	Arizona pricklypoppy	antelope bitterbrush			(MP 133.01–135.55 Arthur Louis Douglas seed mix)
					basin wildrye	white sagebrush	feather fingergrass			
136	Box Elder	R028AY310UT	12–18	Upland Loam (Mountain Big Sage-brush)	Indian ricegrass	arrowleaf balsamroot	mountain big sagebrush	0–30	4,200–6,500	Mountain big sagebrush
					squirreltail	common yarrow	antelope bitterbrush			
					bluebunch wheatgrass	white sagebrush	basin big sagebrush			
137	Box Elder	R028AY309UT	Ecological site description not available				Mixed salt-desert scrub based on LANDFIRE existing vegetation cover			Shadscale

Table A-1 Utah Ecological Sites by Milepost with assigned Seed Mix

MP (7/10/09)	County	NRCS ID	Annual Precip. (inches)	Ecological Site Name	Dominant Graminoid	Dominant Forb	Dominant Shrub	Slope (%)	Elevation (ft)	Seed Mix (Private Owner Specified Seed Mix)
138	Box Elder	R028AY310UT	12–18	Upland Loam (Mountain Big Sagebrush)	Indian ricegrass	arrowleaf balsamroot	mountain big sagebrush	0–30	4,200–6,500	Mountain big sagebrush
					squirreltail	common yarrow	antelope bitterbrush			
					bluebunch wheat-grass	white sagebrush	basin big sagebrush			
139	Box Elder	R028AY307UT	12–16	Uplan Gravelly Loam (Wyoming Big Sage-brush)	slender wheat-grass	white sagebrush	Wyoming big sagebrush		4,400–5,400	Mountain big sagebrush (MP 139.83–143 Frank Rees Limited Partnership seed mix)
					western wheat-grass	tapertip hawksbeard	antelope bitterbrush			
					bluebunch wheat-grass	Torrey's milkvetch	yellow rabbitbrush			
140	Box Elder	R028AY338UT	12–18	Upland Stony Loam (Singleleaf Pinyon-Utah Juniper)	Indian ricegrass	tapertip hawksbeard	Utah Service-berry	20–60	6,200–8,500	Mountain big sagebrush (MP 139.83–143
					needle and thread	Utah milkvetch	black sagebrush			

Table A-1 Utah Ecological Sites by Milepost with assigned Seed Mix

MP (7/10/09)	County	NRCS ID	Annual Precip. (inches)	Ecological Site Name	Dominant Graminoid	Dominant Forb	Dominant Shrub	Slope (%)	Elevation (ft)	Seed Mix (Private Owner Specified Seed Mix)
					muttongrass	Wyoming Indian paintbrush	mountain big sagebrush			Frank Rees Limited Partnership seed mix)
141	Box Elder	No Data	site description not available				Developed open space based on LANDFIRE existing vegetation cover			Landowner defined (MP 139.83–143 Frank Rees Limited Partnership seed mix)
142	Box Elder	R028AY338UT	12–18	Upland Stony Loam (Singleleaf Pinyon-Utah Juniper)	Indian ricegrass	tapertip hawksbeard	Utah Service-berry	20–60	6,200–8,500	Mountain big sagebrush (MP 139.83–143 Frank Rees Limited Partnership seed mix)
					needle and thread	Utah milkvetch	black sagebrush			
					mutton-grass	Wyoming Indian paintbrush	mountain big sagebrush			

Table A-1 Utah Ecological Sites by Milepost with assigned Seed Mix

MP (7/10/09)	County	NRCS ID	Annual Precip. (inches)	Ecological Site Name	Dominant Graminoid	Dominant Forb	Dominant Shrub	Slope (%)	Elevation (ft)	Seed Mix (Private Owner Specified Seed Mix)
143	Box Elder	No Data		Ecological site description not available			Basin big sagebrush shrubland based on LANDFIRE existing vegetation cover			Basin big sagebrush (MP 139.83–143 Frank Rees Limited Partnership seed mix)
144	Box Elder	No Data		Ecological site description not available			Basin big sagebrush shrubland based on LANDFIRE existing vegetation cover			Basin big sagebrush

Table A-1 Utah Ecological Sites by Milepost with assigned Seed Mix

MP (7/10/09)	County	NRCS ID	Annual Precip. (inches)	Ecological Site Name	Dominant Graminoid	Dominant Forb	Dominant Shrub	Slope (%)	Elevation (ft)	Seed Mix (Private Owner Specified Seed Mix)
145	Box Elder	No Data		Ecological site description not available			Basin big sagebrush shrubland based on LANDFIRE existing vegetation cover			Basin big sagebrush
146	Box Elder	R028AY309UT	No Data	Ecological site description not available			Basin big sagebrush shrubland based on LANDFIRE existing vegetation cover			Basin big sagebrush

Table A-1 Utah Ecological Sites by Milepost with assigned Seed Mix

MP (7/10/09)	County	NRCS ID	Annual Precip. (inches)	Ecological Site Name	Dominant Graminoid	Dominant Forb	Dominant Shrub	Slope (%)	Elevation (ft)	Seed Mix (Private Owner Specified Seed Mix)
147	Box Elder	No Data		Ecological site description not available			Basin big sagebrush shrubland based on LANDFIRE existing vegetation cover			Basin big sagebrush
148	Box Elder	R028AY309UT	No Data	Ecological site description not available			Annual grassland based on LANDFIRE existing vegetation cover			Basin big sagebrush
149	Box Elder	R028AY004UT	5–8	Alkali Flat (Black Grease-wood)	squirreltail	textile onion	shadscale saltbush	0–5	4,200–5,000	Shadscale
					Indian ricegrass	tumbling saltweed	greasewood			
					low woolly-grass	fivehorn smotherweed	iodinebush			

Table A-1 Utah Ecological Sites by Milepost with assigned Seed Mix

MP (7/10/09)	County	NRCS ID	Annual Precip. (inches)	Ecological Site Name	Dominant Graminoid	Dominant Forb	Dominant Shrub	Slope (%)	Elevation (ft)	Seed Mix (Private Owner Specified Seed Mix)
150	Box Elder	No Data	Ecological site description not available				Greasewood flat LANDFIRE existing vegetation			Shadscale
151	Box Elder	R028AY004UT	5–8	Alkali Flat (Black Grease-wood)	squirreltail	textile onion	shadscale saltbush	0–5	4,200–5,000	Shadscale
					Indian ricegrass	tumbling saltweed	greasewood			
					low woolly-grass	fivehorn smotherweed	iodinebush			
152	Box Elder	R028AY004UT	5–8	Alkali Flat (Black Grease-wood)	squirreltail	textile onion	shadscale saltbush	0–5	4,200–5,000	Shadscale
					Indian ricegrass	tumbling saltweed	greasewood			
					low woolly-grass	fivehorn smotherweed	iodinebush			

Table A-1 Utah Ecological Sites by Milepost with assigned Seed Mix

MP (7/10/09)	County	NRCS ID	Annual Precip. (inches)	Ecological Site Name	Dominant Graminoid	Dominant Forb	Dominant Shrub	Slope (%)	Elevation (ft)	Seed Mix (Private Owner Specified Seed Mix)
153	Box Elder	R028AY309UT	No Data	Ecological site description not available			Basin big sagebrush shrubland based on LANDFIRE existing vegetation cover			Basin big sagebrush
154	Box Elder	R028AY309UT	No Data	Ecological site description not available			Basin big sagebrush shrubland based on LANDFIRE existing vegetation cover			Basin big sagebrush

Table A-1 Utah Ecological Sites by Milepost with assigned Seed Mix

MP (7/10/09)	County	NRCS ID	Annual Precip. (inches)	Ecological Site Name	Dominant Graminoid	Dominant Forb	Dominant Shrub	Slope (%)	Elevation (ft)	Seed Mix (Private Owner Specified Seed Mix)
155	Box Elder	No Data		Ecological site description not available			Perennial grassland based on LANDFIRE existing vegetation cover			Basin big sagebrush
156	Box Elder	R028AY334UT	11–16	Upland Stony Loam (Mountain Big Sage-brush)	Indian ricegrass	spiny phlox	Wyoming big sagebrush		4,300-6,000	Basin big sagebrush
					squirreltail	Fendler's sandwort	antelope bitterbrush			
					prairie Junegrass	white sagebrush	Utah Service-berry			
157	Box Elder	R028AY334UT	11-16	Upland Stony Loam (Mountain Big Sage-brush)	Indian ricegrass	spiny phlox	Wyoming big sagebrush		4,300-6,000	Wyoming big sagebrush
					squirreltail	Fendler's sandwort	antelope bitterbrush			

Table A-1 Utah Ecological Sites by Milepost with assigned Seed Mix

MP (7/10/09)	County	NRCS ID	Annual Precip. (inches)	Ecological Site Name	Dominant Graminoid	Dominant Forb	Dominant Shrub	Slope (%)	Elevation (ft)	Seed Mix (Private Owner Specified Seed Mix)
					prairie Junegrass	white sagebrush	Utah Service-berry			
158	Box Elder	R028AY334UT	11–16	Upland Stony Loam (Mountain Big Sage-brush)	Indian ricegrass	spiny phlox	Wyoming big sagebrush		4,300–6,000	Wyoming big sagebrush
					squirreltail	Fendler's sandwort	antelope bitterbrush			
					prairie Junegrass	white sagebrush	Utah Service-berry			
159	Box Elder	R028AY004UT	5–8	Alkali Flat (Black Grease-wood)	squirreltail	textile onion	shadscale saltbush	0–5	4,200–5,000	Shadscale
					Indian ricegrass	tumbling saltweed	greasewood			
					low woolly-grass	fivehorn smotherweed	iodinebush			
160	Box Elder	R028AY004UT	5–8	Alkali Flat (Black	squirreltail	textile onion	shadscale saltbush	0–5	4,200–5,000	Shadscale

Table A-1 Utah Ecological Sites by Milepost with assigned Seed Mix

MP (7/10/09)	County	NRCS ID	Annual Precip. (inches)	Ecological Site Name	Dominant Graminoid	Dominant Forb	Dominant Shrub	Slope (%)	Elevation (ft)	Seed Mix (Private Owner Specified Seed Mix)
				Grease-wood)	Indian ricegrass	tumbling saltweed	greasewood			
					low woolly-grass	fivehorn smotherweed	iodinebush			
161	Box Elder	R028AY004UT	5–8	Alkali Flat (Black Grease-wood)	squirreltail	textile onion	shadscale saltbush	0–5	4,200–5,000	Shadscale (MP 161–165 Russell Boyer et al. seed mix)
					Indian ricegrass	tumbling saltweed	greasewood			
					low woolly-grass	fivehorn smotherweed	iodinebush			
162	Box Elder	R028AY243UT	8–12	Semidesert Shallow Loam (Wyoming Big Sagebrush)	Indian ricegrass	freckled milkvetch	Wyoming big sagebrush		5,500–6,200	Shadscale (MP 161–165 Russell Boyer et al. seed mix)
					bluebunch wheatgrass	roundspike cryptantha	Nevada jointfir			
					squirreltail	cushion buckwheat	Mexican cliffrose			
163	Box Elder	R028AY119UT	5–8	Semidesert Shallow	Indian ricegrass	scarlet globemallow	shadscale saltbush	0–3	4,200–4,800	Shadscale (MP 161–

Table A-1 Utah Ecological Sites by Milepost with assigned Seed Mix

MP (7/10/09)	County	NRCS ID	Annual Precip. (inches)	Ecological Site Name	Dominant Graminoid	Dominant Forb	Dominant Shrub	Slope (%)	Elevation (ft)	Seed Mix (Private Owner Specified Seed Mix)
				Loam (Wyoming Big Sagebrush)	squirreltail	roundspike cryptantha	green molly			165 Russell Boyer et al. seed mix)
					James' galleta	clasping pepperweed	trailing krameria			
164	Box Elder	R028AY119UT	5–8	Semidesert Shallow Loam (Wyoming Big Sagebrush)	Indian ricegrass	scarlet globemallow	shadscale saltbush	0–3	4,200–4,800	Greasewood (MP 161–165 Russell Boyer et al. seed mix)
					squirreltail	roundspike cryptantha	green molly			
					James' galleta	clasping pepperweed	trailing krameria			
165	Box Elder	R028AY004UT	5–8	Alkali Flat (Black Grease-wood)	squirreltail	textile onion	shadscale saltbush	0–5	4,200–5,000	Greasewood
					Indian ricegrass	tumbling saltweed	greasewood			
					low woollygrass	fivehorn smotherweed	iodinebush			
166	Box Elder	R028AY119UT	5–8	Semidesert Shallow Loam (Wyoming	Indian ricegrass	scarlet globemallow	shadscale saltbush	0–3	4,200–4,800	Greasewood
					squirreltail	roundspike cryptantha	green molly			

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MP (7/10/09)	County	NRCS ID	Annual Precip. (inches)	Ecological Site Name	Dominant Graminoid	Dominant Forb	Dominant Shrub	Slope (%)	Elevation (ft)	Seed Mix (Private Owner Specified Seed Mix)
				Big Sagebrush)	James' galleta	clasping pepperweed	trailing krameria			
167	Box Elder	R028AY004UT	5–8	Alkali Flat (Black Grease-wood)	squirreltail	textile onion	shadscale saltbush	0–5	4,200–5,000	Greasewood
					Indian ricegrass	tumbling saltweed	greasewood			
					low woollygrass	fivehorn smotherweed	iodinebush			
168	Box Elder	R028AY004UT	5–8	Alkali Flat (Black Grease-wood)	squirreltail	textile onion	shadscale saltbush	0–5	4,200–5,000	Greasewood
					Indian ricegrass	tumbling saltweed	greasewood			
					low woollygrass	fivehorn smotherweed	iodinebush			
169	Box Elder	R028AY004UT	5–8	Alkali Flat (Black Grease-wood)	squirreltail	textile onion	shadscale saltbush	0–5	4,200–5,000	Greasewood
					Indian ricegrass	tumbling saltweed	greasewood			
					low woollygrass	fivehorn smotherweed	iodinebush			

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MP (7/10/09)	County	NRCS ID	Annual Precip. (inches)	Ecological Site Name	Dominant Graminoid	Dominant Forb	Dominant Shrub	Slope (%)	Elevation (ft)	Seed Mix (Private Owner Specified Seed Mix)
170	Box Elder	R028AY004UT	5–8	Alkali Flat (Black Grease-wood)	squirreltail	textile onion	shadscale saltbush	0–5	4,200–5,000	Greasewood
					Indian ricegrass	tumbling saltweed	greasewood			
					low woollygrass	fivehorn smotherweed	iodinebush			
171	Box Elder	R028AY132UT	5–8	Desert Salty Silt (Iodinebush)	saltgrass	clustered goldenweed	iodinebush	0–2	4,210–4,230	Greasewood
					Torrey's rush	slender grasswort	sickle saltbush			
					alkali cordgrass	Mojave seablite	whiteflower rabbitbrush			
172	Box Elder	R028AY132UT	5–8	Desert Salty Silt (Iodinebush)	saltgrass	clustered goldenweed	iodinebush	0–2	4,210–4,230	Greasewood
					Torrey's rush	slender grasswort	sickle saltbush			
					alkali cordgrass	Mojave seablite	whiteflower rabbitbrush			
173	Box Elder	R028AY132UT	5–8	Desert Salty Silt	saltgrass	clustered goldenweed	iodinebush	0–2	4,210–4,230	Greasewood

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MP (7/10/09)	County	NRCS ID	Annual Precip. (inches)	Ecological Site Name	Dominant Graminoid	Dominant Forb	Dominant Shrub	Slope (%)	Elevation (ft)	Seed Mix (Private Owner Specified Seed Mix)
				(Iodinebush)	Torrey's rush	slender grasswort	sickle saltbush			
					alkali cordgrass	Mojave seablite	whiteflower rabbitbrush			
174	Box Elder	R028AY004UT	5–8	Alkali Flat (Black Greasewood)	squirreltail	textile onion	shadscale saltbush	0–5	4,200–5,000	Greasewood
					Indian ricegrass	tumbling saltweed	greasewood			
					low woollygrass	fivehorn smotherweed	iodinebush			
175	Box Elder	R028AY208UT	8–12	Semidesert Bouldery Loam (Wyoming Big Sagebrush)	Indian ricegrass	Utah milkvetch	Wyoming big sagebrush		4,500–5,500	Wyoming big sagebrush
					squirreltail	quill cryptantha	yellow rabbitbrush			
					western wheatgrass	western tansymustard	spiny hopsage			
176	Box Elder	R028AY124UT	5–8	Desert Loam	Indian ricegrass	Torrey's milkvetch	shadscale saltbush	0–6	4,200–6,500	Wyoming big

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MP (7/10/09)	County	NRCS ID	Annual Precip. (inches)	Ecological Site Name	Dominant Graminoid	Dominant Forb	Dominant Shrub	Slope (%)	Elevation (ft)	Seed Mix (Private Owner Specified Seed Mix)
				(shadscale)	squirreltail	cushion buckwheat	winterfat			sagebrush
					James' galleta	shaggy fleabane	bud sagebrush			
177	Box Elder	R028AY124UT	5–8	Desert Loam (shadscale)	Indian ricegrass	Torrey's milkvetch	shadscale saltbush	0–6	4,200–6,500	Wyoming big sagebrush
					squirreltail	cushion buckwheat	winterfat			
					James' galleta	shaggy fleabane	bud sagebrush			
178	Box Elder	R028AY215UT	8–12	Semidesert Gravelly Loam (Wyoming Big Sagebrush)	Indian ricegrass	Holboell's rockcress	Wyoming big sagebrush		4,400-6,500	Wyoming big sagebrush
					squirreltail	roundspike cryptantha	shadscale saltbush			
					bluebunch wheatgrass	cushion buckwheat	yellow rabbitbrush			
179	Box Elder	R028AY215UT	8-12	Semidesert Gravelly Loam	Indian ricegrass	Holboell's rockcress	Wyoming big sagebrush		4,400–6,500	Wyoming big sagebrush

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MP (7/10/09)	County	NRCS ID	Annual Precip. (inches)	Ecological Site Name	Dominant Graminoid	Dominant Forb	Dominant Shrub	Slope (%)	Elevation (ft)	Seed Mix (Private Owner Specified Seed Mix)
				(Wyoming Big Sagebrush)	squirreltail	roundspike cryptantha	shadscale saltbush			
					bluebunch wheatgrass	cushion buckwheat	yellow rabbitbrush			
180	Box Elder	R028AY124UT	5–8	Desert Loam (shadscale)	Indian ricegrass	Torrey's milkvetch	shadscale saltbush	0–6	4,200–6,500	Wyoming big sagebrush
					squirreltail	cushion buckwheat	winterfat			
					James' galleta	shaggy fleabane	bud sagebrush			
181	Box Elder	R028AY124UT	5–8	Desert Loam (shadscale)	Indian ricegrass	Torrey's milkvetch	shadscale saltbush	0–6	4,200–6,500	Wyoming big sagebrush
					squirreltail	cushion buckwheat	winterfat			
					James' galleta	shaggy fleabane	bud sagebrush			
182	Box Elder	R028AY124UT	5–8	Desert Loam (shadscale)	Indian ricegrass	Torrey's milkvetch	shadscale saltbush	0–6	4,200–6,500	Black sagebrush
					squirreltail	cushion buckwheat	winterfat			

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MP (7/10/09)	County	NRCS ID	Annual Precip. (inches)	Ecological Site Name	Dominant Graminoid	Dominant Forb	Dominant Shrub	Slope (%)	Elevation (ft)	Seed Mix (Private Owner Specified Seed Mix)
					James' galleta	shaggy fleabane	bud sagebrush			
183	Box Elder	R028AY124UT	5–8	Desert Loam (shadscale)	Indian ricegrass	Torrey's milkvetch	shadscale saltbush	0–6	4,200–6,500	Black sagebrush
					squirreltail	cushion buckwheat	winterfat			
					James' galleta	shaggy fleabane	bud sagebrush			
184	Box Elder	R028AY004UT	5–8	Alkali Flat (Black Grease–wood)	squirreltail	textile onion	shadscale saltbush	0–5	4,200–5,000	Black sagebrush
					Indian ricegrass	tumbling saltweed	greasewood			
					low woollygrass	fivehorn smotherweed	iodinebush			
185	Box Elder	R028AY124UT	5–8	Desert Loam (shadscale)	Elymus elymoides	Astragalus calycosus	Atriplex confertifolia	0–6	4,200–6,500	Black sagebrush
						Eriogonum ovalifolium	Krascheninnikovia lanata			

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MP (7/10/09)	County	NRCS ID	Annual Precip. (inches)	Ecological Site Name	Dominant Graminoid	Dominant Forb	Dominant Shrub	Slope (%)	Elevation (ft)	Seed Mix (Private Owner Specified Seed Mix)
						Erigeron pumilus	Picrothamnus desertorum			
186	Box Elder	R028AY124UT	5–8	Desert Loam (shadscale)	Indian ricegrass	Torrey's milkvetch	shadscale saltbush	0–6	4,200–6,500	Black sagebrush
					squirreltail	cushion buckwheat	winterfat			
					James' galleta	shaggy fleabane	bud sagebrush			
187	Box Elder	R028AY124UT	5–8	Desert Loam (shadscale)	Indian ricegrass	Torrey's milkvetch	shadscale saltbush	0–6	4,200–6,500	Black sagebrush
					squirreltail	cushion buckwheat	winterfat			
					James' galleta	shaggy fleabane	bud sagebrush			
188	Box Elder	R028AY124UT	5–8	Desert Loam (shadscale)	Indian ricegrass	Torrey's milkvetch	shadscale saltbush	0–6	4,200–6,500	Black sagebrush
					squirreltail	cushion buckwheat	winterfat			
					James' galleta	shaggy fleabane	bud sagebrush			

Table A-1 Utah Ecological Sites by Milepost with assigned Seed Mix

MP (7/10/09)	County	NRCS ID	Annual Precip. (inches)	Ecological Site Name	Dominant Graminoid	Dominant Forb	Dominant Shrub	Slope (%)	Elevation (ft)	Seed Mix (Private Owner Specified Seed Mix)
189	Box Elder	R028AY236UT	8–12	Semidesert Shallow Loam (Black Sagebrush)	Indian ricegrass	freckled milkvetch	black sagebrush		4,500–6,700	Black sagebrush
					needle and thread	Hooker's balsamroot	shadscale saltbush			
					bluebunch wheatgrass	cushion buckwheat	yellow rabbitbrush			
190	Box Elder	R028AY124UT	5–8	Desert Loam (shadscale)	Indian ricegrass	Torrey's milkvetch	shadscale saltbush	0–6	4,200–6,500	Wyoming big sagebrush
					squirreltail	cushion buckwheat	winterfat			
					James' galleta	shaggy fleabane	bud sagebrush			
191	Box Elder	R028AY124UT	5–8	Desert Loam (shadscale)	Indian ricegrass	Torrey's milkvetch	shadscale saltbush	0–6	4,200–6,500	Wyoming big sagebrush
					squirreltail	cushion buckwheat	winterfat			
					James' galleta	shaggy fleabane	bud sagebrush			
192	Box Elder	R028AY124UT	5–8	Desert Loam	Indian ricegrass	Torrey's milkvetch	shadscale saltbush	0–6	4,200–6,500	Wyoming big

Table A-1 Utah Ecological Sites by Milepost with assigned Seed Mix

MP (7/10/09)	County	NRCS ID	Annual Precip. (inches)	Ecological Site Name	Dominant Graminoid	Dominant Forb	Dominant Shrub	Slope (%)	Elevation (ft)	Seed Mix (Private Owner Specified Seed Mix)
				(shadscale)	squirreltail	cushion buckwheat	winterfat			sagebrush
					James' galleta	shaggy fleabane	bud sagebrush			
193	Box Elder	R028AY124UT	5–8	Desert Loam (shadscale)	Indian ricegrass	Torrey's milkvetch	shadscale saltbush	0–6	4,200–6,500	Wyoming big sagebrush
					squirreltail	cushion buckwheat	winterfat			
					James' galleta	shaggy fleabane	bud sagebrush			
194	Box Elder	R028AY124UT	5–8	Desert Loam (shadscale)	Indian ricegrass	Torrey's milkvetch	shadscale saltbush	0–6	4,200–6,500	Wyoming big sagebrush
					squirreltail	cushion buckwheat	winterfat			
					James' galleta	shaggy fleabane	bud sagebrush			
195	Box Elder	R028AY124UT	5–8	Desert Loam (shadscale)	Indian ricegrass	Torrey's milkvetch	shadscale saltbush	0–6	4,200–6,500	Black sagebrush
					squirreltail	cushion buckwheat	winterfat			

Table A-1 Utah Ecological Sites by Milepost with assigned Seed Mix

MP (7/10/09)	County	NRCS ID	Annual Precip. (inches)	Ecological Site Name	Dominant Graminoid	Dominant Forb	Dominant Shrub	Slope (%)	Elevation (ft)	Seed Mix (Private Owner Specified Seed Mix)
					James' galleta	shaggy fleabane	bud sagebrush			
196	Box Elder	R028AY124UT	5–8	Desert Loam (shadscale)	Indian ricegrass	Torrey's milkvetch	shadscale saltbush	0–6	4,200–6,500	Black sagebrush
					squirreltail	cushion buckwheat	winterfat			
					James' galleta	shaggy fleabane	bud sagebrush			
197	Box Elder	R028AY124UT	5–8	Desert Loam (shadscale)	Indian ricegrass squirreltail	Torrey's milkvetch cushion buckwheat	shadscale saltbush winterfat	0–6	4,200–6,500	Black sagebrush
					James' galleta	shaggy fleabane	bud sagebrush			
198	Box Elder	R028AY124UT	5–8	Desert Loam (shadscale)	Indian ricegrass	Torrey's milkvetch	shadscale saltbush	0–6	4,200–6,500	Shadscale
					squirreltail	cushion buckwheat	winterfat			
					James' galleta	shaggy fleabane	bud sagebrush			

Table A-1 Utah Ecological Sites by Milepost with assigned Seed Mix

MP (7/10/09)	County	NRCS ID	Annual Precip. (inches)	Ecological Site Name	Dominant Graminoid	Dominant Forb	Dominant Shrub	Slope (%)	Elevation (ft)	Seed Mix (Private Owner Specified Seed Mix)
199	Box Elder	R028AY124UT	5–8	Desert Loam (shadscale)	Indian ricegrass	Torrey's milkvetch	shadscale saltbush	0–6	4,200–6,500	Shadscale
					squirreltail	cushion buckwheat	winterfat			
					James' galleta	shaggy fleabane	bud sagebrush			
200	Box Elder	R028AY124UT	5–8	Desert Loam (shadscale)	Indian ricegrass	Torrey's milkvetch	shadscale saltbush	0–6	4,200–6,500	Shadscale
					squirreltail	cushion buckwheat	winterfat			
					James' galleta	shaggy fleabane	bud sagebrush			
201	Box Elder	R028AY202UT	8–12	Semidesert Alkali Loam (Black Grease-wood)	Indian ricegrass	freckled milkvetch	Wyoming big sagebrush	0–5	4,250–5,800	Wyoming big sagebrush
					squirreltail	clasping pepperweed	greasewood			
					Sandberg bluegrass	scarlet globemallow	shadscale saltbush			

Table A-1 Utah Ecological Sites by Milepost with assigned Seed Mix

MP (7/10/09)	County	NRCS ID	Annual Precip. (inches)	Ecological Site Name	Dominant Graminoid	Dominant Forb	Dominant Shrub	Slope (%)	Elevation (ft)	Seed Mix (Private Owner Specified Seed Mix)
202	Box Elder	R028AY202UT	8–12	Semidesert Alkali Loam (Black Grease-wood)	Indian ricegrass	freckled milkvetch	Wyoming big sagebrush	0–5	4,250–5,800	Wyoming big sagebrush
					squirreltail	clasping pepperweed	greasewood			
					Sandberg bluegrass	scarlet globemallow	shadscale saltbush			
203	Box Elder	R028AY202UT	8–12	Semidesert Alkali Loam (Black Grease-wood)	Achnatherum hymenoides	Astragalus lentiginosus	Artemisia tridentata ssp. wyomingensis	0–5	4,250–5,800	Wyoming big sagebrush
					Elymus elymoides	Lepidium perfoliatum	Sarcobatus vermiculatus			
						Sphaeralcea coccinea				
204	Box Elder	R028AY252UT	8–12	Semidesert Stony Loam (Black Sagebrush)	Indian ricegrass	Utah milkvetch	black sagebrush		4,900–5,700	Black sagebrush
					squirreltail	Hooker's balsamroot	shadscale saltbush			

Table A-1 Utah Ecological Sites by Milepost with assigned Seed Mix

MP (7/10/09)	County	NRCS ID	Annual Precip. (inches)	Ecological Site Name	Dominant Graminoid	Dominant Forb	Dominant Shrub	Slope (%)	Elevation (ft)	Seed Mix (Private Owner Specified Seed Mix)
					James' galleta	cushion buckwheat	yellow rabbitbrush			
205	Box Elder	R028AY252UT	8–12	Semidesert Stony Loam (Black Sagebrush)	Indian ricegrass	Utah milkvetch	black sagebrush		4,900–5,700	Black sagebrush
					squirreltail	Hooker's balsamroot	shadscale saltbush			
					James' galleta	cushion buckwheat	yellow rabbitbrush			
206	Box Elder	R028AY252UT	8–12	Semidesert Stony Loam (Black Sagebrush)	Indian ricegrass	Utah milkvetch	black sagebrush		4,900–5,700	Black sagebrush
					squirreltail	Hooker's balsamroot	shadscale saltbush			
					James' galleta	cushion buckwheat	yellow rabbitbrush			
207	Box Elder	R028AY252UT	8–12	Semidesert Stony Loam (Black Sagebrush)	Indian ricegrass	Utah milkvetch	black sagebrush		4,900–5,700	Black sagebrush
					squirreltail	Hooker's balsamroot	shadscale saltbush			
					James' galleta	cushion buckwheat	yellow rabbitbrush			

Table A-1 Utah Ecological Sites by Milepost with assigned Seed Mix

MP (7/10/09)	County	NRCS ID	Annual Precip. (inches)	Ecological Site Name	Dominant Graminoid	Dominant Forb	Dominant Shrub	Slope (%)	Elevation (ft)	Seed Mix (Private Owner Specified Seed Mix)
208	Box Elder	R028AY252UT	8–12	Semidesert Stony Loam (Black Sagebrush)	Indian ricegrass	Utah milkvetch	black sagebrush		4,900–5,700	Black sagebrush
					squirreltail	Hooker's balsamroot	shadscale saltbush			
					James' galleta	cushion buckwheat	yellow rabbitbrush			
209	Box Elder	R028AY252UT	8–12	Semidesert Stony Loam (Black Sagebrush)	Indian ricegrass	Utah milkvetch	black sagebrush		4,900–5,700	Black sagebrush
					squirreltail	Hooker's balsamroot	shadscale saltbush			
					James' galleta	cushion buckwheat	yellow rabbitbrush			
210	Box Elder	R028AY252UT	8–12	Semidesert Stony Loam (Black Sagebrush)	Indian ricegrass	Utah milkvetch	black sagebrush		4,900–5,700	Black sagebrush
					squirreltail	Hooker's balsamroot	shadscale saltbush			
					James' galleta	cushion buckwheat	yellow rabbitbrush			
211	Box Elder	R028AY119UT	5–8	Semidesert Shallow	Indian ricegrass	scarlet globemallow	shadscale saltbush	0–3	4,200–4,800	Shadscale

Table A-1 Utah Ecological Sites by Milepost with assigned Seed Mix

MP (7/10/09)	County	NRCS ID	Annual Precip. (inches)	Ecological Site Name	Dominant Graminoid	Dominant Forb	Dominant Shrub	Slope (%)	Elevation (ft)	Seed Mix (Private Owner Specified Seed Mix)
				Loam (Wyoming Big Sagebrush)	squirreltail	roundspike cryptantha	green molly			
					James' galleta	clasping pepperweed	trailing krameria			
212	Box Elder	R028AY119UT	5–8	Semidesert Shallow Loam (Wyoming Big Sagebrush)	Indian ricegrass	scarlet globemallow	shadscale saltbush	0–3	4,200–4,800	Black sagebrush
					squirreltail	roundspike cryptantha	green molly			
					James' galleta	clasping pepperweed	trailing krameria			
213	Box Elder	R028AY119UT	5–8	Semidesert Shallow Loam (Wyoming Big Sagebrush)	Indian ricegrass	scarlet globemallow	shadscale saltbush	0–3	4,200–4,800	Shadscale
					squirreltail	roundspike cryptantha	green molly			
					James' galleta	clasping pepperweed	trailing krameria			
214	Box Elder	R028AY119UT	5–8	Semidesert Shallow Loam (Wyoming	Indian ricegrass	scarlet globemallow	shadscale saltbush	0–3	4,200–4,800	Black sagebrush
					squirreltail	roundspike cryptantha	green molly			

Table A-1 Utah Ecological Sites by Milepost with assigned Seed Mix

MP (7/10/09)	County	NRCS ID	Annual Precip. (inches)	Ecological Site Name	Dominant Graminoid	Dominant Forb	Dominant Shrub	Slope (%)	Elevation (ft)	Seed Mix (Private Owner Specified Seed Mix)
				Big Sagebrush)	James' galleta	clasping pepperweed	trailing krameria			
215	Box Elder	R028AY252UT	8–12	Semidesert Stony Loam (Black Sagebrush)	Indian ricegrass	Utah milkvetch	black sagebrush		4,900–5,700	Black sagebrush
					squirreltail	Hooker's balsamroot	shadscale saltbush			
					James' galleta	cushion buckwheat	yellow rabbitbrush			
216	Box Elder	R028AY252UT	8–12	Semidesert Stony Loam (Black Sagebrush)	Indian ricegrass	Utah milkvetch	black sagebrush		4,900–5,700	Black sagebrush
					squirreltail	Hooker's balsamroot	shadscale saltbush			
					James' galleta	cushion buckwheat	yellow rabbitbrush			
217	Box Elder	R028AY252UT	8–12	Semidesert Stony Loam (Black Sagebrush)	Indian ricegrass	Utah milkvetch	black sagebrush		4,900–5,700	Black sagebrush
					squirreltail	Hooker's balsamroot	shadscale saltbush			
					James' galleta	cushion buckwheat	yellow rabbitbrush			

Table A-1 Utah Ecological Sites by Milepost with assigned Seed Mix

MP (7/10/09)	County	NRCS ID	Annual Precip. (inches)	Ecological Site Name	Dominant Graminoid	Dominant Forb	Dominant Shrub	Slope (%)	Elevation (ft)	Seed Mix (Private Owner Specified Seed Mix)
218	Box Elder	R028AY252UT	8–12	Semidesert Stony Loam (Black Sagebrush)	Indian ricegrass	Utah milkvetch	black sagebrush		4,900–5,700	Black sagebrush
					squirreltail	Hooker's balsamroot	shadscale saltbush			
					James' galleta	cushion buckwheat	yellow rabbitbrush			
219	Box Elder	R028AY252UT	8–12	Semidesert Stony Loam (Black Sagebrush)	Indian ricegrass	Utah milkvetch	black sagebrush		4,900–5,700	Black sagebrush
					squirreltail	Hooker's balsamroot	shadscale saltbush			
					James' galleta	cushion buckwheat	yellow rabbitbrush			
220	Box Elder	R028AY252UT	8–12	Semidesert Stony Loam (Black Sagebrush)	Indian ricegrass	Utah milkvetch	black sagebrush		4,900–5,700	Black sagebrush
					squirreltail	Hooker's balsamroot	shadscale saltbush			
					James' galleta	cushion buckwheat	yellow rabbitbrush			
221	Box Elder	R028AY252UT	8–12	Semidesert Stony Loam	Indian ricegrass	Utah milkvetch	black sagebrush		4,900–5,700	Black sagebrush

Table A-1 Utah Ecological Sites by Milepost with assigned Seed Mix

MP (7/10/09)	County	NRCS ID	Annual Precip. (inches)	Ecological Site Name	Dominant Graminoid	Dominant Forb	Dominant Shrub	Slope (%)	Elevation (ft)	Seed Mix (Private Owner Specified Seed Mix)
				(Black Sagebrush)	squirreltail	Hooker's balsamroot	shadscale saltbush			
					James' galleta	cushion buckwheat	yellow rabbitbrush			
222	Box Elder	R028AY004UT	5–8	Alkali Flat (Black Greasewood)	squirreltail	textile onion	shadscale saltbush	0–5	4,200–5,000	Black sagebrush
					Indian ricegrass	tumbling saltweed	greasewood			
					low woollygrass	fivehorn smotherweed	iodinebush			
223	Box Elder	R028AY119UT	5–8	Semidesert Shallow Loam (Wyoming Big Sagebrush)	Indian ricegrass	scarlet globemallow	shadscale saltbush	0–3	4,200–4,800	Shadscale
					squirreltail	roundspike cryptantha	green molly			
					James' galleta	clasping pepperweed	trailing krameria			
224	Box Elder	R028AY119UT	5–8	Semidesert Shallow Loam (Wyoming	Indian ricegrass	scarlet globemallow	shadscale saltbush	0–3	4,200–4,800	Shadscale
					squirreltail	roundspike cryptantha	green molly			

Table A-1 Utah Ecological Sites by Milepost with assigned Seed Mix

MP (7/10/09)	County	NRCS ID	Annual Precip. (inches)	Ecological Site Name	Dominant Graminoid	Dominant Forb	Dominant Shrub	Slope (%)	Elevation (ft)	Seed Mix (Private Owner Specified Seed Mix)
				Big Sagebrush)	James' galleta	clasping pepperweed	trailing krameria			
225	Box Elder	R028AY124UT	5–8	Desert Loam (shadscale)	Indian ricegrass	Torrey's milkvetch	shadscale saltbush	0–6	4,200–6,500	Shadscale
					squirreltail	cushion buckwheat	winterfat			
					James' galleta	shaggy fleabane	bud sagebrush			
226	Box Elder	R028AY124UT	5–8	Desert Loam (shadscale)	Indian ricegrass	Torrey's milkvetch	shadscale saltbush	0–6	4,200–6,500	Shadscale
					squirreltail	cushion buckwheat	winterfat			
					James' galleta	shaggy fleabane	bud sagebrush			
227	Box Elder	R028AY124UT	5–8	Desert Loam (shadscale)	Indian ricegrass	Torrey's milkvetch	shadscale saltbush	0–6	4,200–6,500	Shadscale
					squirreltail	cushion buckwheat	winterfat			
					James' galleta	shaggy fleabane	bud sagebrush			

Table A-1 Utah Ecological Sites by Milepost with assigned Seed Mix

MP (7/10/09)	County	NRCS ID	Annual Precip. (inches)	Ecological Site Name	Dominant Graminoid	Dominant Forb	Dominant Shrub	Slope (%)	Elevation (ft)	Seed Mix (Private Owner Specified Seed Mix)
228	Box Elder	R028AY124UT	5–8	Desert Loam (shadscale)	Indian ricegrass	Torrey's milkvetch	shadscale saltbush	0–6	4,200–6,500	Black sagebrush
					squirreltail	cushion buckwheat	winterfat			
					James' galleta	shaggy fleabane	bud sagebrush			
229	Box Elder	R028AY124UT	5–8	Desert Loam (shadscale)	Indian ricegrass	Torrey's milkvetch	shadscale saltbush	0–6	4,200–6,500	Black sagebrush
					squirreltail	cushion buckwheat	winterfat			
					James' galleta	shaggy fleabane	bud sagebrush			
230	Box Elder	R028AY124UT	5–8	Desert Loam (shadscale)	Indian ricegrass	Torrey's milkvetch	shadscale saltbush	0–6	4,200–6,500	Black sagebrush
					squirreltail	cushion buckwheat	winterfat			
					James' galleta	shaggy fleabane	bud sagebrush			
231	Box Elder	R028AY252UT	8–12	Semidesert Stony Loam	Indian ricegrass	Utah milkvetch	black sagebrush		4,900–5,700	Black sagebrush

Table A-1 Utah Ecological Sites by Milepost with assigned Seed Mix

MP (7/10/09)	County	NRCS ID	Annual Precip. (inches)	Ecological Site Name	Dominant Graminoid	Dominant Forb	Dominant Shrub	Slope (%)	Elevation (ft)	Seed Mix (Private Owner Specified Seed Mix)
				(Black Sagebrush)	squirreltail	Hooker's balsamroot	shadscale saltbush			
					James' galleta	cushion buckwheat	yellow rabbitbrush			
232	Box Elder	R028AY232UT	8–12	Semidesert Shallow Hardpan (Utah Juniper)	Indian ricegrass	littleleaf pussytoes	black sagebrush		5,500–6,500	Black sagebrush
					squirreltail	freckled milkvetch	yellow rabbitbrush			
					needle and thread	Hooker's balsamroot	Nevada jointfir			
233	Box Elder	R028AY232UT	8–12	Semidesert Shallow Hardpan (Utah Juniper)	Indian ricegrass	littleleaf pussytoes	black sagebrush		5,500–6,500	Black sagebrush
					squirreltail	frecklefd milkvetch	yellow rabbitbrush			
					needle and thread	Hooker's balsamroot	Nevada jointfir			

Restoration and Revegetation Plan: Nevada

RUBY PIPELINE LLC

FERC Docket No. CP09-54-000

June 2010

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Acronyms and Abbreviations

ac	acre
BSC	Biological Soil Crust
BLM	Bureau of Land Management
CFR	Code of Federal Regulations
EDO	Elko District Office
EPA	U.S. Environmental Protection Agency
FEIS	Final Environmental Impact Statement
lbs	pounds
max	maximum
min	minimum
MP	milepost
NDEP	Nevada Division of Environmental Protection
NDOW	Nevada Department of Wildlife
NRCS	National Resource Conservation Service
OHV	off-highway vehicle
POD	Plan of Development
Plan	Restoration and Revegetation Plan
PLS	pure live seed
Project	Ruby Pipeline Project
RDPC	Reclaimed Desired Plan Community
ROW	right-of-way
Ruby	Ruby Pipeline, LLC
SFO	Surprise Field Office
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
WDO	Winnemucca District Office

1.0 Introduction

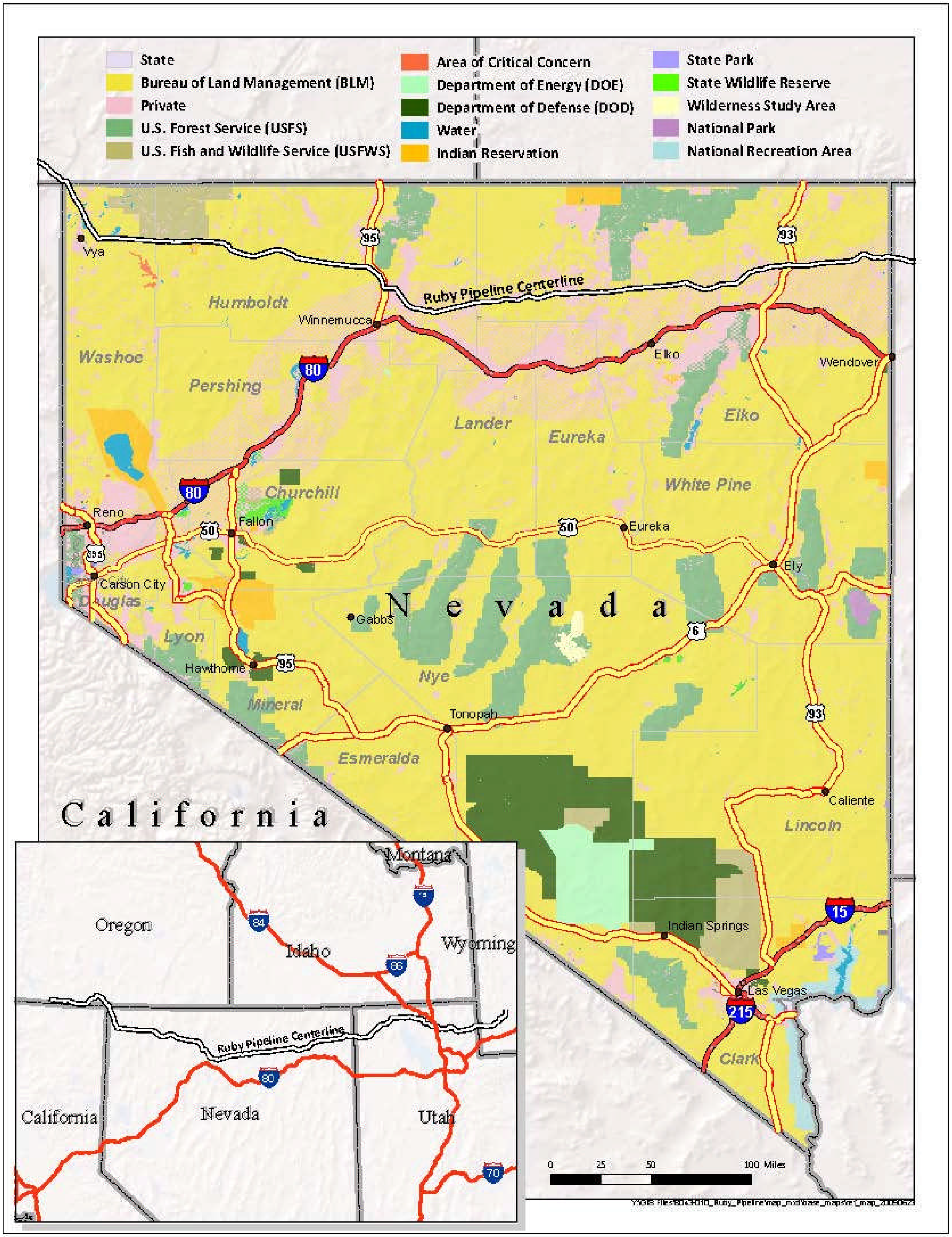
The Ruby Pipeline Project (Project), proposed by Ruby Pipeline, LLC (Ruby), is composed of approximately 675.2 miles of 42-inch diameter natural gas pipeline, along with associated compression and measurement facilities, located between Opal, Wyoming and Malin, Oregon (Figure 1). The Project would include an approximate 2.6-mile lateral to be constructed in Klamath County, Oregon. In addition to the existing King Compressor Station at Opal, Wyoming, Ruby proposes to install four new compressor stations for the Project: one located near the Opal Hub, one in western Utah, one near the mid-point of the Project north of Elko, Nevada, and one northwest of Winnemucca, Nevada. Ruby would utilize a 115-foot wide construction right-of-way (ROW) for installation of both the mainline and the lateral, and the final ROW width is 50 feet. The ROW will cross through four states: Wyoming, Utah, Nevada, and Oregon. A reclamation plan (Plan) is being developed for each state the Project crosses. This Plan is for Nevada from milepost (MP) 234 to 590.

In addition to the pipeline ROW, the Project will require temporary extra workspaces and access roads to the ROW (See the Plan of Development [POD]). Extra workspaces are required for the crossings of waterbodies, roads, railroads, and other utilities; terrain constraints; and staging areas. The Project will use existing public and private roads to access the pipeline ROW and extra workspaces. There are no plans for the construction of new access roads in Nevada. However, some existing roads will be widened to 30 feet and/or upgraded to accommodate heavy construction equipment. Some road sections may require extra grading to allow for adequate turning radius. All temporary road impacts will be reclaimed and seeded.

Nevada federal lands that will be crossed include Bureau of Land Management (BLM) Elko and Winnemucca District Offices (EDO and WDO); and the Surprise Field Office (SFO), California (Project lands are located in Nevada but managed by the SFO). The focus of this Plan is public lands. The Plan will also be applicable to privately owned lands pending approval by landowners.

The Project organized a technical team to provide input for the Nevada Plan. Team members are reclamation specialists from the BLM WDO, EDO, and SFO, as well as the Nevada Department of Wildlife (NDOW). Team members reviewed this Plan, provided important reclamation guidance, and recommended appropriate revegetation seed mixes.

Figure 1 Ruby Pipeline Proposed Route through Nevada



This Plan utilizes reclamation methods developed for other large-diameter pipeline projects that were approved by the Federal Energy Regulatory Commission (FERC) (Dames and Moore 1990; Ecology & Environment, Inc. 2002). Ruby incorporated into the Plan recent technical standards and published long-term restoration monitoring information associated with similar habitats (Ecology and Environment, Inc. 2002). The Plan also incorporates Ruby's Upland Erosion Control, Revegetation, and Maintenance Plan and Noxious and Invasive Weed Control Plan (POD Appendices D and H, respectively).

The BLM POD for the Project includes specifics regarding pipeline construction and clean-up procedures. This plan also incorporates additional landowner or other land management agency requirements, as well as any special conditions or recommendations of FERC as it completes its environmental review and the Final Environmental Impact Statement (FEIS).

2.0 Purpose

The Plan describes the processes and measures that will be implemented following construction to mitigate impacts from the Project in Elko, Humboldt, and Washoe counties. This Plan is applicable to the upland habitats of the ROW, extra workspace, and sections of access roads that require reclamation. Riparian and wetland restoration for Nevada is described the Wetland Mitigation Plan, Plan of Development (POD), Appendix Q.

No eligible or unevaluated cultural sites would be disturbed during reclamation without a data recovery (mitigation) plan. Revegetation criteria standards are presented in section 6.1 to judge plant establishment success. The Plan does not address Ruby's compensatory or off-site mitigation efforts, as they will be fully described in a separate plan (POD, Appendix S).

The purpose of the Plan is to provide guidance for reclaiming lands disturbed by pipeline construction. The Project ROW in Nevada is 357.4 miles, which translates to approximately 5,653 acres with a 115-foot ROW (See POD). Extra workspace would disturb approximately 1,358 acres. The Vya Construction Camp will encompass approximately 40 acres. Access roads would disturb approximately 1,407 acres.

3.0 Goals and Objectives

The short-term goal of pipeline reclamation is to stabilize soils by contouring terrain, spreading stockpiled topsoil, strategically placing erosion control devices, establishing temporary vegetation cover as needed, and abating noxious and invasive weed establishment. ROW reclamation would be initiated within 20 days after pipeline trench closure and final cleanup. The ROW would be contoured to blend with adjacent undisturbed terrain. Erosion control devices such as water bars and/or certified weed-free straw bales or wattles would be strategically placed to limit and/or direct overland water flow. Herbicide control of noxious or invasive weeds may be necessary following BLM regulations and timing.

The long-term restoration goal is to establish a permanent vegetation cover with similar species densities and compositions of adjacent lands undisturbed by the Project in accordance with 18 Code of Federal Regulations (CFR) 380.15 (http://www.gpoaccess.gov/CFR/) and FERC revegetation guidelines (http://www.ferc.gov/industries/gas/enviro/uplndctl.pdf) and Nevada guidelines for successful revegetation (NDEP, not dated). Establishment of a permanent plant cover is essential to provide resiliency to resist invasive annual grasses and forbs and provide soil erosion control. This long-term goal would be achieved through maintaining or adding new or existing erosion control devices, providing continuing noxious and invasive weed abatement, minimizing livestock and wild horse grazing, minimizing off-highway vehicle (OHV) travel, and implementing a monitoring program. Long-term restoration efforts would be deemed complete with successful establishment of a permanent plant cover. Determination of ROW restoration success would rest with the BLM on federal lands and landowners on private lands.

Ruby would employ the following restoration measures to meet short- and long-term goals.

- Apply soil management techniques, including mowing or brush hogging the ROW vegetation to provide construction vehicle access. Mowing or brush hogging would occur on relatively level terrain. Steep terrain would need to be contoured to create a safe working space. Mowed plant materials would be stockpiled for later use as mulch. Topsoil over the trenchline and areas where mowing does not occur would be removed, stockpiled and re-distributed on the trench. Soil management will enhance development of diverse, stable, and self-generating plant communities.
- Pre-treat the ROW with approved herbicides in applicable areas for noxious and invasive weed abatement prior to pipeline construction.

- Minimize weed dispersal by following appropriate methods of abatement (Siegel and Donaldson 2003)
- Use proper soil management techniques including stripping, stockpiling, and reapplying topsoil to establish surface conditions that would enhance development of diverse, stable, and self-generating plant communities.
- Establish stable surface and drainage conditions and the use of erosion control devices should minimize soil erosion and sedimentation.
- Re-establish terrain compatible with the surrounding landscape.
- Establish a permanent plant cover of native shrubs, grasses, and forbs along the ROW, extra workspaces, and access roads.
- No seeds from plants that are listed as noxious or invasive weeds by Nevada or on the U.S. Department of Agriculture (USDA) federal list (PLANTS website) will be planted.
- Use BLM- or landowner-approved seed mixes (which also includes container-grown); correlate with NRCS ecological sites and pipeline MPs (see Attachment A);
- Monitor during the construction and operation phases to ensure the achievement of both short-term and long-term restoration goals and objectives;
- Minimize construction impacts along the route by, where practical and safe, limiting ROW width to avoid impacts to native vegetation, sage-grouse leks, and pygmy rabbit habitat.
- Where long-term impacts occur to certain sensitive environments and habitats, Ruby would work with the BLM and NDOW and landowners to develop a plan for compensatory mitigation to offset ROW impacts. The plan would include proposed types of mitigation to be performed and areas to receive the treatments. The need for an appropriate level of National Environmental Policy Act analysis will be determined in consultation with federal agencies.

4.0 Restoration Schedule

The Project is scheduled to begin June 1, 2010. The POD presents specific information regarding construction procedures and timing. Pipeline construction is planned to be completed by March 1, 2011.

Restoration will include cleanup, backfilling, and surface grading, topsoiling, installing erosion control devices, preparing the seedbed, and establishing a permanent plant cover. Areas that will not be seeded within 14 days because of seasonal limitations, slopes greater than 10 percent, erosive soils, or aesthetically sensitive areas will be seeded with a sterile annual grass or slender wheatgrass immediately after seedbed preparation, in accordance with BLM field office policy; landowner approval would be obtained for private lands. The seeding or transplanting of native plants to establish the permanent vegetation cover will occur during late fall to early winter to take advantage of winter and spring precipitation (Monsen 2000, 2005; Plummer 1977). The temporary plant cover will be incorporated into the soil before the permanent plant cover is seeded.

5.0 Restoration Planning Process

The restoration process includes steps to satisfy the short- and long-term goals described in Section 3. The Plan incorporates lessons learned from the Kern Expansion Project restoration effort (Ecology and Environment, Inc. 2002, 2007) and the experiences of subject matter experts in arid and semi-arid land restoration (Plummer 1977; Institute for Land Rehabilitation 1978; Wallace et al. 1980; Monsen 2000, 2005; EDAW 2002; Monsen et al. 2004; Sheley et al. 2008; Bainbridge 2007). Considerable information is available through the BLM's Great Basin Restoration Initiative projects (BLM 1999, 2000).

The Nevada Guidelines for Revegetation present revegetation standards for planning, conservation, and plant selection (Nevada State Clearinghouse 1998). The goal of revegetation is to return the land to conditions and productive uses similar to pre-disturbance conditions or to a desired site-specific plant community. The use of local seed and plant material sources is encouraged.

In addition, the SFO, under BLM California revegetation policy, calls for the use of local sources of native seed and plant materials, to the greatest extent possible (BLM 2001).

5.1 Revegetation Study Plots

The Project will establish revegetation study plots in Nevada to identify ways to improve the chances of vegetation establishment in sagebrush-steppe and salt-desert shrub vegetation. These vegetation types can be challenging because of limited and unpredictable precipitation and competition from invasive annual weeds (Monsen 2000). Potential areas for study plots are Elko County and the area near the Sheldon National Wildlife Refuge in Nevada. The focus of the research would be to improve sage-grouse, pygmy rabbit, and big game habitat by improving revegetation success through enhanced seed mixes, biological soil crust (BSC) regeneration, and weed abatement. The study plots would be selected following clean-up, final restoration and seeding (fall 2010).

5.2 Restoration Approach

This Plan is applicable to the ROWs, extra workspaces, Vya Construction Camp, and access roads (including the access roads used in the Sheldon National Wildlife Refuge) in Nevada, and reference to the ROW restoration includes extra workspaces and access roads. Measures implemented to ensure successful restoration include topsoil removal and stockpiling during construction, cleanup, backfilling, appropriate surface re-contouring, soil erosion control, seedbed preparation, seeding of ecological site-specific seed mixes, plant establishment, weed abatement, and monitoring. Plants will be established mainly by seed obtained from commercial sources. Seeding will occur from September 15 to January 31. Attachment A presents ecological site information by MP along the ROW and the assigned seed mix.

Container-grown plants will be transplanted during March and April in locations, such as key sage-grouse, pygmy rabbit, and antelope habitats. Shrubs to be grown in containers for transplanting in appropriate sites include low sagebrush, basin big sagebrush, and Wyoming big sagebrush. ROW alignments will be given uneven edges by either leaving shrubs in place when clearing or planting shrub groupings after cleanup.

5.2.1 Clearing, Grading, and Topsoil Removal

Initial construction activities include surveying and staking the ROW, topsoil removal and stockpiling, grading for safe construction passage, trenching, and pipeline alignment as described in the POD. Dense stands of noxious and invasive weeds will be treated with an approved herbicide prior to vegetation clearing occurs, in accordance with Ruby's Noxious Weed Management Plan (Appendix H, POD). ROW surveying and staking will identify the width of excavation and blade work, including cut and fill locations.

The BLM has requested that topsoil only be removed and stockpiled from the ditchline and other areas where vegetation mowing or brush hogging cannot be conducted due to terrain limitations or similar constraints. Refer to the main text of the POD for topsoiling descriptions. The topsoil that is scraped from the ditchline and other areas will be stockpiled separately from subsoils. Environmental Inspectors will identify topsoil thickness for removal.

Existing vegetation, except trees and shrubs, will be scraped and stockpiled along with the topsoil. Large woody plants will be harvested and stored along the ROW. The topsoil and vegetation mixture will not be mixed with underlying subsoil horizons. Certified weed-free erosion control blankets and/or weed-free straw bales will be used to limit erosion as needed. Surface soil and sub-surface soils will be replaced in the proper order during backfilling and final grading operations.

Surface rocks, where present and where useful for restoration, will be stockpiled adjacent to the topsoil for use in restoration work. Salvaged surface rock will be redistributed on the ROW in size, density, and distribution similarly to adjacent areas not disturbed by construction. Subsurface rock will be separated from the subsoil. Salvaged rock will be used to re-create rock outcrops and rock faces to the extent possible. Salvaged rock will also be used as an OHV travel deterrent. Excessive rock excavated on BLM or agricultural lands and not used for restoration purposes will be removed and disposed at BLM- or landowner-approved locations.

Surface rock management in the SFO where surface rock has been removed, the collected rock will be scattered on the ROW after seeding to approximate natural landscape patterns. Rocks scattered over the ROW surface will be of the same types (origins), size, shape, percent cover, and colors as the surrounding landscape. Rock will be scattered to achieve the cover necessary to meet requirements for soil stability and erosion control. Any materials–including but not limited to rocks, stumps, or uprooted trees or shrubs–that cannot be used will be removed off-site. No windrowing or permanent storage will be allowed within the boundaries of the SFO. Excessive rock materials will not be scattered off the approved ROW or into other non-disturbed sites including streams or drainages.

During construction, all vehicle travel and equipment operation will be within the ROW or on approved access roads. Cross-country vehicle travel outside the ROW or on non-approved roads will not be allowed.

5.2.2 ROW, Extra Workspace, and Access Road Restoration

Restoration of the ROW will involve backfilling to the excavated ditchline, replacing stockpiled subsoils and the topsoil and vegetation mixture, restoring pre-existing terrain contours, installing erosion control devices, preparing the seedbed, and seeding. ROW restoration will begin within 20 days after pipeline trench closure and final cleanup. In visually sensitive areas, the ROW will be given an uneven edge either by leaving shrubs and/or trees in place when clearing or randomly seeding and/or planting clumps of shrubs.

Extra workspace, including the Vya Construction Camp, restoration will follow similar steps as ROW restoration including contouring, preparing the seedbed, and seeding. Extra workspace restoration will commence within a few days after the area is no longer needed. The seed mix will be compatible with the surrounding vegetation.

Access roads, including roads in the Sheldon National Wildlife Refuge, will be reclaimed according to agency or landowner directions. The BLM and NDOW have requested that all improved roads on public lands be returned to their original status after they are no longer needed. Access road restoration will include grading, preparing the seed bed, and seeding. Road restoration will begin within a few days after the road is no longer needed. The seed mix will be compatible with the surrounding vegetation.

Backfilling

Backfilling of subsoil materials will be required after the pipeline is aligned in the trench and padded with screened subsoil or other appropriate materials. The excavated subsoils will be used to backfill the trench. Any extra subsoil will be transported and used for pipeline padding and backfill in areas where suitable subsoils may be limited, such as from MP 500 to

588, where soils are shallow and limited. Also, extra subsoil may be feathered and blended across the construction corridor, creating a roughened surface to capture precipitation, decrease erosion, and provide safe sites for plant establishment.

Compacted Soils

Compacted soils will typically be associated with the ROW travel lane, pipe laydown locations, and access roads. Subsoil de-compaction will occur as necessary to reduce soil bulk density. Identified locations will be de-compacted to a minimum depth of 6-12 inches prior to surface soil replacement. “Soil ripping” will be used along contours to minimize soil erosion and facilitate soil-water retention to aid revegetation. Extra workspace and access roads will also be ripped as needed to reduce soil compaction.

Terrain Contouring

The ROW, extra workspaces, and access roads will be contoured to blend with the surrounding landscape. Contouring will emphasize restoration of existing drainage and landform patterns, to the extent practicable.

Topsoil and Mowed-Vegetation Replacement

The topsoil will be spread over areas where it was removed. The topsoil will provide seeds, vegetative propagules, and soil microbiota to facilitate vegetation establishment on the ROW. The mowed or brush hopped vegetation will be spread over the ROW after seeding to serve as mulch.

Mulch

A mulch cover minimizes soil erosion, conserves soil moisture, and moderates surface temperatures to improve the chances of seedling establishment (Sheley et al. 2008). BLM has requested that crimped straw mulch not be used for restoration purposes. However, to protect erodible soils, mulching materials such as certified weed-free straw, woodchips, soil tackifiers, and fabrics may be needed in localized areas such as slopes greater than 15 percent. These materials would be used with BLM or landowner approval. The mowed or brush-hogged vegetation will be distributed across the ROW as mulch. The vegetation applied at a rate so that approximately 25 percent of bare soil of an area will be observed. Adequate sunlight is necessary for the re-establishment of biological soil crusts (Jayne Belnap, USGS, telephone communication, January 29, 2010).

Soil Erosion Control

Soil erosion control can occur through establishing desirable vegetation, mulch, soil tackifiers, or water control devices (Institute for Land Rehabilitation 1978; Sheley et al. 2008). The Project will establish a permanent plant cover as quickly as possible after pipeline construction to minimize soil erosion. Mulch, erosion control blankets, certified weed-free straw bales and wattles, soil tackifiers, and/or water bars may also be used as appropriate. Water bars will likely be the main approach for controlling soil erosion because they are effective and cost efficient. All organic mulches, blankets, and wattles will be certified weed-free by the appropriate state agency or BLM.

Water bars or slope breakers are earth-berms established to control the flow of surface water (University of Minnesota Extension 1998). Water bars will be installed in all areas, except agricultural and pasture land and lawns, using spacing recommendations obtained from the local soil conservation authority or land management agency. In the absence of recommendations, Ruby will use the minimum spacing requirements outlined Ruby's Upland Erosion Control and Revegetation, and Maintenance Plan (POD Appendix D). Additionally, permanent water bars may extend slightly (about four feet) beyond the edge of the construction ROW to effectively drain water away from the disturbed area. Where slope breakers extend beyond the edge of the construction ROW, they are subject to compliance with all applicable survey requirements.

Water bars will consist of a one-foot-high berm with an upslope swale. Water bars will be reseeded. Water bars will be gently angled downslope to divert storm water runoff to a stable upland discharge point or to a "j" hook created at the outfall point.
The purposes of water bars are to:

- Decrease overland water velocities on disturbed lands by reducing slope lengths;
- Remove water from the disturbed area in a controlled manner and at frequent intervals to reduce its erosive power;
- Direct water into a stabilized location to minimize surface scour;
- Maximize water infiltration along the Project ROW; and,
- Slow water flow across the ROW to help maintain soil moisture for restoration efforts.

Noxious and Invasive Weed Abatement

Noxious and invasive weeds may reduce the success of ROW revegetation through competition for water, soil nutrients, space, and sunlight (Monsen 2000). Monitoring will identify where noxious and invasive weeds occur and abatement measures will be applied as appropriate (Noxious and Invasive Weed Control Plan, Appendix H, POD).

Cheatgrass, medusahead ryegrass, and annual mustards are anticipated to be the prevailing weeds impacting revegetation success (Shaw and Monsen 2000). The Project will use BLM- or landowner-approved herbicides to reduce annual weed presence and competition before seeding (Sheley et al. 2008). Application rates will follow the manufacturer's recommendations. A Pesticide Use Permit will be secured from the appropriate agencies prior to herbicide application.

Playas

A playa is a wet or dry shallow depression in a desert basin that may become at times a shallow lake due to precipitation or may have a central spring or pond due to interception of groundwater (NRCS 2010). Wet playas are typically characterized by a shallow depth to the groundwater, typically less than four meters. Evaporation of the high-total dissolved solids groundwater produces saline minerals at the surface and within the fine grained sediments between the surface and the groundwater table. Surfaces of wet playas can change over short periods of time between soft and hard, depending on the depth to groundwater, which fluctuates seasonally. . Dust emissions may also be present from the playa during dry periods. Dry playas are characterized by greater depths to the saturated zone and lack of evaporation of groundwater at the surface, which leads to hard, stable surfaces of clastic sediment. Dry playas typically do not produce much dust. Field identification of playas uses the following criteria:

- Vegetation is typically absent due to the fine-grained sediments, saline soils, and periodic flooding. Hydrophilic vegetation may be present, especially within the central or deepest portion of the depression if a spring or pond is present. Playas usually occur in salt-desert shrub vegetation types with plants adapted to alkaline and saline soils.
- Soils of dry and wet playas have fine grained sediments composed of silt and clay. Wet playas are typically identified by saline soils with a characteristic white color.
- Topography of a playa is defined by a depression or sink within topography of a basin. The perimeter of the depression is generally defined by soils and vegetation.
- Surface water may be present as springs within the central or deepest portion of the depression or present as shallow lakes after periods of precipitation and runoff.
- Groundwater is typically less than four meters below the surface for wet playas, although the depth may vary seasonally or may be intercepted in the deepest portions of the depression. Dry playas typically have groundwater more than four meters below the surface. Installation of shallow wells or borings may help determine if the playa is wet or dry.

Playas occur in Nevada at MPs 488 and 565. The Project will avoid these playas to the extent possible. The majority of the construction would occur in the early summer to late fall timeframe, which should help minimize the chance of crossing playas when significant water is present. Playas that are disturbed from the Project would be returned to their preconstruction condition to the extent practicable, through soil compaction using heavy equipment. However, these soils may need sufficient water for compaction and the proper soil moisture is difficult to achieve. Where the hardpan has been punctured, the addition of bentonite clay to the subsurface or bentonite patches may be useful to restore preconstruction soil infiltration and drainage rates if compaction is not possible.

The approach to playa restoration will also apply to spring and seep areas to prevent interception of subsurface water into the pipeline trench.

Biological Soil Crusts and Playas

BSCs are a complex mixture of cyanobacteria, green algae, lichens, mosses, microfungi, and other bacteria that live within the top one to two inches of the soil surface (Belnap 2001). BSCs are also known as cryptogramic, cryptobiotic, microbiotic, or microphytic soil crusts. BSCs are important for soil-surface stabilization, nutrient recycling, water infiltration, and enhance seed germination. Concentrations of BSC usually occur on silt loam or very fine sandy loam soil textures in Wyoming big sagebrush and shadscale plant communities. BSCs have been identified at MP 487.9, but they are probably more widespread on the ROW than this one location.

Areas where vegetation mowing occurs will leave the soil intact along the ROW. However, construction vehicles will disturb the soils on portions of the ROW. Pockets of undisturbed soil will provide a source of propagules to re-establish BSC on surrounding disturbed soils (Jayne Belnap, USGS, telephone communication, January 29, 2010). Re-establishment of vegetation along the ROW will also facilitate BSC restoration (Belnap 2001).

5.2.3 Revegetation

Vegetation types within the ROW vary according to soil types, topography, climatic conditions, and land management practices. Several seed mixes are necessary to accommodate the range of variability in soils, elevation, terrain, and annual precipitation (Sheley et al. 2008). Plants will be re-established by seeding and by planting container-grown seedlings. The different mixes of species for seeding and seedling transplanting were developed with input from BLM and NDOW. Analysis of ecological sites along the ROW also informed the development of seeding mixes and appropriate locations for their application (Attachment A).

Seedings will be the main method of establishing plants on the ROW, extra workspaces, and access roads. Container-grown seedlings will be used to re-establish sagebrush in specific habitat areas recommended by BLM and NDOW. Reference to seed mixes also includes container-grown seedlings, as appropriate.

Seeds for the seed mixes will be purchased from commercial vendors or collected by professional seed collectors following BLM seed collecting policy. Seeds will be sourced from the ROW, immediately adjacent to the ROW, or from similar ecological sites, where possible. Ecotypic variation within species is important for successful plant establishment (Plummer 1977; Institute for Land Rehabilitation 1978). Commercially purchased seed will be sourced from ecological sites similar to the ROW. The BLM will be informed of commercially available seed sources and any major changes to the seed mixes.

These databases were resources in developing the seed mixes: USDA-NRCS Plants Database (http://plants.usda.gov), VegSpec (http://vegspec.nrcs.usda.gov/vegSpec/index.jsp), and the Native Seed Network (http://www.nativeseednetwork.org).

The proposed seed mixtures were designed to be compatible with the dominant vegetation and land uses currently found along the ROW. The criteria used for selecting the seed mixes were based on the following:

- Erosion-control capability,
- Plant dominance of surrounding vegetation,
- Land use,
- Availability of seed,
- Wildlife habitat value,
- Livestock management, and
- Restoration of traditional food and medicine gathered by Native Americans.

Seeds will be tested for purity and viability, and certified as weed free to ensure compliance with local, state, and federal seed requirements (Monsen 2000).

Seedbed Preparation and Seed Mix

Seedbed preparation will consist of contouring, decompacting, and restoring surface soil, as described in Section 5.2.2. The soil surface will be worked with heavy equipment to create a roughened surface (Institute for Land Rehabilitation 1978, Monsen 2000, 2005, Sheley et al. 2008). The roughened soil surface will facilitate the collection of precipitation to enhance soil water percolation, reduce erosion, and provide safe sites for seedling establishment. The seedbed will be firm but not compacted, nor will it have a crusted surface.

The pipeline will cross sagebrush-steppe vegetation, salt-desert shrub, pinion-juniper riparian/wetland, and agricultural vegetation types. Seeds mixes including grasses, forbs, and shrubs will be used to restore vegetation on BLM lands. The seed mix for private lands will be based on previous or adjacent land uses and approved by the landowner.

Establishing vegetation in arid and semi-arid sagebrush-steppe and salt-desert shrub vegetation types can be challenging because of unpredictable precipitation and noxious or invasive weed competition (Monsen 2000). Proper seedbed preparation, mulch, adapted seed mix, mycorrhizal fungi inoculation, and weed abatement are all ways to improve the chances of successful plant establishment (Institute for Land Rehabilitation 1978; Monsen 2000, 2005; Plummer 1977; Sheley et al. 2008).

Plant establishment objectives are to stabilize the site, and establish a productive plant community based on the applicable land use plan (M. Zielinski, BLM Winnemucca Field Office, emails dated February 3, 2010). To meet these goals, a Reclaimed Desired Plant Community (RDPC) is defined. The RDPC is a permanent plant community established on a disturbed site, which contributes to stability through management and land treatment, and which produces the type and amount of vegetation necessary to meet or exceed both land uses for the site.

Seed Mixes

Tables 5.2-1 through 5.2-17 present the seed mixes provided by the BLM for use on federal lands under its jurisdiction in the Elko and Winnemucca District Offices (pounds and seed numbers are rounded) (M. Zielinski, BLM Winnemucca District Office, emails dated February 3, 2010). EDO MP reference is pending a cross-check with ecological site references completed by Walsh Environmental for the pipeline route. Seed mixes locations are referenced in Attachment A and on map copies of the march chart (under development).

Table 5.2-1 Shadscale MPs 264, 401–404, 409–411; 436–437; 488–489

Ecological site: NV024XY002 Loamy 5–8;

Species/Variety [1]	Rate PLS (lbs/ac)	Max. Rate Bulk (lbs/ac)	Min. PLS/ BLM	Total Bulk lbs	# PLS Seeds/ Acre	# PLS Seeds/ square foot
Drill Seeding Seed Mix						
Siberian wheatgrass (Vavilov)	4.0	4.9	0.8075		680,000	16
Russian wildrye (Boizoisky)[2]	2.0	2.6	0.7650		350,000	8
Gooseberry-leaf globemallow	0.50	0.7	0.6750		250,000	6
Four-wing saltbush (Local Source)	1.5	4.8	0.3150		78,000	2
Shadscale (Local Source)	1.5	4.8	0.3150		97,350	2
Aerial/Ground Broadcast Seeding						
Forage kochia (Immigrant) [3]	0.75	1.5	0.5100		305,775	7
Rounded Total	10.75	19.3				41

1 Species could be substituted due to availability or future knowledge regarding better cultivars or similar species for the site(s).
2 Recommend seeding by itself in separate drill rows through partition in the drill to increase potential for establishment
3 Aerial/Ground broadcast-seeded over the drill seeding area after drill-seeding operations

Table 5.2-2 Low-precipitation Wyoming Big Sagebrush MPs 241–246, 250–256, 263, 268–269, 271–275, 279–280, 286, 303–317, 321–335, 380–386, 394–397, 423–425

Ecological sites: NV023XY038, NV024XY020, NV028BXY010 Droughty Loam 8-10; NV023XY006, NV024XY005, NV025XY019, NV028BXY047 Loamy 8-10; NV024XY006 Dry Floodplain;

Species/Variety[1]	Rate Pure Live Seed (lbs/ac)	Max. Rate Bulk (lbs/ac)	Min. PLS/ BLM	Total Bulk lbs	# PLS Seeds/ Acre	# PLS Seeds/ square foot
Drill Seeding Seed Mix						
Siberian wheatgrass (Vavilov)	3.0	3.7	0.8075		510,000	12
Russian wildrye (Boizoisky) [2]	2.0	2.6	0.7650		350,000	8
Sandberg bluegrass	0.5	0.7	0.7200		462,500	11
Thickspike wheatgrass (Bannock)	1.5	2.0	0.7650		231,000	5
Blue flax (Appar)	0.50	0.7	0.7600		146,500	3
Gooseberry-leaf globemallow	0.50	0.7	0.6750		250,000	6
Four-wing saltbush (Local source)	1.5	4.8	0.3150			
Aerial/Ground Broadcast Seeding[3]						
Forage kochia (Immigrant) [3]	0.75	1.5	0.5100		305,775	7
Western Yarrow (Idaho cultivar) [3]	0.15	0.18	0.8414		415,500	10
Wyoming big sagebrush[3]	0.10	0.6	0.1600		250,000	6
Rounded Total	10.40	17.48				68

[1] Species could be substituted due to availability or future knowledge regarding better cultivars or similar species for the site(s).
[2] Recommend seeding by itself in separate drill rows through partition in the drill to increase potential for establishment
[3] Aerial/Ground broadcast-seeded over the drill seeding area after drill-seeding operations

Table 5.2-3 High-precipitation Wyoming Big Sagebrush MPs 528–530, 485–487

Ecological sites: NV023XY005 Dry Floodplain; NV23XY020, NV024XY013, NV025XY014 Loamy 10-12; NV023XY030, NV024XY028 South Slope 8-12, NV024XY035 Shallow Loam 10-14; NV023XY039 Loamy Slope 10-14; NV023XY082 Loamy Fan 10-12

Species/Variety [1]	Rate Pure Live Seed (lbs/ac)	Max. Rate Bulk (lbs/ac)	Min. PLS/ BLM	Total Bulk lbs	# PLS Seeds/ Acre	# PLS Seeds/ square foot
Drill Seeding Seed Mix						
Siberian wheatgrass (Vavilov)	1.5	1.9	0.8075		255,000	6
Great Basin wildrye (Magnar)	2.0	2.6	0.7650		260,000	6
Sandberg's bluegrass (Mtn Home, ID)	0.25	0.4	0.7200		231,250	5
Big bluegrass (Sherman)	0.25	0.4	0.6300		220,500	5
P-7 Bluebunch wheatgrass	1.5	2.0	0.7650		210,000	5
Thickspike wheatgrass (Bannock)	1.5	2.0	0.7650		231,000	5
Blue flax (Appar)	0.25	0.3	0.7600		73,250	2
Gooseberry-leaf globemallow	0.25	0.4	0.6750		125,000	3
Arrowleaf balsamroot	1.0	5.0	0.2000		55,000	1
Aerial/Ground Broadcast Seeding [2]						
Western Yarrow (Idaho cultivar) [2]	0.15	0.18	0.8414		415,500	10
Wyoming big sagebrush[2]	0.10	0.6	0.1600		250,000	6
Basin big sagebrush[2]	0.10	0.6	0.1600		250,000	6
Rounded Total	8.85	16.38				60

[1] Species could be substituted due to availability or future knowledge regarding better cultivars or similar species for the site(s).
[2] Aerial/Ground broadcast-seeded over the drill seeding area after drill-seeding operations

Table 5.2-4. Low-Sagebrush Vegetation Type MPs 281–285, 287–302, 336–343, 348–366, 377–379

Gray low sagebrush (*Artemesia arbuscula arbuscula*) or early low sagebrush (*Artemesia arbuscula longiloba*) seed would have to be collected locally. **Ecological sites:** NV023XY031Claypan 10-14; NV23XY017 Claypan 14-16; NV024XY018, NV025XY018 Claypan 10-12; NV024XY027, NV025XY017 Claypan 12-16; NV023XY059 Gravelly Claypan 10-12; NV025XY023 Gravelly Claypan 12-16; NV023XY003 Clay Basin; NV025XY024 Mountain Ridge;

Species/Variety [1]	Rate Pure Live Seed (lbs/ac)	Max. Rate Bulk (lbs/ac)	Min. PLS/ BLM	Total Bulk lbs	# PLS Seeds/ Acre	# PLS Seeds/ square foot
Drill Seeding Seed Mix						
P-7 Bluebunch wheatgrass	2.5	3.2	0.7650		350,000	8
Great Basin wildrye (Magnar)	1.0	1.3	0.7650		130,000	3
Sandberg's bluegrass (Mtn Home, ID)	0.4	0.6	0.7200		370,000	8
Bottlebrush squirreltail (Sand Hollow or local source)[2]	1.0	1.5	0.6750		192,000	4
Idaho fescue (Joseph)	1.0	1.2	0.8550		450,000	10
Antelope bitterbrush[2] (local NE NV source)	2	2.3	0.8850		15,000	0.6
Arrowleaf balsamroot	2.0	10	0.2000		110,000	2
Blue flax (Appar)	0.25	0.3	0.7600		73,250	2
Aerial/Ground Broadcast Seeding [3]						
Western Yarrow (Idaho cultivar) [3]	0.15	0.18	0.8414		415,500	10
Gray low sagebrush/early low sagebrush[3]	0.15	0.9	0.1600		375,000	9
Basin big sagebrush[3]	0.15	0.9	0.1600		375,000	9
Rounded Total	10.60	19.99				66

[1] Species could be substituted due to availability or future knowledge regarding better cultivars or similar species for the site(s).
[2] Recommend seeding by itself in separate drill rows through partition in the drill to increase potential for establishment. Seeded where bitterbrush occurred prior to pipeline construction disturbance. Seeds need to be acid washed, scarified, or outer shell removed before seeding.
[3] Aerial/Ground broadcast-seeded over the drill seeding area after drill-seeding operations

Table 5.2-5 Pre-Disturbance Big Sagebrush–Bitterbrush Vegetation Type-Dominated Areas MPs 367–376, 387–393

Big Sagebrush – Bitterbrush Vegetation Type (Willow Creek area starting west on Tuscarora Allotment/Private Lands) – Primarily Loamy 10-12 PZ. Eco Site (with other eco sites as associated sites). **Adjust blue flax, balsamroot and sainfoin rates up to allow for collective 50 seeds/sq. ft or more to make up for any "no shrub" seeding areas to allow for fuel break efforts.**

Species/Variety [1]	Rate Pure Live Seed (lbs/ac)	Max. Rate Bulk (lbs/ac)	Min. PLS/ BLM	Total Bulk lbs	# PLS Seeds/ Acre	# PLS Seeds /square foot
Drill Seeding Seed Mix						
Secar Snake River wheatgrass	1.5	2.0	0.7650		210,000	5
Bannock thickspike wheatgrass	1.5	2.0	0.7650		231,000	5
P-7'Bluebunch wheatgrass	2.0	2.6	0.7650		280,000	6
'Magnar' Great Basin wildrye	1.0	1.3	0,7650		130,000	3
'Canbar' Canby bluegrass	0.25	0.4	0.6300		231,500	5
Big bluegrass (Sherman)	0.25	0.4	0.6300		220,500	5
Arrowleaf balsamroot	1.0 [2.0][2]	5.0 [10.0]	0.2000		55,000 [110,000]	1 [2]
Sainfoin (Eski)	2.0 [4.0][2]	2.5 [5.0]	0.8075		44,000 [88,000]	1 [2]
Blue flax (Appar)	0.25 [0.75][2]	0.30 [1.00]	0.7600		73,25021 9,750	2 [6]
Antelope Bitterbrush – (Local NE NV source) [2]	3.0	3.5	0.8550		45,000	1
Aerial/Ground Broadcast Seeding [3]						
Western Yarrow (Idaho cultivar) [3]	0.15	0.18	0.8414		415,500	10
Mountain big sagebrush[3]	0.05	0.31	0.1600		125,000	3
Basin big sagebrush[3]	0.05	0.31	0.1600		125,000	3
Wyoming big sagebrush[3]	0.05	0.31	0.1600		125,000	3
Rounded Total	13.05 [17.05]	16.61 [1.00]				53 [49]

[1] Species could be substituted due to availability or future knowledge regarding better cultivars or similar species for the site(s).
[2] Recommend seeding by itself in separate drill rows through partition in the drill to increase potential for establishment. Seeded where bitterbrush occurred prior to pipeline construction disturbance. Seeds need to be acid washed, scarified, or outer shell removed before seeding.
[3] Aerial/Ground broadcast-seeded over the drill seeding area after drill-seeding operations.

Table 5.2-6 Mountain Big Sagebrush MPs 344–345; 347, 514-–527

Ecological site – NV023XY007 Loamy 14-16; NV023XY015 Stony Loam 12-14; NV023XY016 South Slope 12-16; NV023XY066 Ashy Loam 14-16, NV025XY056 Loamy 14-16; NV25XY031 Stony Mahogany Savanna; NV25XY012 Loamy slope 12-16; NV025XY009 South Slope 12-14; NV025XY007 Gravelly Loam 12-16; NV025XY004 Loamy Slope 16+;

Species/Variety [1]	Rate Pure Live Seed (lbs/ac)	Max. Rate Bulk (lbs/ac)	Min. PLS/ BLM	Total Bulk lbs	# PLS Seeds/ Acre	# PLS Seeds/ square foot
Drill Seeding Seed Mix						
Bannock thickspike wheatgrass	1.5	2.0	0.7650		231,000	5
'Magnar' Great Basin wildrye	2.0	2.6	0.7650		260,000	6
'Secar' Snake River wheatgrass	1.5	2.0	0.7650		210,000	5
'P-7' Bluebunch wheatgrass	2.0	2.6	0.7650		280,000	7
Intermediate wheatgrass 'Oahe'	1.0	1.2	0.8075		88,0000	2
'Canbar' Canby bluegrass	0.25	0.4	0.6300		231,500	5
Big bluegrass (Sherman)	0.25	0.4	0.6300		220,500	5
Pacific aster[3]	0.05		?		133,400	3
'Delar' Small burnet	2.0	2.6	0.7600		110,000	2
'Ladak' upland alfalfa	1.0	1.1	0.8075		210,000	5
'Palmer' penstemon	0.80	1.1	0.7200		488,000	11
Arrowleaf balsamroot	1.0	5.0	0.2000		55,000	1
Sainfoin (Eski)	2.0	2.3	0.8075		44,000	1
Antelope Bitterbrush (Local NE NV source) [2]	3.0	3.5	0.8550		45,000	1
Utah Serviceberry	4.0		?		103,200	2
Aerial/Ground Broadcast Seeding [3]						
Western Yarrow (Idaho cultivar) [3]	0.10	0.12	0.8100		415,500	10
Mountain big sagebrush[3]	0.05	0.9	0.1600		125,000	3
Basin big sagebrush[3]	0.05	0.9	0.1600		125,000	3
Wyoming big sagebrush[3]	0.05	0.9	0.1600		125,000	3
White-stemmed rubber rabbitbrush[3]	0.10	0.9	0.1125		40,000	1
Rounded Total	20.7	?				81

[1] Species could be substituted due to availability or future knowledge regarding better cultivars or similar species for the site(s).
[2] Where bitterbrush was documented to occur prior to the project. Recommend seeding by itself in separate drill rows through partition in the drill to increase potential for establishment
[3] Aerial/Ground broadcast-seeded over the drill seeding area after drill-seeding operations.

Table 5.2-7 Black Sagebrush 234-240; 247-249; 257-262; 276-278; 318-320

Ecological Sites: NV024XY30 Shallow Calcareous Loam 8-10, NV024XY31 Shallow Calcareous Loam 10-14, and NV028XY060 Shallow Calcareous Loam 10-14, NV025XY057 Shallow Clay Loam 10-14;

Species/Variety [1]	Rate Pure Live Seed (lbs/ac)	Max. Rate Bulk (lbs/ac)	Min. PLS/ BLM	Total Bulk lbs	# PLS Seeds/ Acre	# PLS Seeds/ square foot
Drill Seeding Seed Mix						
Siberian wheatgrass 'Vavilov'	2.0	2.5	0.8075		340,000	8
Indian Ricegrass 'rimrock'	2.0	2.6	0.7600		282,000	6
Bluebunch wheatgrass 'P-7'	2.0	2.6	0.7650		280,000	6
Blue flax 'Appar'	0.5	0.7	0.7600		146,000	3
American vetch	0.5	0.7	0.7600		15,500	1
Winterfat local NE NV source[2]	1.0	3.3	0.3000		56,500	1
Antelope Bitterbrush – local NE NV source[2]	3.0	3.5	0.8550		45,000	1
Aerial/Ground Broadcast Seeding [3]						
Western Yarrow (Idaho cultivar) [3]	0.15	0.18	0.8414		415,500	10
Black sagebrush[2]	0.10	0.62	0.1600		250,000	6
Wyoming big sagebrush[3]	0.05	0.31	0.1600		125,000	3
Rounded Total	11.30	17.01				45

[1] Species could be substituted due to availability or future knowledge regarding better cultivars or similar species for the site(s).

[2] Recommend seeding by itself in separate drill rows through partition in the drill to increase potential for establishment. Seeded where bitterbrush occurred prior to pipeline construction disturbance. Seeds need to be acid washed, scarified, or outer shell removed before seeding.

[3] Aerial/Ground broadcast-seeded over the drill seeding area after drill-seeding operations.

Table 5.2-8 Little Sagebrush (Lahontan) MPs 507–513

Ecological Site: NV023XY037 Clayey Slope 8-12; Little sagebrush ((*Artemisia arbuscula longicaulis*)) seed is not available, and would have to be collected locally.

Species/Variety [1]	Rate Pure Live Seed (lbs/ac)	Max. Rate Bulk (lbs/ac)	Min. PLS/ BLM	Total Bulk lbs	# PLS Seeds/ Acre	# PLS Seeds/ square foot
Drill Seeding Seed Mix						
Fourwing saltbush	1.5	4.8	0.3150		58,00	1
Bluebunch wheatgrass ‘p-7’	3.0	3.9	0.7650		420,000	10
‘Secar’ Snake River wheatgrass	3.0	3.9	0.7650		420,000	10
‘Ladak’ alfalfa	0.8	1.0	0.8075		168,000	4
Blue flax (Appar)	0.50	0.7	0.7600		146,500	3
‘Ladak” upland alfalfa	1.0	1.1	0.8075		210,000	5
Aerial/Ground Broadcast Seeding[2]						
Western Yarrow (Idaho cultivar) [2]	0.15	0.18	0.8414		415,500	10
Little sage[2]	0.2	1.2	0.1600		181,440	14
Basin big sagebrush[2]	0.2	1.2	0.1600		181,440	14
Rounded Total	10.25	13.48				63

Notes:
[1] Species could be substituted due to availability or future knowledge regarding better cultivars or similar species for the site(s).
[2] Aerial/Ground broadcast-seeded over the drill seeding area after drill-seeding operations.

Table 5.2-9 Black Greasewood MPs 265–267, 270, 405–408, 412–413, 454–484, 493–502

Ecological Site: NV024XY003, NV027XY024 Sodic Terrace 6-8; NV024XY008 Sodic Flat 8-10; NV024XY011 Sodic Flat 6-8; NV024XY015 Deep Sodic Fan; NV024XY022 Sodic Terrace 8-10; NV028BXY020 Sodic Flat 5-12.

Species/Variety [1]	Rate Pure Live Seed (lbs/ac)	Max. Rate Bulk (lbs/ac)	Min. PLS/ BLM	Total Bulk lbs	# PLS Seeds/ Acre	# PLS Seeds/ square foot
Drill Seeding Seed Mix						
Fourwing saltbush	3.00	9.6	0.3150		156,000	4
Shadscale	3.00	9.6	0.3150		194,700	4
Siberian wheatgrass	3.00	3.7	0.8075		510,000	10
Black greasewood	3.00	9.6	0.3150		630,000	18
Gooseberry-leaf globemallow	0.25	0.4	0.6750		125,000	3
Rounded Total	12.25	32.9				39

Notes:
[1] Species could be substituted due to availability or future knowledge regarding better cultivars or similar species for the site(s).

Table 5.2-10 Alkali Sacaton MPs 435, 490–492

Ecological Site: NV024XY010 Sodic Floodplain; NV024XY007 Saline Bottom, NV024XY009 Saline Meadow

Species/Variety [1]	Rate Pure Live Seed (lbs/ac)	Max. Rate Bulk (lbs/ac)	Min. PLS/ BLM	Total Bulk lbs	# PLS Seeds/ Acre	# PLS Seeds/ square foot
Drill Seeding Seed Mix						
Basin wildrye ‘Magmar or Trailhead	4.0	5.2	0.7650		520,000	4
Inland saltgrass	4.0	5.2	0.7650		1,591,200	37
Alkali sacaton	0.8	1.0	0.7650		1,406,400	32
Rounded Total	8.8	11.4				83

Notes:
[1] Species could be substituted due to availability or future knowledge regarding better cultivars or similar species for the site(s).

Table 5.2-11 Sandy Big Sagebrush Sites MPs 430–434

Ecological site: NV024XY017 Sandy 8-10; NV023XY051 Sandy 10-12

Species/Variety [1]	Rate Pure Live Seed (lbs/ac)	Max. Rate Bulk (lbs/ac)	Min. PLS/ BLM	Total Bulk lbs	# PLS Seeds/ Acre	# PLS Seeds/ square foot
Drill Seeding Seed Mix						
Indian Ricegrass ‘Rimrock’	3.0	3.9	0.7600		423,000	12
Needle and thread	3.0	6.6	0.4500		345,000	8
‘Palmer’ penstemon	0.8	1.1	0.7200		488,000	11
Fourwing saltbush	3.0	9.6	0.3150		156,000	4
Rounded Total	9.8	21.2				35

Notes:
[1] Species could be substituted due to availability or future knowledge regarding better cultivars or similar species for the site(s).

Table 5.2-12–Fire Fuel Break MPs 397–400, 414–423, 426–429, 438 to 453, 503–506, 542-545

Ecological site: NV024XY005 Loamy 8-10; NV024XY020 Droughty Loam 8-10;

Species/Variety [1]	Rate Pure Live Seed (lbs/ac)	Max. Rate Bulk (lbs/ac)	Min. PLS/ BLM	Total Bulk lbs	# PLS Seeds/ Acre	# PLS Seeds/ square foot
Drill Seeding Seed Mix						
Crested Wheatgrass any of the following varieties: ‘Hycrest’, ‘Kirk’, ‘Nordan’, ‘Roadcrest’, or ‘Siberian’	5.0	6.2	0.8075		875,000	25
Forage kochia	0.5	1.0	0.5100		203,500	5
Rounded Total	5.5	7.2				30

Notes:
[1] Species could be substituted due to availability or future knowledge regarding better cultivars or similar species for the site(s).

The fuel-break mix would be used in areas dominated by non-native invasive annual grasses such as cheatgrass and medusahead wildrye. Annual grasses are highly flammable and have the potential to carry fire through the landscape. Crested wheatgrass and forage kochia are introduced perennial species with low-flammability characteristics. The crested wheatgrass and forage kochia seedings would reduce fuel continuity and flammability. Native plants could be interseeded by BLM and Ruby into the crested wheatgrass and kochia plantings after successful establishment to increase plant diversity. Species would be selected that would still maintain a low flammability.

Surprise Field Office Seed Mixes

First priority, seeds for the seeding mixes will be collected from local native stock within or adjacent to ROW or similar ecological sites, or within the watershed adjacent to the ROW. Second priority, if local native seed is unavailable, native cultivars can be used.

Table 5.2.13 Low-Precipitation Wyoming Big Sagebrush MPs 539–541, 546–549

Ecological site: NV023XY006 Loamy 8-10" PZ

Species/Variety [1]	Rate Pure Live Seed (lbs/ac)	Max. Rate Bulk (lbs/ac)	Min. PLS/ BLM	Total Bulk lbs	# PLS Seeds/ Acre	# PLS Seeds/ square foot
Drill Seeding Seed Mix						
Thurber's needlegrass	2.0	4.4	0.4500		300,000	7
Indian ricegrass	1.0	1.3	0.7600		141,000	4
Bottlebrush squirreltail	1.0	1.4	0.7200		192,000	4
Sandberg's bluegrass	1.0	1.6	0.6300		925,000	21
Blue flax (Appar)	0.5	0.7	0.7600		146,000	3
Globemallow	0.5	0.7	0.6750		250,000	6
Aerial/Ground Broadcast Seeding [2]						
Western yarrow (Idaho cultivar) [2]	0.25	0.30	0.8414		1,038,750	24
Wyoming big sagebrush (local) [2]	0.25	1.56	0.1600		625,000	9
Rounded Total	6.50	11.96				78

[1] Species could be substituted due to availability or future knowledge regarding better cultivars or similar species for the site(s). Seed would be purchased on a Pure Live Seed Basis. Also, seed must be Certified or "Source Identified" with no detectable State of Nevada or California-listed noxious weeds.

[2] Aerial/Ground broadcast-seeded over the drill seeding area after drill-seeding operations

Table 5.2-14 Low-Sagebrush Vegetation Type MPs 534–541, 573–576, 580–590

Ecological site: NV023XY031 Claypan 10-14; NV23XY017 Claypan 14-16; NV023XY059 Gravelly Claypan 10-12

Species/Variety [1]	Rate Pure Live Seed (lbs/ac)	Rate Bulk lbs/ac	Min PLS per BLM standard	Total Bulk lbs (rounded)	# PLS Seeds per Acre	# PLS Seeds/ square foot (rounded)
Drill Seeding Seed Mix						
Bluebunch wheatgrass	2.5	3.2	0.7650		350,000	8
Great Basin wildrye	1.0	1.3	0.7650		130,000	3
Sandberg's bluegrass	0.4	0.6	0.7200		370,000	8
Bottlebrush squirreltail	1.0	1.5	0.6750		192,000	4
Idaho fescue	1.0	1.2	0.8550		450,000	10
Antelope bitterbrush[2] (local source)	2.0	2.3	0.8850		15,000	0.6
Arrowleaf balsamroot	2.0	10	0.2000		110,000	2
Blue flax (Appar)	0.25	0.3	0.7600		73,250	2
Aerial/Ground Broadcast Seeding [3]						
Western Yarrow (Idaho cultivar) [3]	0.15	0.2	0.8100		415,500	10
low sagebrush[3]	0.15	0.9	0.1600		375,000	9
Rounded Total	10.45	21.5				56.6

[1] Species could be substituted due to availability or future knowledge regarding better cultivars or similar species for the site(s). Seed would be purchased on a Pure Live Seed Basis. Also, seed must be Certified or "Source Identified" with no detectable State of Nevada or California-listed noxious weeds.

[2] Recommend seeding by itself in separate drill rows through partition in the drill to increase potential for establishment. Seeded where bitterbrush occurred prior to pipeline construction disturbance. Seeds need to be acid washed, scarified, or outer shell removed before seeding.

[3] Aerial/Ground broadcast-seeded over the drill seeding area after drill-seeding operations

low sagebrush (Artemesia arbuscula ssp.) seed collected locally would have to be completed under a bid contract.

Table 5.2-15 Mountain Big Sagebrush MPs 531–533, 572.5–573, 576–580

Ecological site – NV023XY007 Loamy 14-16; NV023XY039 Loamy Slope10-14; NV023XY015 Stony Loam 12-14; NV023XY016 South Slope 12-16

Species/Variety [1]	Rate Pure Live Seed (lbs/ac)	Rate Bulk lbs/ac	Min PLS per BLM standard	Total Bulk lbs (rounded)	# PLS Seeds per Acre	# PLS Seeds/ square foot (rounded)
Drill Seeding Seed Mix						
Bluebunch wheatgrass	3.0	4.0	0.7650		420,000	10
Thurber's needlegrass	2.0	4.4	0.4500		300,000	7
Canby's bluegrass	0.25	0.4	0.6300		231,500	5
Great Basin wildrye	1.0	1.3	0.7650		130,000	3
Arrowleaf balsamroot	1.0	5.0	0.2000		55,000	1
Antelope Bitterbrush [2] (local source)	3.0	3.5	0.8550		45,000	1
Aerial/Ground Broadcast Seeding [3]						
Western Yarrow (Idaho cultivar)*	0.10	0.12	0.8100		415,500	10
Mountain big sagebrush*	0.05	0.9	0.1600		125,000	3
Basin big sagebrush*	0.05	0.9	0.1600		125,000	3
Wyoming big sagebrush*	0.05	0.9	0.1600		125,000	3
Utah Serviceberry	4.0		?		103,200	2
Rounded Total	14.50	?				46

[1] Species could be substituted due to availability or future knowledge regarding better cultivars or similar species for the site(s). Seed would be purchased on a Pure Live Seed Basis. Also, seed must be Certified or "Source Identified" with no detectable State of Nevada or California-listed noxious weeds.

[2] Recommend seeding by itself in separate drill rows through partition in the drill to increase potential for establishment. Seeded where bitterbrush occurred prior to pipeline construction disturbance. Seeds need to be acid washed, scarified, or outer shell removed before seeding.

[3] Aerial/Ground broadcast-seeded over the drill seeding area after drill-seeding operations.

*Broadcast last over harrowed or mulched area, then lightly covered (approx. 1/16 to 1/8 inch) with soil or mulch

Table 5.2.16 Black Greasewood MPs 563–571

Ecological sites: NV024XY008 Sodic Flat 8-10; NV024XY022 Sodic Terrace 8-10; NV023XY010 Saline Bottom; NV023XY005 Dry Floodplain

Species/Variety [1]	Rate Pure Live Seed (lbs/ac)	Rate Bulk lbs/ac	Min PLS per BLM standard	Total Bulk lbs (rounded)	# PLS Seeds per Acre	# PLS Seeds/ square foot (rounded)
Drill Seeding Seed Mix						
Great Basin wildrye	3.0	3.9	0.7650		390,000	9
Indian ricegrass	0.5	0.7	0.7600		70,500	2
Bottlebrush squirreltail	0.5	0.8	0.6750		96,000	2
Inland saltgrass	3.0	3.0	0.7650		1,591,200	25
Alkali sacaton	0.8	1.0	0.7650		1,060,800	32
Nevada bluegrass	1.0	1.6	0.6300		87,120	2
Globemallow	0.5	0.7	0.6750		250,000	6
Fourwing saltbush	3.0	9.6	0.3150		156,000	4
Black greasewood	3.0	9.6	0.3150		630,000	18
Rounded Total	15.3					

[1] Species could be substituted due to availability or future knowledge regarding better cultivars or similar species for the site(s). Seed would be purchased on a Pure Live Seed Basis. Also, seed must be Certified or "Source Identified" with no detectable State of Nevada or California-listed noxious weeds.

Table 5.2-17 Sandy Big Sagebrush Sites MP 550–562

Ecological site: NV023XY051 Sandy 10-12; NV023XY082 Loamy Fan 10-12

Species/Variety [1]	Rate Pure Live Seed (lbs/ac)	Max. Rate Bulk (lbs/ac)	Min. PLS/ BLM	Total Bulk lbs	# PLS Seeds/ Acre	# PLS Seeds/ square foot
Drill Seeding Seed Mix						
Nevada bluegrass	0.5	0.7	0.7200		463,000	11
Western needlegrass	0.5	1.1	0.4500		75,000	2
Indian Ricegrass	3.0	3.9	0.7600		423,000	12
Needle-and-thread	3.0	6.6	0.4500		345,000	8
Native penstemon	0.80	1.1	0.7200		488,000	11
Aerial/Ground Broadcast Seeding [3]						
Wyoming big sagebrush	0.15	0.9	0.1600		375,000	9
Basin big sagebrush[3]	0.15	0.9	0.1600		375,000	9
Rounded Total	8.10	15.2				52

[1] Species could be substituted due to availability or future knowledge regarding better cultivars or similar species for the site(s). Seed would be purchased on a Pure Live Seed Basis. Also, seed must be Certified or "Source Identified" with no detectable State of Nevada or California-listed noxious weeds.

The Wieland and Desert Valley compressor stations will be near Elko and Winnemucca, respectively. Within the compounds, it is necessary create a grass buffer to maintain water quality (Tables 5.2-18 and 5.2-19). Other areas in the compounds will be seeded with the appropriate seed mix depending on surrounding vegetation.

Table 5.2-18 Grass Buffer Seed Mix for Wieland Flats Compressor Station

Scientific Name	Common Name	Variety	Season	Pounds per acre (PLS)
Achnatherum occidentale	Western needlegrass	LK621e	C	
Achnatherum speciosum	Desert needlegrass	VNS	C	5
Elymus elymoides ssp. *californicus*	Squirreltail	Toe Jam Creek Germplasm	C	7
Elymus lanceolatus ssp. *lanceolatus*	Thickspike wheatgrass	Critana	C	3
Festuca idahoensis	Idaho fescue	Joseph	C	3
Leymus cinereus	Basin wildrye	Trailhead	C	5
Pascopyrum smithii	Western wheatgrass	Rosana	C	5
Pseudoroegneria spicata	Bluebunch wheatgrass	VNS	W	7
Poa secunda	Sandberg bluegrass	Sherman	C	3
Sporobolus cryptandrus	Sand dropseed	VNS	W	2

VNS = variety not specified
C = cool weather
W = warm weather

Table 5.2-19 Grass Buffer Seed Mix for Desert Valley Compressor Station

Scientific Name	Common Name	Variety	Season	Pounds per acre (PLS)
Achnatherum speciosum	Desert needlegrass	VNS	C	5
Bouteloua gracilis	Blue grama	VNS	W	3
Distichlis spicata	Inland saltgrass	VNS	W	7
Elymus elymoides ssp. *californicus*	Squirreltail	Toe Jam Creek Germplasm	C	7
Elymus junceus	Russian wildrye	Bozoisky	C	3
Elymus lanceolatus ssp. *lanceolatus*	Thickspike wheatgrass	Critana	C	3
Pascopyrum smithii	Western wheatgrass	Rosana	C	5
Poa arida	Plains bluegrass	VNS	C	3
Sporobolus cryptandrus	Sand dropseed	VNS	W	2

VNS = variety not specified
C = cool weather
W = warm weather

Seeding Methods

The NRCS guidelines for seeding native plants in arid and semi-arid rangelands will be followed (Dreesen, not dated). These guidelines call for at least 20-40 pure live seeds per square foot for drilled seed. Seeding rates will be doubled for broadcast seedings.

The main purpose of seeding methods is to place the seed in direct contact with the soil, cover the seed with soil, and firm the soil around the seed to eliminate air pockets (Sheley et al. 2008). Drill and broadcasting seeding techniques will be used. Most species can be successfully drill seeded into the soil. Seeding depth in the soil depends on seed size. Grass and forb seed will be planted at a soil depth greater than 0.5 and 0.25 inch, respectively. Sagebrush seed is best planted on the soil surface because it usually germinates better from broadcast seeding.

Direct (drill) seeding will be the primary method for seeding within the ROW. Direct seeding uses specialized equipment such as a rangeland seeder. The advantages of direct seeding with a rangeland seeder are efficiency at placing seed at the proper soil depth and economy of bulk seed. Its disadvantages are terrain limitations such as slopes greater than 15 percent and rocky soils. However, broadcast seeding followed with harrowing or racking to cover seeds with soil is effective and is not as terrain limited as a rangeland seeder.

Broadcast seeding distributes the seed on top of the soil surface using a hand-held or all-terrain vehicle-mounted cyclone-type seed spreader, seed blower, hydroseeding, and/or aerial application. Broadcast seed is not as efficient as direct seeding because in this method seeds are not buried in the soil, and it requires approximately twice the bulk seed unless harrowing or racking occurs after seeding to cover seed with soil.

Seeding and Transplanting Timing

Seeds must be planted at the proper time. The seeding window is from September 15 to January 31. Native seedings fail consistently after February 1. The optimum seeding window for sagebrush is September 15 to December 31; sagebrush establishment decreases if planted in January. Container-grown sagebrush seedlings will be transplanted during March 15 to April 30.

Fertilizers, Soil Amendments and Weed Control

Soil amendments consist of fertilizers, wood or straw mulches, tackifying agents, or soil stabilizing emulsions. Neither Ruby nor the BLM anticipate the need for application of fertilizers as part of its post-construction restoration activities because elevated levels of soil nitrogen may encourage weedy plant colonization (Sheley et al. 2008). Mycorrhizal fungi may be used to inoculate the soil to aid shrub establishment; soil microorganisms should remain viable during stockpiling. Application of the mycorrhizal inoculums such as AM 120 would be in accordance with manufacturer's recommendations.

Ruby will use pre-emergent herbicide to minimize annual germination of weeds, such as cheatgrass, medusahead rye, halogeton, and mustards. Herbicide selection, application rates, and timing will be conducted in compliance with product use directions and approved by the BLM field offices or private landowner.

Sagebrush Container-Grown Seedlings

Sagebrush seedlings per BLM requirements (M. Zielinski, BLM Winnemucca Field Office, emails dated February 3, 2010) will be planted in habitats occupied by pygmy rabbits and within two miles of active leks to restore or enhance these areas a quickly as possible (Table 5.2-20). Seedlings will also be planted within identified important pronghorn sites defined by BLM. Density of seedlings will be 0.2 per meter square or 800 sagebrush seedlings per acre. To approximate natural islands that would help reseed adjacent sites, Ruby will plant small blocks of no more than 200 sagebrush seedlings at 328 foot (100 m) intervals[(1)] in sagebrush vegetation types. This equates to about 12 blocks per mile or 2,400 plants per mile of ROW or three acres of seedlings per mile of ROW. Broadcast seed sagebrush at a higher rate of 0.50 PLS lb/acre[(2)] between seedling blocks with a mix of grass and forbs appropriate for each range site. The taxon of the transplanted sagebrush seedlings will correspond to the sagebrush vegetation type.

Table 5.2-20 Sagebrush Seedling Sites

Mile Post	Wildlife Species Habitat	Comments	Approximate acres of seedlings	Minimum Percent canopy cover of sagebrush in 10 yrs
585.5-588.5	Sage-grouse	Within two miles of lek	9	15
540-542	Sage-grouse	Within two miles of lek	6	15
562	Pygmy rabbit	Active burrows	0.75*	15
569	Pygmy rabbit	Active burrows	0.75*	15
539-548	Pronghorn antelope	Crucial summer range	27	15 big sagebrush types 10 low sagebrush types
548-552	Pronghorn antelope	Known winter range	12	15 big sagebrush types 10 low sagebrush types

[1] Based on information from "A design solution to big sagebrush establishment: seed production plots and facilitation", available at http://www.google.com/search?hl=en&safe=active&q=sagebrush+seed+dispersal&aq=f&oq=&aqi=

[2]Sage-Grouse Habitat Restoration: getting started in the Dakotas. (PDF; 200KB) Bismarck PMC. 2007. USDA NRCS, Bismarck, ND. February 2007. 6p. (ID# 7087)

*Average burrow size based on LARRUCEA AND BRUSSARD 2008. Journal of Mammalogy, 89(3):691–699, 2008.

Barrel Springs Traditional Cultural Property

The Barrel Springs Traditional Cultural Property is important marmot habitat and will require specific restoration needs (Table 5.2-21) per BLM instructions (M. Zielinski, BLM Winnemucca Field Office, emails dated February 3, 2010). This area is summer habitat for sage-grouse as well. Barrel Springs from approximately MP 580 to 584 will require higher amounts of grass and forbs (see above tables for appropriate range site). Entire area can be seeded for reclamation. Seeded sagebrush will be increased to 0.50 PLS lb/acre. The "acres to seed" assumes a 115-foot ROW with all plant material removed and sagebrush community along the entire section of ROW.

Table 5.2-21 Required Reclamation in Barrel Springs Traditional Cultural Property for Marmot Habitat

Mile Post	Wildlife Species Habitat	Comments	Approximate acres to seed	Minimum Total Percent canopy cover in 10 yrs
580-584*	Marmot	Build habitat using largest rocks available and ≥ 20 cm in length. Rock clusters should be connected but can be separated being no more than 40 m apart. To reduce aerial predation, rock clusters cannot be higher than surrounding occupied habitat .	56	25

* This is only an estimate of the MP; Ruby will do pre-surveys to determine occupied habitat extent.

5.3 Reclamation Treatment for Erodible Soils

Erodible soils have been identified in the Project area (see FEIS Section 4.2.1). Erodible soils may require additional restorative inputs to minimize wind and water erosion. The objective will be to rapidly stabilize erodible soils by means of erosion control measures, including a vegetation cover. Erosion control measures will include one or more techniques, such as the planting of a sterile annual grass or slender wheatgrass (6-8 lbs PLS per acre) according to BLM policy, certified weed-free straw bales or wattles, silt fencing, water bars, soil tackifier, and/or wetting compounds to decrease erosion. The application of a sterile annual grass will be approved by BLM, or the landowner on private lands. Appropriate reclamation action will be commenced immediately after pipeline trench closure.

6.0 Restoration Monitoring and Maintenance

The purpose of restoration monitoring is to evaluate the short- and long-term soil stability, plant cover and density, habitat quality, and levels of noxious and invasive weeds. Ruby will ensure that the BLM, NDOW, and private landowners have the opportunity to participate in designing and carrying out post-restoration monitoring. Monitoring would occur for at least five years.

The primary objectives of monitoring are:

- Assess the effectiveness of temporary and permanent erosion control structures (e.g., slope breakers) to ensure the soil-surface stability of the ROW and extra workspaces and to ensure that runoff is naturally controlled in place, with no accelerated erosion or wash-outs. Locations where additional remedial work may be required should be apparent and will be identified by MP. The monitoring of the ROW for significant and/or new erosion or third-party damage is an element of Ruby's routine aerial surveillance that will be conducted throughout the life of the pipeline. It is anticipated that any active erosion will be apparent during the first two years following restoration or after the first runoff event.
- Monitor and assess, through quantitative analysis, the success of the reseeding and transplanting efforts for years 1 through 5. Additional monitoring beyond year 5 may be necessary as agreed upon by Ruby and the BLM. Monitor the survival of special plantings for visual restoration, if applicable, and the extent to which the restored ROW blends in with the adjacent undisturbed areas.
- Monitor and assess targeted weeds in accordance with the noxious and invasive weed control plan (Noxious and Invasive Weed Control Plan, Appendix H, POD). Newly established weed colonies will be reported to the appropriate BLM office immediately. Identify places where other vegetation control may be needed. Note that with the exception of noxious and invasive weed control, vegetation maintenance, including mowing of non-agricultural lands and general tree removal, is not anticipated. Ruby may selectively remove trees and shrubs that could limit aerial surveillance or their roots pose a risk to the integrity of the buried pipe.
- Monitor and identify other disturbances that may hinder revegetation success, such as excessive livestock grazing or unauthorized OHV travel. Determine ways to take corrective actions in consultation with the BLM and NDOW.

- Ruby will fund an NDOW restoration project oversight position. The purpose of the position would be to monitor post-construction Project reclamation and plant establishment, unauthorized OHV activity, and excessive grazing. The position would be funded for a predetermined number of years, the cost and number of years of which would be agreed upon by Ruby and NDOW.

6.1 Revegetation and Site Stability Monitoring

Revegetation Monitoring
Vegetation monitoring goals are to ensure that germination was successful and revegetation is moving towards the established objectives for both seeded and natural establishing plant species for objectives, and to monitor for invasive and noxious weeds and implement control treatments as needed. Revegetation objectives are defined in Table 6-1.

Table 6-1 Reclaimed Desired Plant Community Criteria Minimums (Mature perennial plants fifth year criteria

Vegetation type based on seeding mix	Min.% cover (basal & crown)	Min. % cover (canopy)	Min. Plants per meter	Min. Plant life forms types required	Min. Desirable plant species	Max. annuals % cover (canopy) allowed	Min. Aggregate Stability Class[1]
1 - Shadscale	10	15	3	2	4	15	>2
2 - Low ppt. Wy.	15	20	5	2	4	15	>2
3 - High ppt. Wy.	20	25	7	3	6	10	>3
4 - Low sage	20	25	7	3	6	5	>3
5 - Predisturbance	20	25	7	3	6	10	>3
6 - Mtn. sage	35	45	9	3	8	5	>4
7 - Black sage	20	25	5	3	5	10	>3
8 - Little sage	20	25	5	3	5	10	>3
9 - Black greasewood	15	20	3	2	3	5	>1.5
10- Alkali sacaton	15	20	5	1	2	0	>1.5
11 - Sandy	20	25	5	2	3	5	0
12 - Fuel break	15	20	5	2	2	10	>3
13 - Low Wy.	15	20	5	2	4	15	>2
14 - Low sage	20	25	7	3	6	5	>3
15 - Mtn. sage	35	45	9	3	8	5	>4
16 - Black Greasewood	15	20	3	2	3	5	>1.5
17 - Sandy	20	25	5	2	3	5	0

[1] Aggregate stability measures the amount of stable aggregates against flowing water. A slake test measures the stability of soil when exposed to rapid wetting.

Vegetation monitoring will occur yearly for a minimum of five years. The first year, Ruby field crews will monitor the presence of germination, noxious weeds, and soil settling and erosion. The second and fifth years will focus on plant success, as defined in Table 5.2-21. The third and fourth years, Ruby will monitor the presence of noxious and invasive weeds and soil settling and erosion. Additional monitoring will occur as necessary. Vegetation monitoring may be conducted following the fifth year if criteria have not been met, but progress toward the objectives is being made.

Initial seeding and reclamation efforts may not be successful in some areas. Seeding establishment may not be able to be determined until the third year or later. The initial seeding is the best opportunity for establishment of plants. Seedbed conditions deteriorate as annual weeds and pioneer plant species establish and compete with seeded species. To retreat and reseed requires removing existing undesirable vegetation by mechanical or chemical (herbicides) methods for preparation of a seedbed; desirable species that have established would also be lost. Therefore, reseeding effort will not be conducted if successful plant establishment is not achieved within five years.

Ruby will quantitatively document reclamation success within the ROW. Ruby will establish three to five one-acre monitoring plots within each of the seeding types (Table 5.2-21). Vegetation will be monitored by using a quadrant sampling (1 x 1 meters in size) method to assess species cover and density in the monitoring plots. Approximately 25 quadrants would be randomly placed in the one-acre monitoring plots and scored. Parameters that will be measured include a species list; species density; percentage of plant cover (canopy, basal, and crown), litter, rock, and bare ground; diversity; percentage of annuals. Observations and/or measurements of soil disturbance, occurrence of noxious and invasive weeds, plant growth stages, animal use, and grazing impacts will be documented using the rangeland health assessment procedures (Pellant et al. 2000). Qualitative analysis methods will be incorporated at established monitoring locations to provide visual documentation of all quantitative data.

Site Stability and Erosion Control Monitoring

The ROW will be considered stable if no large rills or gullies, perceptible soil movement or headcutting in drainages, slope instability, subsidence, slumping, or other signs of erosion that are inconsistent with adjacent area are observed or measured. Reclamation will be considered successful when the following “accelerated erosion indicators” are not exceeded or the ROW surface appears similar to adjacent, undisturbed land:

- Soil movement: depth of recent deposits around rock fragments and other obstacles or on micro-terrace is greater than 0.5-inch deep;
- Surface litter movement: greater than 25% surface litter has been translocated and redeposited against obstacles down slope;

- Pedestaling: pedestals are 0.5 inch or higher and/or frequency of 10 or more/100 square feet;
- Flow pattern development: greater than 25% of area shows evidence of recent movement of soil and litter;
- Rills: greater than three-inch deep and found at 10 foot intervals;
- Gullies: more frequent than 200 foot and intervals and appear unstable;
- Channel erosion and gulley development: greater than 25% of channel bed and walls showing active erosion; gully formation, headcutting or bank failure is evident and progressing along channel walls; obvious signs of sediment is occurring along 25 percent of the channel bottom;
- Plant root systems – disturbance observed on site; and
- Wind scoured depressions – deeper than 0.5 inch over 25% of a 100 square foot area.

Site-stability monitoring would be conducted through observation and documented by MP for the areas exceeding the above criteria. Areas exceeding the above indicators would be considered unsuccessful in meeting the site-stability criteria and corrective actions would be necessary. Aerial flights by helicopter and/or ground surveys may be use to document the above indicators.

6.2 Remedial Action and Maintenance

Ruby will address identified erosion problems as soon as practical based on evaluation of conditions outside the permanent ROW and conditions prior to ROW construction. The same technique could be re-applied or a new approach taken based on site-specific conditions and agreed upon by BLM. Erosion control structures, such as certified weed-free straw bale or sediment fences, will be removed when sites are deemed stable and reclamation is determined to be successful. Discussions will occur with BLM to determine actions required to limit livestock and wild horse/burro grazing or OHV use, where they may be problematic. Noxious and invasive weed control is also included in maintenance and would be performed in accordance with the Ruby's Noxious Weed Control Plan (POD Appendix H).

6.3 Reporting

Ruby will document its observations of reclamation success following the field inspections and provide summary reports to the BLM, NDOW, and FERC. Areas that need remedial action will also be identified by MP and will include a description of additional erosion controls or revegetation work anticipated. Reports including a summary of corrective actions proposed will be submitted within three months of identifying these conditions. Areas where control applications for noxious and invasive weeds are needed will also be reported.

7.0 Off-Highway Vehicle Control

The BLM, NDOW, and private landowners have expressed concerns that the reclaimed ROW will be used for unauthorized OHV travel, which could thwart reclamation efforts and promote erosion. To minimize OHV access on the ROW, Ruby will install OHV barriers at appropriate locations in coordination with BLM or landowner. Ruby will submit to BLM for review and approval site-specific designs for OHV barriers. All designs will meet agency standards and may include dirt/rock berms, log barriers, vegetation screens, signs, fencing, and locked gates. The proposed OHV barriers will be constructed in a manner that attempts to prevent unauthorized motor vehicle/OHV use to and along the ROW. BLM understands that unauthorized OHV trespass can be difficult to control in remote, heavy OHV use areas. Efforts to control unauthorized OHV use will be monitored throughout the life of the Project and additional measures implemented as necessary to control OHV use.

To discourage OHV use of the ROW, Ruby will use the following deterrents, in consultation with BLM visual resource specialist and soil scientist:

- Leave the ROW surface in a roughened condition, especially visible areas within 200 feet from entryways such as roads;
- Establish “keep off” signs with an explanation at entryways onto the ROW;
- Install rock barriers, earthen berms, or other barricades at existing authorized OHV routes that cross the ROW; and
- Work closely with the BLM and private landowners, grazing lessees, local law enforcement personnel, and adjacent landowners to monitor and eliminate unauthorized access to the ROW.

Ruby will coordinate with BLM, NDOW, landowners, and appropriate law enforcement personnel to determine the adequacy and appropriateness of proposed countermeasures. Ruby in consultation with BLM will maintain, repair, or replace countermeasures during life of the Project as appropriate.

8.0 Livestock and Wild Horse Grazing Control

The ROW will cross through livestock grazing allotments and wild horse/burro management areas on BLM land. Succulent grass and forb growth may attract livestock and wild horses. Excessive grazing may cause plant establishment efforts to fail. The following management practices for livestock grazing may be implemented as options to limit grazing where necessary. Actions will be in consultation with BLM:

- Leave the ROW surface in a roughened condition;
- Include low palatable plant species in the seeding mix such as sagebrush and western yarrow; and
- Negotiate with allotment permittees to limit livestock activity in areas where grazing is excessive by using one or more of the following options: herding or placing salt licks and/or protein blocks one-mile distance from the ROW, fencing crucial habitat areas, deferring grazing for two to three years, closing pasture, implementing seasonal deferment, and/or reducing stocking preference. Ruby may compensate permittees if reduced stocking preference or pasture closure occurs.

Ruby will work with the BLM to limit wild horse/burro grazing along the reclaimed ROW in areas where grazing becomes excessive. A possible management action would be to provide water sources away from the ROW.

9.0 References

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Attachment A Ecological Site Occurrence and Descriptive Information Along the ROW in Nevada

Table A-1 Elko District Office Ecological Sites

MP (7/17/09)	County	NRCS ID	Annual Precip. (inches)	Ecological Site Name	Dominant Graminoid	Dominant Forb	Dominant Shrub	Slope (%)	Elevation (ft)	Seed Mix (Pending BLM input)
234	Elko	No Primary ID								Black sagebrush
235	Elko	No Primary ID								Black sagebrush
236	Elko	R024XY030 NV	8–10.0	Shallow calcareous loam	Thurber's needlegrass	Globemallow	Black sagebrush	Range, 2–>50 Average, 4–30	5,000–6,500	Black sagebrush
					Indian ricegrass	Milkvetch	Winterfat			
					Bluebunch wheatgrass	Phlox	Spiny hopsage			
237	Elko	R024XY030 NV	8–10.0	Shallow calcareous loam	Thurber's needlegrass	Globemallow	Black sagebrush	Range, 2–>50 Average, 4–30	5,000–6,500	Black sagebrush
					Indian ricegrass	Milkvetch	Winterfat			
					Bluebunch wheatgrass	Phlox	Spiny hopsage			
238	Elko	R024XY030 NV	8–10.0	Shallow calcareous loam	Thurber's needlegrass	Globemallow	Black sagebrush	Range, 2–>50 Average, 4–30	5,000–6,500	Black sagebrush
					Indian ricegrass	Milkvetch	Winterfat			
					Bluebunch wheatgrass	Phlox	Spiny hopsage			
239	Elko	No Primary ID								Black sagebrush
240	Elko	R025XY057 NV	10–14.0	Shallow clay loam	bluebunch wheatgrass	other perennial forbs	black sagebrush	Range, 4–70 Average, 4–15	5,500–7,000	Black sagebrush
					Thurber's needlegrass	balsamroot	other shrubs and trees			
					Indian ricegrass	tapertip hawksbeard	downy rabbitbrush,			

Table A-1 Elko District Office Ecological Sites

MP (7/17/09)	County	NRCS ID	Annual Precip. (inches)	Ecological Site Name	Dominant Graminoid	Dominant Forb	Dominant Shrub	Slope (%)	Elevation (ft)	Seed Mix (Pending BLM input)
241	Elko	R028BY020 NV	5–8.0	Sodic Flat	alkali sacation	other perennial forbs	black greasewood,	Average, <2	4,500–5,800	
					inland saltgrass	thelypody	shadscale			
					basin wildrye		rubber rabbitbrush			
242	Elko	R025XY001 NV	6–10.0	Moist Floodplain	wildrye	other perennial forbs	willow	Range, 0–4	4,000–6,000	
					creeping wildrye	sierra clover	other shrubs			
					basin wildrye	cinquefoil	basin big sagebrush,			
243	Elko	R025XY001 NV	6–10.0	Moist Floodplain	wildrye	other perennial forbs	willow	Range, 0–4	4,000–6,000	
					creeping wildrye	sierra clover	other shrubs			
					basin wildrye	cinquefoil	basin big sagebrush,			
244	Elko	No Data								
245	Elko	R025XY019 NV	8–10.0	Loamy	bluebunch wheatgrass	globemallow	Wyoming big sagebrush	Range, 2–50 Average, 4–30	4,500–6000	Low precip. Wyoming big sagebrush
					Thruber's needlegrass		Douglas' rabbitbrush			
					Sandberg's bluegrass		spiny hopsage			
246	Elko	R025XY019 NV	8–10.0	Loamy	bluebunch wheatgrass	globemallow	Wyoming big sagebrush	Range, 2–50 Average, 4–30	4,500–6000	Low precip. Wyoming big sagebrush

Table A-1 Elko District Office Ecological Sites

MP (7/17/09)	County	NRCS ID	Annual Precip. (inches)	Ecological Site Name	Dominant Graminoid	Dominant Forb	Dominant Shrub	Slope (%)	Elevation (ft)	Seed Mix (Pending BLM input)
					Thruber's needlegrass		Douglas' rabbitbrush			
					Sandberg's bluegrass		spiny hopsage			
247	Elko	F028BY060 NV	10–14.0	Pimo-Juos	Idaho fescue	balsamroot	low sagebrush,	Range, 0–15 Average, 2–8	4,000–6,000	Black sagebrush
					bluebunch wheatgrass	phlox	antelope bitterbrush, early sagebrush			
					bluegrass sp.	tapertip hawksbeard				
248	Elko	No Data								Black sagebrush
249	Elko	No Data								Black sagebrush
250	Elko	No Data								Low precip. Wyoming big sagebrush
251	Elko	No Data								Low precip. Wyoming big sagebrush
252	Elko	No Data								Low precip. Wyoming big sagebrush
253	Elko	R028BY047 NV	5–8.0	Saline Terrace	western wheatgrass	globemallow	sickle saltbrush	Average,0–2	4,500–5,500	Low precip. Wyoming big sagebrush
					Indian ricegrass	milkvetch	winterfat			
					bottlebrush squirreltail	povertyweed	shadscale			

Table A-1 Elko District Office Ecological Sites

MP (7/17/09)	County	NRCS ID	Annual Precip. (inches)	Ecological Site Name	Dominant Graminoid	Dominant Forb	Dominant Shrub	Slope (%)	Elevation (ft)	Seed Mix (Pending BLM input)
254	Elko	R028BY010 NV	8–10.0	Loamy	Indian ricegrass	globemallow	Wyoing big sagebrush	Range, 2–50 Average, 4–15	5,000–6,500	Low precip. Wyoming big sagebrush
					needleandthread	phlox	Douglas' rabbitbrush			
					bottlebrush squirreltail	paintbrush	fourwing saltbrush			
255	Elko	No Data								Low precip. Wyoming big sagebrush
256	Elko	No Data								Low precip. Wyoming big sagebrush
257	Elko	No Data								Black sagebrush
258	Elko	No Data								Black sagebrush
259	Elko	R024XY030 NV	8–10.0	Shallow Calcareous Loam	Thurber's needlegrass	globemallow	black sagebrush	Range, 2–50 Average, 4–30	5,000–6,500	Black sagebrush
					Indian ricegrass	milkvetch	winterfat			
					bluebunch wheatgrass	phlox	spiny hopsage			
260	Elko	R024XY030 NV	8–10.0	Shallow Calcareous Loam	Thurber's needlegrass	globemallow	black sagebrush	Range, 2–50 Average, 4–30	5,000–6,500	Black sagebrush
					Indian ricegrass	milkvetch	winterfat			

Table A-1 Elko District Office Ecological Sites

MP (7/17/09)	County	NRCS ID	Annual Precip. (inches)	Ecological Site Name	Dominant Graminoid	Dominant Forb	Dominant Shrub	Slope (%)	Elevation (ft)	Seed Mix (Pending BLM input)
					bluebunch wheatgrass	phlox	spiny hopsage			
261	Elko	R024XY030 NV	8–10.0	Shallow Calcareous Loam	Thurber's needlegrass	globemallow	black sagebrush	Range, 2–50 Average, 4–30	5,000–6,500	Black sagebrush
					Indian ricegrass	milkvetch	winterfat			
					bluebunch wheatgrass	phlox	spiny hopsage			
262	Elko	R025XY019 NV	8–10.0	Loamy	bluebunch wheatgrass	globemallow	Wyoming big sagebrush	Range, 2–50 Average, 4–30	4,500–6000	Black sagebrush
					Thruber's needlegrass		Douglas' rabbitbrush			
					Sandberg's bluegrass		spiny hopsage			
263 (263.5)	Elko	R025XY019 NV	8–10.0	Loamy	bluebunch wheatgrass	other perennial forbs	Wyoming big sagebrush,	Range, 2–50 Average, 4–30	4,500–6,000	Low precip. Wyoming big sagebrush
					Thurber's needlegrass	globemallow	Douglas' rabbitbrush,			
					Sandberg's bluegrass		spiny hopsage			
264	Elko	R028BY047 NV	5–8.0	Saline Terrace	western wheatgrass	globemallow	sickle saltbrush	Average, 0–2	4,500–5,500	Shadscale
					Indian ricegrass	milkvetch	winterfat			
					bottlebrush squirreltail	povertyweed	shadscale			
265	Elko	R024XY022 NV	8–10.0	Sodic Terrace	basin wildrye	globemallow	black greasewood	Average, 0–4	4,000–5,500	Black greasewood
					bottlebrush squirreltail	thelypody	Wyoming big sagebrush			

Table A-1 Elko District Office Ecological Sites

MP (7/17/09)	County	NRCS ID	Annual Precip. (inches)	Ecological Site Name	Dominant Graminoid	Dominant Forb	Dominant Shrub	Slope (%)	Elevation (ft)	Seed Mix (Pending BLM input)
					Indian ricegrass	milkvetch	basin big sagebrush			
266	Elko	R024XY022 NV	8–10.0	Sodic Terrace	basin wildrye	globemallow	black greasewood	Average, 0–4	4,000–5,500	Black greasewood
					bottlebrush squirreltail	thelypody	Wyoming big sagebrush			
					Indian ricegrass	milkvetch	basin big sagebrush			
267	Elko	R024XY022 NV	8–10.0	Sodic Terrace	basin wildrye	globemallow	black greasewood	Average, 0–4	4,000–5,500	Black greasewood
					bottlebrush squirreltail	thelypody	Wyoming big sagebrush			
					Indian ricegrass	milkvetch	basin big sagebrush			
268	Elko	R025XY019 NV	8–10.0	Loamy	bluebunch wheatgrass	globemallow	Wyoming big sagebrush	Range, 2–50 Average, 4–30	4,500–6,000	Low precip. Wyoming big sagebrush
					Thurber's needlegrass		Douglas' rabbitbrush			
					Sandberg's bluegrass		spiny hopsage			
269	Elko	R025XY019 NV	8–10.0	Loamy	bluebunch wheatgrass	globemallow	Wyoming big sagebrush	Range, 2–50 Average, 4–30	4,500–6,000	Low precip. Wyoming big sagebrush
					Thurber's needlegrass		Douglas' rabbitbrush			
					Sandberg's bluegrass		spiny hopsage			
270	Elko	R024XY009 NV	6–10.0	Saline Meadow	slkali sacaton	arrowgrass	black greasewood	Range, 0–4 Average, 2	4,000–6,000	Black greasewood
					alkali muhly	povertyweed	silver buffaloberry			

Table A-1 Elko District Office Ecological Sites

MP (7/17/09)	County	NRCS ID	Annual Precip. (inches)	Ecological Site Name	Dominant Graminoid	Dominant Forb	Dominant Shrub	Slope (%)	Elevation (ft)	Seed Mix (Pending BLM input)
					bluegrass	dock	willow			
271	Elko	R025XY019 NV	8–10.0	Loamy	bluebunch wheatgrass	globemallow	Wyoming big sagebrush	Range, 2–50 Average, 4–30	4,500–6,000	Low precip. Wyoming big sagebrush
					Thurber's needlegrass		Douglas' rabbitbrush			
					Sandberg's bluegrass		spiny hopsage			
272	Elko	R025XY019 NV	8–10.0	Loamy	bluebunch wheatgrass	globemallow	Wyoming big sagebrush	Range, 2–50 Average, 4–30	4,500–6,000	
					Thurber's needlegrass		Douglas' rabbitbrush			
					Sandberg's bluegrass		spiny hopsage			
273 (273.5)	Elko	R025XY019 NV	8–10.0	Loamy	bluebunch wheatgrass	globemallow	Wyoming big sagebrush	Range, 2–50 Average, 4–30	4,500–6,000	
					Thurber's needlegrass		Douglas' rabbitbrush			
					Sandberg's bluegrass		spiny hopsage			
274 (274.5)	Elko	R025XY019 NV	8–10.0	Loamy	bluebunch wheatgrass	globemallow	Wyoming big sagebrush	Range, 2–50 Average, 4–30	4,500–6,000	
					Thurber's needlegrass		Douglas' rabbitbrush			
					Sandberg's bluegrass		spiny hopsage			
275	Elko	R025XY057 NV	10–14.0	Shallow Clay Loam	bluebunch wheatgrass	balsamroot	black sagebrush	Range, 4–70 Average, 4–15	5,500–7,000	

Table A-1 Elko District Office Ecological Sites

MP (7/17/09)	County	NRCS ID	Annual Precip. (inches)	Ecological Site Name	Dominant Graminoid	Dominant Forb	Dominant Shrub	Slope (%)	Elevation (ft)	Seed Mix (Pending BLM input)
					Thurber's needlegrass	tapertip hawksbeard	downy rabbitbrush			
					Indian ricegrass	eriogonum	spiny hopsage			
276	Elko	R025XY057 NV	10–14.0	Shallow Clay Loam	bluebunch wheatgrass	balsamroot	black sagebrush	Range, 4–70 Average, 4–15	5,500–7,000	Black sagebrush
					Thurber's needlegrass	tapertip hawksbeard	downy rabbitbrush			
					Indian ricegrass	eriogonum	spiny hopsage			
277	Elko	R025XY057 NV	10–14.0	Shallow Clay Loam	bluebunch wheatgrass	balsamroot	black sagebrush	Range, 4–70 Average, 4–15	5,500–7,000	Black sagebrush
					Thurber's needlegrass	tapertip hawksbeard	downy rabbitbrush			
					Indian ricegrass	eriogonum	spiny hopsage			
278	Elko	R025XY057 NV	10–14.0	Shallow Clay Loam	bluebunch wheatgrass	balsamroot	black sagebrush	Range, 4–70 Average, 4–15	5,500–7,000	Black sagebrush
					Thurber's needlegrass	tapertip hawksbeard	downy rabbitbrush			
					Indian ricegrass	eriogonum	spiny hopsage			
279	Elko	R025XY019 NV	8–10.0	Loamy	bluebunch wheatgrass	globemallow	Wyoming big sagebrush	Range, 2–50 Average, 4–30	4,500–6,000	Low precip. Wyoming big sagebrush
					Thurber's needlegrass		Douglas' rabbitbrush			
					Sandberg's bluegrass		spiny hopsage			
280	Elko	R025XY018 NV	10–12.0	Claypan	bluebunch wheatgrass	balsamroot	sagebrush (low sagebrush, early sagebrush)	Range, 2–50 Average, 8–30	5,500–6,500	Low precip. Wyoming big sagebrush
					Thurber's needlegrass	bluebells	antelope bitterbrush			

Table A-1 Elko District Office Ecological Sites

MP (7/17/09)	County	NRCS ID	Annual Precip. (inches)	Ecological Site Name	Dominant Graminoid	Dominant Forb	Dominant Shrub	Slope (%)	Elevation (ft)	Seed Mix (Pending BLM input)
					Webber's needlegrass	aster	Douglas' rabbitbrush			
281	Elko	R025XY018 NV	10–12.0	Claypan	bluebunch wheatgrass	balsamroot	sagebrush (low sagebrush, early sagebrush)	Range, 2–50 Average, 8–30	5,500–6,500	Low sagebrush
					Thurber's needlegrass	bluebells	antelope bitterbrush			
					Webber's needlegrass	aster	Douglas' rabbitbrush			
282	Elko	R025XY007 NV	12–16.0	Gravelly Loam	Idaho fescue	lupine	anteloper bitterbrush	Range, 4–50 Average, 8–30	6,000–8,000	Low sagebrush
					bluebunch wheatgrass	arrowleaf balsamroot	mountain big sagebrush			
					Thurber's needlegrass	tapertip hawksbeard	Douglas rabbitbrush			
283	Elko	R025XY017 NV	12–16.0	Claypan	Idaho fescue	balsamroo	low sagebrush	Range, 4–50 Average, <30	6,000–8,000	Low sagebrush
					bluebunch wheatgrass	phlox	antelope bitterbrush			
					bluegrass	tapertip hawksbeard	early sagebrush			
284	Elko	R025XY024 NV	14–20.0	Mountain Ridge	Idaho fescue	goldenweed	sagebrush (low sagebrush, black sagebrush)	Range, 4–75 Average, 4–15	7,000–9,500	Low sagebrush
					bluegrass	Hooker balsamroot	winterfat			
					spike-fescue	mock goldenweed	Douglas rabbitbrush			
285	Elko	R025XY024 NV	14–20.0	Mountain Ridge	Idaho fescue	goldenweed	sagebrush (low sagebrush, black sagebrush)	Range, 4–75 Average, 4–15	7,000–9,500	Low sagebrush
					bluegrass	Hooker balsamroot	winterfat			
					spike-fescue	mock goldenweed	Douglas rabbitbrush			

Table A-1 Elko District Office Ecological Sites

MP (7/17/09)	County	NRCS ID	Annual Precip. (inches)	Ecological Site Name	Dominant Graminoid	Dominant Forb	Dominant Shrub	Slope (%)	Elevation (ft)	Seed Mix (Pending BLM input)
286	Elko	R025XY046 NV	8–10.0	Loamy	bluebunch wheatgrass	other perennial forbs	Wyoming big sagebrush,	Range, 2–50 Average, 4–30	4,500–6,000	Low precip. Wyoming big sagebrush
					Thurber's needlegrass	globemallow	Douglas' rabbitbrush,			
					Sandberg's bluegrass		spiny hopsage			
287	Elko	R025XY017 NV	12–16.0	Claypan	Idaho fescue	balsamroo	low sagebrush	Range, 4–50 Average, <30	6,000–8,000	Low sagebrush
					bluebunch wheatgrass	phlox	antelope bitterbrush			
					bluegrass	tapertip hawksbeard	early sagebrush			
288	Elko	R025XY017 NV	12–16.0	Claypan	Idaho fescue	balsamroo	low sagebrush	Range, 4–50 Average, <30	6,000–8,000	Low sagebrush
					bluebunch wheatgrass	phlox	antelope bitterbrush			
					bluegrass	tapertip hawksbeard	early sagebrush			
289	Elko	R025XY017 NV	12–16.0	Claypan	Idaho fescue	balsamroo	low sagebrush	Range, 4–50 Average, <30	6,000–8,000	Low sagebrush
					bluebunch wheatgrass	phlox	antelope bitterbrush			
					bluegrass	tapertip hawksbeard	early sagebrush			
290	Elko	R025XY017 NV	12–16.0	Claypan	Idaho fescue	balsamroo	low sagebrush	Range, 4–50 Average, <30	6,000–8,000	Low sagebrush
					bluebunch wheatgrass	phlox	antelope bitterbrush			
					bluegrass	tapertip hawksbeard	early sagebrush			

Table A-1 Elko District Office Ecological Sites

MP (7/17/09)	County	NRCS ID	Annual Precip. (inches)	Ecological Site Name	Dominant Graminoid	Dominant Forb	Dominant Shrub	Slope (%)	Elevation (ft)	Seed Mix (Pending BLM input)
291	Elko	R025XY019 NV	8–10.0	Loamy	bluebunch wheatgrass	globemallow	Wyoming big sagebrush	Range, 2–50 Average, 4–30	4,500–6,000	Low sagebrush
					Thurber's needlegrass		Douglas' rabbitbrush			
					Sandberg's bluegrass		spiny hopsage			
292	Elko	R025XY019 NV	8–10.0	Loamy	bluebunch wheatgrass	globemallow	Wyoming big sagebrush	Range, 2–50 Average, 4–30	4,500–6,000	Low sagebrush
					Thurber's needlegrass		Douglas' rabbitbrush			
					Sandberg's bluegrass		spiny hopsage			
293	Elko	R025XY019 NV	8–10.0	Loamy	bluebunch wheatgrass	globemallow	Wyoming big sagebrush	Range, 2–50 Average, 4–30	4,500–6,000	Low sagebrush
					Thurber's needlegrass		Douglas' rabbitbrush			
					Sandberg's bluegrass		spiny hopsage			
294	Elko	R025XY019 NV	8–10.0	Loamy	bluebunch wheatgrass	globemallow	Wyoming big sagebrush	Range, 2–50 Average, 4–30	4,500–6,000	Low sagebrush
					Thurber's needlegrass		Douglas' rabbitbrush			
					Sandberg's bluegrass		spiny hopsage			
295	Elko	R025XY019 NV	8–10.0	Loamy	bluebunch wheatgrass	globemallow	Wyoming big sagebrush	Range, 2–50 Average, 4–30	4,500–6,000	Low sagebrush
					Thurber's needlegrass		Douglas' rabbitbrush			
					Sandberg's bluegrass		spiny hopsage			

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MP (7/17/09)	County	NRCS ID	Annual Precip. (inches)	Ecological Site Name	Dominant Graminoid	Dominant Forb	Dominant Shrub	Slope (%)	Elevation (ft)	Seed Mix (Pending BLM input)
296	Elko	R025XY019 NV	8–10.0	Loamy	bluebunch wheatgrass	globemallow	Wyoming big sagebrush	Range, 2–50 Average, 4–30	4,500–6,000	Low sagebrush
					Thurber's needlegrass		Douglas' rabbitbrush			
					Sandberg's bluegrass		spiny hopsage			
297	Elko	R025XY019 NV	8–10.0	Loamy	bluebunch wheatgrass	globemallow	Wyoming big sagebrush	Range, 2–50 Average, 4–30	4,500–6,000	Low sagebrush
					Thurber's needlegrass		Douglas' rabbitbrush			
					Sandberg's bluegrass		spiny hopsage			
298	Elko	R025XY019 NV	8–10.0	Loamy	bluebunch wheatgrass	globemallow	Wyoming big sagebrush	Range, 2–50 Average, 4–30	4,500–6,000	Low sagebrush
					Thurber's needlegrass		Douglas' rabbitbrush			
					Sandberg's bluegrass		spiny hopsage			
299	Elko	R025XY019 NV	8–10.0	Loamy	bluebunch wheatgrass	globemallow	Wyoming big sagebrush	Range, 2–50 Average, 4–30	4,500–6,000	Low sagebrush
					Thurber's needlegrass		Douglas' rabbitbrush			
					Sandberg's bluegrass		spiny hopsage			
300	Elko	R025XY019 NV	8–10.0	Loamy	bluebunch wheatgrass	globemallow	Wyoming big sagebrush	Range, 2–50 Average, 4–30	4,500–6,000	Low sagebrush
					Thurber's needlegrass		Douglas' rabbitbrush			
					Sandberg's bluegrass		spiny hopsage			

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MP (7/17/09)	County	NRCS ID	Annual Precip. (inches)	Ecological Site Name	Dominant Graminoid	Dominant Forb	Dominant Shrub	Slope (%)	Elevation (ft)	Seed Mix (Pending BLM input)
301	Elko	R025XY019 NV	8–10.0	Loamy	bluebunch wheatgrass	globemallow	Wyoming big sagebrush	Range, 2–50 Average, 4–30	4,500–6,000	Low sagebrush
					Thurber's needlegrass		Douglas' rabbitbrush			
					Sandberg's bluegrass		spiny hopsage			
302	Elko	R025XY019 NV	8–10.0	Loamy	bluebunch wheatgrass	globemallow	Wyoming big sagebrush	Range, 2–50 Average, 4–30	4,500–6,000	Low sagebrush
					Thurber's needlegrass		Douglas' rabbitbrush			
					Sandberg's bluegrass		spiny hopsage			
303	Elko	R024XY006 NV	6–10.0	Dry Floodplain	basin wildrye	povertyweed	basin big sagebrush	Range, 0–4 Average, <2	4,000–6,000	
					western wheatgrass	milkvetch	black greasewood			
					creeping wildrye	thelypody	shadscale			
304	Elko	R024XY006 NV	6–10.0	Dry Floodplain	basin wildrye	povertyweed	basin big sagebrush	Range, 0–4 Average, <2	4,000–6,000	
					western wheatgrass	milkvetch	black greasewood			
					creeping wildrye	thelypody	shadscale			
305	Elko	R025XY019 NV	8–10.0	Loamy	bluebunch wheatgrass	globemallow	Wyoming big sagebrush	Range, 2–50 Average, 4–30	4,500–6,000	Low precip. Wyoming big sagebrush
					Thurber's needlegrass		Douglas' rabbitbrush			
					Sandberg's bluegrass		spiny hopsage			
306	Elko	R025XY019 NV	8–10.0	Loamy	bluebunch wheatgrass	globemallow	Wyoming big sagebrush	Range, 2–50 Average, 4–30	4,500–6,000	Low precip. Wyoming big sagebrush
					Thurber's needlegrass		Douglas' rabbitbrush			

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MP (7/17/09)	County	NRCS ID	Annual Precip. (inches)	Ecological Site Name	Dominant Graminoid	Dominant Forb	Dominant Shrub	Slope (%)	Elevation (ft)	Seed Mix (Pending BLM input)
					Sandberg's bluegrass		spiny hopsage			
307	Elko	R025XY015 NV	8–10.0	South Slope	bluebunch wheatgrass	tapertip hawksbeard	Wyoming big sagebrush	Range, 15–75 Average, 30–50	5,500–6,500	Low precip. Wyoming big sagebrush
					Thurber's needlegrass	eriogonum	antelope bitterbrush			
					basin wildrye	lupine	Douglas' rabbitbrush			
308	Elko	R025XY015 NV	8–10.0	South Slope	bluebunch wheatgrass	tapertip hawksbeard	Wyoming big sagebrush	Range, 15–75 Average, 30–50	5,500–6,500	Low precip. Wyoming big sagebrush
					Thurber's needlegrass	eriogonum	antelope bitterbrush			
					basin wildrye	lupine	Douglas' rabbitbrush			
309	Elko	R025XY015 NV	8–10.0	South Slope	bluebunch wheatgrass	tapertip hawksbeard	Wyoming big sagebrush	Range, 15–75 Average, 30–50	5,500–6,500	Low precip. Wyoming big sagebrush
					Thurber's needlegrass	eriogonum	antelope bitterbrush			
					basin wildrye	lupine	Douglas' rabbitbrush			
310	Elko	R025XY019 NV	8–10.0	Loamy	bluebunch wheatgrass	globemallow	Wyoming big sagebrush	Range, 2–50 Average, 4–30	4,500–6,000	Low precip. Wyoming big sagebrush
					Thurber's needlegrass		Douglas' rabbitbrush			
					Sandberg's bluegrass		spiny hopsage			
311	Elko	R024XY030 NV	8–10.0	Shallow Calcareous Loam	Thurber's needlegrass	globemallow	black sagebrush	Range, 2–50 Average, 4–30	5,000–6,500	Low precip. Wyoming big sagebrush
					Indian ricegrass	milkvetch	winterfat			
					bluebunch wheatgrass	phlox	spiny hopsage			

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MP (7/17/09)	County	NRCS ID	Annual Precip. (inches)	Ecological Site Name	Dominant Graminoid	Dominant Forb	Dominant Shrub	Slope (%)	Elevation (ft)	Seed Mix (Pending BLM input)
312	Elko	R025XY019 NV	8–10.0	Loamy	bluebunch wheatgrass	globemallow	Wyoming big sagebrush	Range, 2–50 Average, 4–30	4,500–6,000	Low precip. Wyoming big sagebrush
					Thurber's needlegrass		Douglas' rabbitbrush			
					Sandberg's bluegrass		spiny hopsage			
313	Elko	R025XY019 NV	8–10.0	Loamy	bluebunch wheatgrass	globemallow	Wyoming big sagebrush	Range, 2–50 Average, 4–30	4,500–6,000	Low precip. Wyoming big sagebrush
					Thurber's needlegrass		Douglas' rabbitbrush			
					Sandberg's bluegrass		spiny hopsage			
314	Elko	R025XY019 NV	8–10.0	Loamy	bluebunch wheatgrass	globemallow	Wyoming big sagebrush	Range, 2–50 Average, 4–30	4,500–6,000	Low precip. Wyoming big sagebrush
					Thurber's needlegrass		Douglas' rabbitbrush			
					Sandberg's bluegrass		spiny hopsage			
315	Elko	R025XY019 NV	8–10.0	Loamy	bluebunch wheatgrass	globemallow	Wyoming big sagebrush	Range, 2–50 Average, 4–30	4,500–6,000	Low precip. Wyoming big sagebrush
					Thurber's needlegrass		Douglas' rabbitbrush			
					Sandberg's bluegrass		spiny hopsage			
316	Elko	R025XY019 NV	8–10.0	Loamy	bluebunch wheatgrass	globemallow	Wyoming big sagebrush	Range, 2–50 Average, 4–30	4,500–6,000	Low precip. Wyoming big sagebrush
					Thurber's needlegrass		Douglas' rabbitbrush			
					Sandberg's bluegrass		spiny hopsage			
317	Elko	R025XY019 NV	8–10.0	Loamy	bluebunch wheatgrass	globemallow	Wyoming big sagebrush	Range, 2–50 Average, 4–30	4,500–6,000	Low precip. Wyoming big sagebrush
					Thurber's needlegrass		Douglas' rabbitbrush			

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MP (7/17/09)	County	NRCS ID	Annual Precip. (inches)	Ecological Site Name	Dominant Graminoid	Dominant Forb	Dominant Shrub	Slope (%)	Elevation (ft)	Seed Mix (Pending BLM input)
					Sandberg's bluegrass		spiny hopsage			
318	Elko	R024XY030 NV	8–10.0	Shallow Calcareous Loam	Thurber's needlegrass	globemallow	black sagebrush	Range, 2–50 Average, 4–30	5,000–6,500	Black sagebrush
					Indian ricegrass	milkvetch	winterfat			
					bluebunch wheatgrass	phlox	spiny hopsage			
319	Elko	R024XY030 NV	8–10.0	Shallow Calcareous Loam	Thurber's needlegrass	globemallow	black sagebrush	Range, 2–50 Average, 4–30	5,000–6,500	Black sagebrush
					Indian ricegrass	milkvetch	winterfat			
					bluebunch wheatgrass	phlox	spiny hopsage			
320	Elko	R024XY030 NV	8–10.0	Shallow Calcareous Loam	Thurber's needlegrass	globemallow	black sagebrush	Range, 2–50 Average, 4–30	5,000–6,500	Black sagebrush
					Indian ricegrass	milkvetch	winterfat			
					bluebunch wheatgrass	phlox	spiny hopsage			
321	Elko	R025XY019 NV	8–10.0	Loamy	bluebunch wheatgrass	globemallow	Wyoming big sagebrush	Range, 2–50 Average, 4–30	4,500–6,000	Low precip. Wyoming big sagebrush
					Thurber's needlegrass		Douglas' rabbitbrush			
					Sandberg's bluegrass		spiny hopsage			
322	Elko	R025XY019 NV	8–10.0	Loamy	bluebunch wheatgrass	globemallow	Wyoming big sagebrush	Range, 2–50 Average, 4–30	4,500–6,000	Low precip. Wyoming big sagebrush
					Thurber's needlegrass		Douglas' rabbitbrush			
					Sandberg's bluegrass		spiny hopsage			
323	Elko	R025XY019 NV	8–10.0	Loamy	bluebunch wheatgrass	globemallow	Wyoming big sagebrush	Range, 2–50 Average, 4–30	4,500–6,000	

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MP (7/17/09)	County	NRCS ID	Annual Precip. (inches)	Ecological Site Name	Dominant Graminoid	Dominant Forb	Dominant Shrub	Slope (%)	Elevation (ft)	Seed Mix (Pending BLM input)
					Thurber's needlegrass		Douglas' rabbitbrush			
					Sandberg's bluegrass		spiny hopsage			
324	Elko	R025XY018 NV	10–12.0	Claypan	bluebunch wheatgrass	balsamroot	sagebrush (low sagebrush, early sagebrush)	Range, 2–50 Average, 8–30	5,500–6,500	Low precip. Wyoming big sagebrush
					Thurber's needlegrass	bluebells	antelope bitterbrush			
					Webber's needlegrass	aster	Douglas' rabbitbrush			
325	Elko	R025XY018 NV	10–12.0	Claypan	bluebunch wheatgrass	balsamroot	sagebrush (low sagebrush, early sagebrush)	Range, 2–50 Average, 8–30	5,500–6,500	Low precip. Wyoming big sagebrush
					Thurber's needlegrass	bluebells	antelope bitterbrush			
					Webber's needlegrass	aster	Douglas' rabbitbrush			
326	Elko	R025XY019 NV	8–10.0	Loamy	bluebunch wheatgrass	globemallow	Wyoming big sagebrush	Range, 2–50 Average, 4–30	4,500–6,000	Low precip. Wyoming big sagebrush
					Thurber's needlegrass		Douglas' rabbitbrush			
					Sandberg's bluegrass		spiny hopsage			
327	Elko	R025XY019 NV	8–10.0	Loamy	bluebunch wheatgrass	globemallow	Wyoming big sagebrush	Range, 2–50 Average, 4–30	4,500–6,000	Low precip. Wyoming big sagebrush
					Thurber's needlegrass		Douglas' rabbitbrush			
					Sandberg's bluegrass		spiny hopsage			
328	Elko	R025XY019 NV	8–10.0	Loamy	bluebunch wheatgrass	other perennial forbs	Wyoming big sagebrush,	Range, 2–50 Average, 4–30	4,500–6,000	Low precip. Wyoming big sagebrush
					Thurber's needlegrass	globemallow	Douglas' rabbitbrush,			
					Sandberg's bluegrass		spiny hopsage			

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MP (7/17/09)	County	NRCS ID	Annual Precip. (inches)	Ecological Site Name	Dominant Graminoid	Dominant Forb	Dominant Shrub	Slope (%)	Elevation (ft)	Seed Mix (Pending BLM input)
329	Elko	R025XY019 NV	8–10.0	Loamy	bluebunch wheatgrass	other perennial forbs	Wyoming big sagebrush,	Range, 2–50 Average, 4–30	4,500–6,000	Low precip. Wyoming big sagebrush
					Thurber's needlegrass	globemallow	Douglas' rabbitbrush,			
					Sandberg's bluegrass		spiny hopsage			
330	Elko	R025XY019 NV	8–10.0	Loamy	bluebunch wheatgrass	other perennial forbs	Wyoming big sagebrush,	Range, 2–50 Average, 4–30	4,500–6,000	Low precip. Wyoming big sagebrush
					Thurber's needlegrass	globemallow	Douglas' rabbitbrush,			
					Sandberg's bluegrass		spiny hopsage			
331	Elko	R025XY005 NV	12–16.0	Wet Meadow	tufted hairgrass	Sierra clover	willow	Range, 0–15 Average, 0–4	5,000–6,000	Low precip. Wyoming big sagebrush
					Nevada bluegrass	cinquefoil	Wood's rose			
					alpine timothy	aster	mountain silver sagebrush			
332	Elko	R025XY019 NV	8–10.0	Loamy	bluebunch wheatgrass	other perennial forbs	Wyoming big sagebrush,	Range, 2–50 Average, 4–30	4,500–6,000	Low precip. Wyoming big sagebrush
					Thurber's needlegrass	globemallow	Douglas' rabbitbrush,			
					Sandberg's bluegrass		spiny hopsage			
333	Elko	R025XY019 NV	8–10.0	Loamy	bluebunch wheatgrass	other perennial forbs	Wyoming big sagebrush,	Range, 2–50 Average, 4–30	4,500–6,000	Low precip. Wyoming big sagebrush
					Thurber's needlegrass	globemallow	Douglas' rabbitbrush,			
					Sandberg's bluegrass		spiny hopsage			
334	Elko	R025XY019 NV	8–10.0	Loamy	bluebunch wheatgrass	other perennial forbs	Wyoming big sagebrush,	Range, 2–50 Average, 4–30	4,500–6,000	Low precip. Wyoming big sagebrush
					Thurber's needlegrass	globemallow	Douglas' rabbitbrush,			
					Sandberg's bluegrass		spiny hopsage			

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MP (7/17/09)	County	NRCS ID	Annual Precip. (inches)	Ecological Site Name	Dominant Graminoid	Dominant Forb	Dominant Shrub	Slope (%)	Elevation (ft)	Seed Mix (Pending BLM input)
335	Elko	R025XY019 NV	8–10.0	Loamy	bluebunch wheatgrass	other perennial forbs	Wyoming big sagebrush,	Range, 2–50 Average, 4–30	4,500–6,000	Low precip. Wyoming big sagebrush
					Thurber's needlegrass	globemallow	Douglas' rabbitbrush,			
					Sandberg's bluegrass		spiny hopsage			
336	Elko	R025XY018 NV	10–12.0	Claypan	bluebunch wheatgrass	balsamroot	sagebrush (low sagebrush, early sagebrush)	Range, 2–50 Average, 8–30	5,500–6,500	Low sagebrush
					Thurber's needlegrass	bluebells	antelope bitterbrush			
					Webber's needlegrass	aster	Douglas' rabbitbrush			
337	Elko	R025XY018 NV	10–12.0	Claypan	bluebunch wheatgrass	balsamroot	sagebrush (low sagebrush, early sagebrush)	Range, 2–50 Average, 8–30	5,500–6,500	Low sagebrush
					Thurber's needlegrass	bluebells	antelope bitterbrush			
					Webber's needlegrass	aster	Douglas' rabbitbrush			
338	Elko	R025XY018 NV	10–12.0	Claypan	bluebunch wheatgrass	balsamroot	sagebrush (low sagebrush, early sagebrush)	Range, 2–50 Average, 8–30	5,500–6,500	Low sagebrush
					Thurber's needlegrass	bluebells	antelope bitterbrush			
					Webber's needlegrass	aster	Douglas' rabbitbrush			
339	Elko	R025XY018 NV	10–12.0	Claypan	bluebunch wheatgrass	balsamroot	sagebrush (low sagebrush, early sagebrush)	Range, 2–50 Average, 8–30	5,500–6,500	Low sagebrush
					Thurber's needlegrass	bluebells	antelope bitterbrush			

Table A-1 Elko District Office Ecological Sites

MP (7/17/09)	County	NRCS ID	Annual Precip. (inches)	Ecological Site Name	Dominant Graminoid	Dominant Forb	Dominant Shrub	Slope (%)	Elevation (ft)	Seed Mix (Pending BLM input)
					Webber's needlegrass	aster	Douglas' rabbitbrush			
340	Elko	R025XY018 NV	10–12.0	Claypan	bluebunch wheatgrass	balsamroot	sagebrush (low sagebrush, early sagebrush)	Range, 2–50 Average, 8–30	5,500–6,500	Low sagebrush
					Thurber's needlegrass	bluebells	antelope bitterbrush			
					Webber's needlegrass	aster	Douglas' rabbitbrush			
341	Elko	R025XY017 NV	12–16.0	Claypan	Idaho fescue	balsamroo	low sagebrush	Range, 4–50 Average, <30	6,000–8,000	Low sagebrush
					bluebunch wheatgrass	phlox	antelope bitterbrush			
					bluegrass	tapertip hawksbeard	early sagebrush			
342	Elko	R025XY017 NV	12–16.0	Claypan	Idaho fescue	balsamroo	low sagebrush	Range, 4–50 Average, <30	6,000–8,000	Low sagebrush
					bluebunch wheatgrass	phlox	antelope bitterbrush			
					bluegrass	tapertip hawksbeard	early sagebrush			
343	Elko	R025XY017 NV	12–16.0	Claypan	Idaho fescue	balsamroo	low sagebrush	Range, 4–50 Average, <30	6,000–8,000	Low sagebrush
					bluebunch wheatgrass	phlox	antelope bitterbrush			
					bluegrass	tapertip hawksbeard	early sagebrush			
344	Elko	R025XY009 NV	12–14.0	South Slope	bluebunch wheatgrass	tapertip hawksbeard	mountain big sagebrush	Range, 30–75 Average, 30–50	6,000–8,500	Mountain big sagebrush
					basin wildrye	arrowleaf balsamroot	antelope bitterbrush			

Table A-1 Elko District Office Ecological Sites

MP (7/17/09)	County	NRCS ID	Annual Precip. (inches)	Ecological Site Name	Dominant Graminoid	Dominant Forb	Dominant Shrub	Slope (%)	Elevation (ft)	Seed Mix (Pending BLM input)
					Thurber needlegrass	lupine	rubber rabbitbrush			
345	Elko	R025XY009 NV	12–14.0	South Slope	bluebunch wheatgrass	tapertip hawksbeard	mountain big sagebrush	Range, 30–75 Average, 30–50	6,000–8,500	Mountain big sagebrush
					basin wildrye	arrowleaf balsamroot	antelope bitterbrush			
					Thurber needlegrass	lupine	rubber rabbitbrush			
346	Elko	R025XY017 NV	12–16.0	Claypan	Idaho fescue	balsamroo	low sagebrush	Range, 4–50 Average, <30	6,000–8,000	Low sagebrush
					bluebunch wheatgrass	phlox	antelope bitterbrush			
					bluegrass	tapertip hawksbeard	early sagebrush			
347	Elko	R025XY009 NV	12–14.0	South Slope	bluebunch wheatgrass	tapertip hawksbeard	mountain big sagebrush	Range, 30–75 Average, 30–50	6,000–8,500	Mountain big sagebrush
					basin wildrye	arrowleaf balsamroot	antelope bitterbrush			
					Thurber needlegrass	lupine	rubber rabbitbrush			
348	Elko	R025XY017 NV	12–16.0	Claypan	Idaho fescue	balsamroo	low sagebrush	Range, 4–50 Average, <30	6,000–8,000	Low sagebrush
					bluebunch wheatgrass	phlox	antelope bitterbrush			
					bluegrass	tapertip hawksbeard	early sagebrush			
349	Elko	R025XY024 NV	14–20.0	Mountain Ridge	Idaho fescue	goldenweed	sagebrush (low sagebrush, black sagebrush)	Range, 4–75 Average, 4–15	7,000–9,500	Low sagebrush
					bluegrass	Hooker balsamroot	winterfat			
					spike-fescue	mock goldenweed	Douglas rabbitbrush			
350	Elko	R025XY024 NV	14–20.0	Mountain Ridge	Idaho fescue	goldenweed	sagebrush (low sagebrush, black sagebrush)	Range, 4–75 Average, 4–15	7,000–9,500	Low sagebrush

Table A-1 Elko District Office Ecological Sites

MP (7/17/09)	County	NRCS ID	Annual Precip. (inches)	Ecological Site Name	Dominant Graminoid	Dominant Forb	Dominant Shrub	Slope (%)	Elevation (ft)	Seed Mix (Pending BLM input)
					bluegrass	Hooker balsamroot	winterfat			
					spike–fescue	mock goldenweed	Douglas rabbitbrush			
351	Elko	R025XY024 NV	14–20.0	Mountain Ridge	Idaho fescue	goldenweed	sagebrush (low sagebrush, black sagebrush)	Range, 4–75 Average, 4–15	7,000–9,500	Low sagebrush
					bluegrass	Hooker balsamroot	winterfat			
					spike-fescue	mock goldenweed	Douglas rabbitbrush			
352	Elko	R025XY017 NV	12–16.0	Claypan	Idaho fescue	balsamroot	low sagebrush	Range, 4–50 Average, <30	6,000–8,000	Low sagebrush
					bluebunch wheatgrass	phlox	antelope bitterbrush			
					bluegrass	tapertip hawksbeard	early sagebrush			
353	Elko	R025XY017 NV	12–16.0	Claypan	Idaho fescue	balsamroo	low sagebrush	Range, 4–50 Average, <30	6,000–8,000	Low sagebrush
					bluebunch wheatgrass	phlox	antelope bitterbrush			
					bluegrass	tapertip hawksbeard	early sagebrush			
354	Elko	R025XY017 NV	12–16.0	Claypan	Idaho fescue	balsamroo	low sagebrush	Range, 4–50 Average, <30	6,000–8,000	Low sagebrush
					bluebunch wheatgrass	phlox	antelope bitterbrush			
					bluegrass	tapertip hawksbeard	early sagebrush			
355	Elko	R025XY017 NV	12–16.0	Claypan	Idaho fescue	balsamroot	low sagebrush,	Range, 4–50 Average, <30	6,000–8,000	Low sagebrush
					bluebunch wheatgrass	phlox	antelope bitterbrush, early sagebrush			

Table A-1 Elko District Office Ecological Sites

MP (7/17/09)	County	NRCS ID	Annual Precip. (inches)	Ecological Site Name	Dominant Graminoid	Dominant Forb	Dominant Shrub	Slope (%)	Elevation (ft)	Seed Mix (Pending BLM input)
					bluegrass sp.	tapertip hawksbeard				
356	Elko	R025XY018 NV	10–12.0	Claypan	bluebunch wheatgrass	balsamroot	sagebrush (low sagebrush, early sagebrush)	Range, 2–50 Average, 8–30	5,500–6,500	Low sagebrush
					Thurber's needlegrass	bluebells	antelope bitterbrush			
					Webber's needlegrass	aster	Douglas' rabbitbrush			
357	Elko	R025XY017 NV	12–16.0	Claypan	Idaho fescue	balsamroot	low sagebrush,	Range, 4–50 Average, <30	6,000–8,000	Low sagebrush
					bluebunch wheatgrass	phlox	antelope bitterbrush, early sagebrush			
					bluegrass sp.	tapertip hawksbeard				
358	Elko	R025XY017 NV	12–16.0	Claypan	Idaho fescue	balsamroot	low sagebrush,	Range, 4–50 Average, <30	6,000–8,000	Low sagebrush
					bluebunch wheatgrass	phlox	antelope bitterbrush, early sagebrush			
					bluegrass sp.	tapertip hawksbeard				
359	Elko	R025XY017 NV	12–16.0	Claypan	Idaho fescue	balsamroot	low sagebrush,	Range, 4–50 Average, <30	6,000–8,000	Low sagebrush
					bluebunch wheatgrass	phlox	antelope bitterbrush, early sagebrush			
					bluegrass sp.	tapertip hawksbeard				
360	Elko	R025XY017	12–16.0	Claypan	Idaho fescue	balsamroot	low sagebrush,	Range, 4–50	6,000–8,000	Low sagebrush

Table A-1 Elko District Office Ecological Sites

MP (7/17/09)	County	NRCS ID	Annual Precip. (inches)	Ecological Site Name	Dominant Graminoid	Dominant Forb	Dominant Shrub	Slope (%)	Elevation (ft)	Seed Mix (Pending BLM input)
		NV			bluebunch wheatgrass	phlox	antelope bitterbrush, early sagebrush	Average, <30		
					bluegrass sp.	tapertip hawksbeard				
361	Elko	R025XY017 NV	12–16.0	Claypan	Idaho fescue	balsamroot	low sagebrush,	Range, 4–50 Average, <30	6,000–8,000	Low sagebrush
					bluebunch wheatgrass	phlox	antelope bitterbrush, early sagebrush			
					bluegrass sp.	tapertip hawksbeard				
362	Elko	R025XY017 NV	12–16.0	Claypan	Idaho fescue	balsamroot	low sagebrush,	Range, 4–50 Average, <30	6,000–8,000	Low sagebrush
					bluebunch wheatgrass	phlox	antelope bitterbrush, early sagebrush			
					bluegrass sp.	tapertip hawksbeard				
363	Elko	R025XY017 NV	12–16.0	Claypan	Idaho fescue	balsamroot	low sagebrush,	Range, 4–50 Average, <30	6,000–8,000	Low sagebrush
					bluebunch wheatgrass	phlox	antelope bitterbrush, early sagebrush			
					bluegrass sp.	tapertip hawksbeard				
364	Elko	R025XY018 NV	10–12.0	Claypan	bluebunch wheatgrass	balsamroot	sagebrush (low sagebrush, early sagebrush)	Range, 2–50 Average, 8–30	5,500–6,500	Low sagebrush
					Thurber's needlegrass	bluebells	antelope bitterbrush			
					Webber's needlegrass	aster	Douglas' rabbitbrush			
365	Elko	R025XY018 NV	10–12.0	Claypan	bluebunch wheatgrass	balsamroot	sagebrush (low sagebrush, early sagebrush)	Range, 2–50 Average, 8–30	5,500–6,500	Low sagebrush

Table A-1 Elko District Office Ecological Sites

MP (7/17/09)	County	NRCS ID	Annual Precip. (inches)	Ecological Site Name	Dominant Graminoid	Dominant Forb	Dominant Shrub	Slope (%)	Elevation (ft)	Seed Mix (Pending BLM input)
					Thurber's needlegrass	bluebells	antelope bitterbrush			
					Webber's needlegrass	aster	Douglas' rabbitbrush			
366	Elko	R025XY018 NV	10–12.0	Claypan	bluebunch wheatgrass	balsamroot	sagebrush (low sagebrush, early sagebrush)	Range, 2–50 Average, 8–30	5,500–6,500	Low sagebrush
					Thurber's needlegrass	bluebells	antelope bitterbrush			
					Webber's needlegrass	aster	Douglas' rabbitbrush			
367	Elko	R025XY019 NV	8–10.0	Loamy	bluebunch wheatgrass	other perennial forbs	Wyoming big sagebrush,	Range, 2–50 Average, 4–30	4,500–6,000	Big sagebrush bitterbrush
					Thurber's needlegrass	globemallow	Douglas' rabbitbrush,			
					Sandberg's bluegrass		spiny hopsage			
368	Elko	R025XY014 NV	10–12.0	Loamy	bluebunch wheatgrass	tapertip hawksbeard	big sagebrush	Range, 4–30 Average, 4–15	5,500–6,500	Big sagebrush bitterbrush
					Thurber's needlegrass	arrowleaf balsamroot	basin big sagebrush			
					Webber's needlegrass	lupine	mountain big sagebrush			
369	Elko	R025XY014 NV	10–12.0	Loamy	bluebunch wheatgrass	tapertip hawksbeard	big sagebrush	Range, 4–30 Average, 4–15	5,500–6,500	Big sagebrush bitterbrush
					Thurber's needlegrass	arrowleaf balsamroot	basin big sagebrush			
					Webber's needlegrass	lupine	mountain big sagebrush			

Table A-1 Elko District Office Ecological Sites

MP (7/17/09)	County	NRCS ID	Annual Precip. (inches)	Ecological Site Name	Dominant Graminoid	Dominant Forb	Dominant Shrub	Slope (%)	Elevation (ft)	Seed Mix (Pending BLM input)
370	Elko	R025XY003 NV	8–14.0	Loamy bottom	basin wildrye	lupine	basin big sagebrush,	Range, 0–8 Average, 2–4	4,500–7,000	Big sagebrush bitterbrush
					Nevada bluegrass	povertyweed	rubber rabbitbrush,			
					streambank wheatgrass	groundsel	Wood's rose			
371	Elko	R025XY018 NV	10–12.0	Claypan	bluebunch wheatgrass	balsamroot	low sagebrush,	Range, 2—50 Average, 8—30	5,500–6,500	Big sagebrush bitterbrush
					Thurber's needlegrass	bluebells	early sagebrush,			
					Webber's needlegrass	aster	antelope sagebrush			
372	Elko	R025XY014 NV	10-12.0	Loamy	bluebunch wheatgrass	tapertip hawksbeard	big sagebrush	Range, 4–30 Average, 4–15	5,500–6,500	Big sagebrush bitterbrush
					Thurber's needlegrass	arrowleaf balsamroot	basin big sagebrush			
					Webber's needlegrass	lupine	mountain big sagebrush			
373	Elko	R025XY014 NV	10–12.0	Loamy	bluebunch wheatgrass	tapertip hawksbeard	big sagebrush	Range, 4–30 Average, 4–15	5,500–6,500	Big sagebrush bitterbrush
					Thurber's needlegrass	arrowleaf balsamroot	basin big sagebrush			
					Webber's needlegrass	lupine	mountain big sagebrush			
374	Elko	R025XY014 NV	10–12.0	Loamy	bluebunch wheatgrass	tapertip hawksbeard	big sagebrush	Range, 4–30 Average, 4–15	5,500–6,500	Big sagebrush bitterbrush
					Thurber's needlegrass	arrowleaf balsamroot	basin big sagebrush			
					Webber's needlegrass	lupine	mountain big sagebrush			
375	Elko	R025XY003 NV	8–14.0	Loamy bottom	basin wildrye	lupine	basin big sagebrush,	Range, 0–8 Average, 2–4	4,500–7,000	Big sagebrush bitterbrush

Table A-1 Elko District Office Ecological Sites

MP (7/17/09)	County	NRCS ID	Annual Precip. (inches)	Ecological Site Name	Dominant Graminoid	Dominant Forb	Dominant Shrub	Slope (%)	Elevation (ft)	Seed Mix (Pending BLM input)
					Nevada bluegrass	povertyweed	rubber rabbitbrush,			
					streambank wheatgrass	groundsel	Wood's rose			
376	Elko	R025XY003 NV	8–14.0	Loamy bottom	basin wildrye	lupine	basin big sagebrush,	Range, 0–8 Average, 2–4	4,500–7,000	Big sagebrush bitterbrush
					Nevada bluegrass	povertyweed	rubber rabbitbrush,			
					streambank wheatgrass	groundsel	Wood's rose			
377	Elko	R025XY019 NV	8–10.0	Loamy	bluebunch wheatgrass	other perennial forbs	Wyoming big sagebrush,	Range, 2–50 Average, 4–30	4,500–6,000	Low sagebrush
					Thurber's needlegrass	globemallow	Douglas' rabbitbrush,			
					Sandberg's bluegrass		spiny hopsage			
378	Elko	R025XY019 NV	8–10.0	Loamy	bluebunch wheatgrass	other perennial forbs	Wyoming big sagebrush,	Range, 2–50 Average, 4–30	4,500–6,000	Low sagebrush
					Thurber's needlegrass	globemallow	Douglas' rabbitbrush,			
					Sandberg's bluegrass		spiny hopsage			
379	Elko	R025XY019 NV	8–10.0	Loamy	bluebunch wheatgrass	other perennial forbs	Wyoming big sagebrush,	Range, 2–50 Average, 4–30	4,500–6,000	Low sagebrush
					Thurber's needlegrass	globemallow	Douglas' rabbitbrush,			
					Sandberg's bluegrass		spiny hopsage			
380	Elko	R025XY003 NV	8–14.0	Loamy bottom	basin wildrye	lupine	basin big sagebrush,	Range, 0–8 Average, 2–4	4,500–7,000	
					Nevada bluegrass	povertyweed	rubber rabbitbrush,			

Table A-1 Elko District Office Ecological Sites

MP (7/17/09)	County	NRCS ID	Annual Precip. (inches)	Ecological Site Name	Dominant Graminoid	Dominant Forb	Dominant Shrub	Slope (%)	Elevation (ft)	Seed Mix (Pending BLM input)
					streambank wheatgrass	groundsel	Wood's rose			
381	Elko	R025XY019 NV	8–10.0	Loamy	bluebunch wheatgrass	other perennial forbs	Wyoming big sagebrush,	Range, 2–50 Average, 4–30	4,500–6,000	Low precip. Wyoming big sagebrush
					Thurber's needlegrass	globemallow	Douglas' rabbitbrush,			
					Sandberg's bluegrass		spiny hopsage			
382	Elko	R025XY019 NV	8–10.0	Loamy	bluebunch wheatgrass	other perennial forbs	Wyoming big sagebrush,	Range, 2–50 Average, 4–30	4,500–6,000	Low precip. Wyoming big sagebrush
					Thurber's needlegrass	globemallow	Douglas' rabbitbrush,			
					Sandberg's bluegrass		spiny hopsage			
383	Elko	R025XY019 NV	8–10.0	Loamy	bluebunch wheatgrass	other perennial forbs	Wyoming big sagebrush,	Range, 2–50 Average, 4–30	4,500–6,000	Low precip. Wyoming big sagebrush
					Thurber's needlegrass	globemallow	Douglas' rabbitbrush,			
					Sandberg's bluegrass		spiny hopsage			
384	Elko	R025XY019 NV	8–10.0	Loamy	bluebunch wheatgrass	other perennial forbs	Wyoming big sagebrush,	Range, 2–50 Average, 4–30	4,500–6,000	Low precip. Wyoming big sagebrush
					Thurber's needlegrass	globemallow	Douglas' rabbitbrush,			
					Sandberg's bluegrass		spiny hopsage			
385	Elko	R025XY019 NV	8–10.0	Loamy	bluebunch wheatgrass	other perennial forbs	Wyoming big sagebrush,	Range, 2–50 Average, 4–30	4,500–6,000	Low precip. Wyoming big sagebrush
					Thurber's needlegrass	globemallow	Douglas' rabbitbrush,			
					Sandberg's bluegrass		spiny hopsage			
386	Elko	R025XY019 NV	8–10.0	Loamy	bluebunch wheatgrass	other perennial forbs	Wyoming big sagebrush,	Range, 2–50 Average, 4–30	4,500–6,000	Low precip. Wyoming big sagebrush

Table A-1 Elko District Office Ecological Sites

MP (7/17/09)	County	NRCS ID	Annual Precip. (inches)	Ecological Site Name	Dominant Graminoid	Dominant Forb	Dominant Shrub	Slope (%)	Elevation (ft)	Seed Mix (Pending BLM input)
					Thurber's needlegrass	globemallow	Douglas' rabbitbrush,			
					Sandberg's bluegrass		spiny hopsage			
387	Elko	R025XY014 NV	10–12.0	Loamy	bluebunch wheatgrass	tapertip hawksbeard	big sagebrush	Range, 4–30 Average, 4–15	5,500–6,500	Big sagebrush bitterbrush
					Thurber's needlegrass	arrowleaf balsamroot	basin big sagebrush			
					Webber's needlegrass	lupine	mountain big sagebrush			
388	Elko	R025XY014 NV	10–12.0	Loamy	bluebunch wheatgrass	tapertip hawksbeard	big sagebrush	Range, 4–30 Average, 4–15	5,500–6,500	Big sagebrush bitterbrush
					Thurber's needlegrass	arrowleaf balsamroot	basin big sagebrush			
					Webber's needlegrass	lupine	mountain big sagebrush			
389	Elko	R025XY014 NV	10–12.0	Loamy	bluebunch wheatgrass	tapertip hawksbeard	big sagebrush	Range, 4–30 Average, 4–15	5,500–6,500	Big sagebrush bitterbrush
					Thurber's needlegrass	arrowleaf balsamroot	basin big sagebrush			
					Webber's needlegrass	lupine	mountain big sagebrush			
390	Elko	R025XY014 NV	10–12.0	Loamy	bluebunch wheatgrass	tapertip hawksbeard	big sagebrush	Range, 4–30 Average, 4–15	5,500–6,500	Big sagebrush bitterbrush
					Thurber's needlegrass	arrowleaf balsamroot	basin big sagebrush			
					Webber's needlegrass	lupine	mountain big sagebrush			
391	Elko	R025XY014 NV	10–12.0	Loamy	bluebunch wheatgrass	tapertip hawksbeard	big sagebrush	Range, 4–30 Average, 4–15	5,500–6,500	Big sagebrush bitterbrush
					Thurber's needlegrass	arrowleaf balsamroot	basin big sagebrush			

Table A-1 Elko District Office Ecological Sites

MP (7/17/09)	County	NRCS ID	Annual Precip. (inches)	Ecological Site Name	Dominant Graminoid	Dominant Forb	Dominant Shrub	Slope (%)	Elevation (ft)	Seed Mix (Pending BLM input)
					Webber's needlegrass	lupine	mountain big sagebrush			
392	Elko	R025XY014 NV	10–12.0	Loamy	bluebunch wheatgrass	tapertip hawksbeard	big sagebrush	Range, 4–30 Average, 4–15	5,500–6,500	Big sagebrush bitterbrush
					Thurber's needlegrass	arrowleaf balsamroot	basin big sagebrush			
					Webber's needlegrass	lupine	mountain big sagebrush			
393	Elko	R025XY019 NV	8–10.0	Loamy	bluebunch wheatgrass	other perennial forbs	Wyoming big sagebrush,	Range, 2–50 Average, 4–30	4,500–6,000	Big sagebrush bitterbrush
					Thurber's needlegrass	globemallow	Douglas' rabbitbrush,			
					Sandberg's bluegrass		spiny hopsage			
394	Elko	R025XY019 NV	8–10.0	Loamy	Bluebunch wheatgrass, Thurbers needlegrass, Sandberg's bluegrass	globemallow	Wyoming big sagebrush, Douglas' rabbitbrush, spiny hopsage	Range , 2–50, Average, 4–30	4,500–6,000	Low precip. Wyoming big sagebrush
395	Elko	R025XY019 NV	8–10.0	Loamy	Bluebunch wheatgrass Thurbers needlegrass Sandberg's bluegrass	globemallow	Wyoming big sagebrush, Douglas' rabbitbrush, spiny hopsage	Range , 2–50, Average, 4–30	4,500–6,000	Low precip. Wyoming big sagebrush
396	Elko	R025XY019 NV	8–10.0	Loamy	Bluebunch wheatgrass, Thurbers needlegrass, Sandberg's bluegrass	globemallow	Wyoming big sagebrush, Douglas' rabbitbrush, spiny hopsage	Range , 2–50, Average, 4–30	4,500–6,000	Low precip. Wyoming big sagebrush
397	Elko	R024XY020	8–10.0	Droughty	Thurber's	Globemallow	Wyoming big	Range, 2–30,	4,000–6,000	Fuel break

Table A-1 Elko District Office Ecological Sites

MP (7/17/09)	County	NRCS ID	Annual Precip. (inches)	Ecological Site Name	Dominant Graminoid	Dominant Forb	Dominant Shrub	Slope (%)	Elevation (ft)	Seed Mix (Pending BLM input)
		NV	P.Z.	loam	needlegrass, Indian ricegrass, bottlebrush squirreltail	phox biscuitroot	sagebrush, spiny hopsage, bud sagebrush	Average, 4–15		

Table A-2 Winnemucca District Office Ecological Sites

MP (7/10/09)	County	NRCS ID	Annual Precip. (inches)	Ecological Site Name	Dominant Graminoid	Dominant Forb	Dominant Shrub	Slope (%)	Elevation (ft)	Seed Mix
398	Elko	R024XY020 NV	8–10.0	Droughty loam	Thurber's needlegrass, Indian ricegrass, bottlebrush squirreltail	Globemallow, phox, biscuitroot	Wyoming big sagebrush, spiny hopsage, bud sagebrush	Range, 2–30, Average, 4–15	4,000–6,000	Fuel break
399	Humboldt	R024XY020 NV	8–10.0	Droughty loam	Thurber's needlegrass, Indian ricegrass, bottlebrush squirreltail	Globemallow, phox, biscuitroot	Wyoming big sagebrush, spiny hopsage, bud sagebrush	Range, 2–30, Average, 4–15	4,000–6,000	Fuel break
400	Humboldt	R024XY020 NV	8–10.0	Droughty loam	Thurber's needlegrass, Indian ricegrass, bottlebrush squirreltail	Globemallow, phox, biscuitroot	Wyoming big sagebrush, spiny hopsage, bud sagebrush	Range, 2–30, Average, 4–15	4,000–6,000	Fuel break
401	Humboldt	R024XY020 NV	8–10.0	Droughty loam	Thurber's needlegrass, Indian ricegrass, bottlebrush squirreltail	Globemallow, phox, biscuitroot	Wyoming big sagebrush, spiny hopsage, bud sagebrush	Range, 2–30, Average, 4–15	4,000–6,000	Shadscale
402	Humboldt	R024XY002 NV	5–8.0	Loamy	Indian ricegrass, bottlebrush squireeltail, needleand thread	Other perennial forbs, globemallow, other annual forbs	Shadscale, bud sagebrush, spiny hopsage	Range, 0–3–, Average, 2–8	4,000–6,000	Shadscale
403	Humboldt	R024XY002 NV	5–8.0	Loamy	Indian ricegrass, bottlebrush squireeltail, needleand thread	Other perennial forbs, globemallow, other annual forbs	Shadscale, bud sagebrush, spiny hopsage	Range, 0–3–, Average, 2–8	4,000–6,000	Shadscale

Table A-2 Winnemucca District Office Ecological Sites

MP (7/10/09)	County	NRCS ID	Annual Precip. (inches)	Ecological Site Name	Dominant Graminoid	Dominant Forb	Dominant Shrub	Slope (%)	Elevation (ft)	Seed Mix
404	Humboldt	R024XY002 NV	5–8”	Loamy	Indian ricegrass, bottlebrush squireeltail, needleand thread	Other perennial forbs, globemallow, other annual forbs	Shadscale, bud sagebrush, spiny hopsage	Range, 0–3–, Average, 2–8	4,000–6,000,	Shadscale
405	Humboldt	R024XY002 NV	5–8”	Loamy	Indian ricegrass, bottlebrush squireeltail, needleand thread	Other perennial forbs, globemallow, other annual forbs	Shadscale, bud sagebrush, spiny hopsage	Range, 0–3–, Average, 2–8	4,000–6,000,	Black greasewood
406	Humboldt	R024XY003 NV	6–8”	Sodic Terrace	Bottlebrush squirreltail, Indian ricegrass, basin wildrye	Miterwort, thelypody, princesplume	Shadscale, black greasewood, bud sagebrush	Range, 0–15, Average, 2–4	3,500–5,500	Black greasewood
407	Humboldt	R024XY003 NV	6–8”	Sodic Terrace	Bottlebrush squirreltail, Indian ricegrass, basin wildrye	Miterwort, thelypody, princesplume	Shadscale, black greasewood, bud sagebrush	Range, 0–15, Average, 2–4	3,500–5,500	Black greasewood
408	Humboldt	R024XY010 NV	6–10.0	Sodic Floodplain	alkali sacaton, inland saltgrass, basin wildrye	Other perennial forbs, povertyweed, miterwort	iodinebush, black greasewood, seepweed	Range, 0–4, Average, 0–2	4,000–5,000,	Black greasewood
409	Humboldt	R024XY010 NV	6–10.0	Sodic Floodplain	alkali sacaton, inland saltgrass, basin wildrye	Other perennial forbs, povertyweed, miterwort	iodinebush, black greasewood, seepweed	Range, 0–4, Average, 0–2	4,000–5,000,	Shadscale
410	Humboldt	R024XY003 NV	6–8.0	Sodic Terrace	Bottlebrush squirreltail, Indian ricegrass, basin wildrye	Miterwort, thelypody, princesplume	Shadscale, black greasewood, bud sagebrush	Range, 0–15, Average, 2–4	3,500–5,500	Shadscale
411	Humboldt	R024XY022 NV	8–10.0	Sodic terrace	basin wildrye,	globemallow,	black greasewood,	Range, 0–4	4,000–5,500	Shadscale

Table A-2 Winnemucca District Office Ecological Sites

MP (7/10/09)	County	NRCS ID	Annual Precip. (inches)	Ecological Site Name	Dominant Graminoid	Dominant Forb	Dominant Shrub	Slope (%)	Elevation (ft)	Seed Mix
					bottlebrush squirreltail, Indian ricegrass	thelypody, milkvetch	Wyoming big sagebrush, basin big sagebrush			
412	Humboldt	R024XY002 NV	5–8.0	Loamy	Indian ricegrass, bottlebrush squirreltail, needleandthread	other perennial forbs, globemallow, other annual forbs	shadscale, bud sagebrush, spiny hopsage	Range, 0–30 Average, 2–8	4,000–6,000	Black greasewood
413	Humboldt	R024XY002 NV	5–8.0	Loamy	Indian ricegrass, bottlebrush squirreltail, needleandthread	other perennial forbs, globemallow, other annual forbs	shadscale, bud sagebrush, spiny hopsage	Range, 0–30 Average, 2–8	4,000–6,000	Black greasewood
414	Humboldt	R024XY022 NV	8–10.0	Sodic terrace	basin wildrye, bottlebrush squirreltail, Indian ricegrass	globemallow, thelypody, milkvetch	black greasewood, Wyoming big sagebrush, basin big sagebrush	Range, 0–4	4,000–5,500	Fuel break
415	Humboldt	R024XY002 NV	5–8.0	Loamy	Indian ricegrass, bottlebrush squirreltail, needleandthread	other perennial forbs, globemallow, other annual forbs	shadscale, bud sagebrush, spiny hopsage	Range, 0–30 Average, 2–8	4,000–6,000	Fuel break
416	Humboldt	R024XY022 NV	8–10.0	Sodic terrace	basin wildrye, bottlebrush squirreltail,	globemallow, thelypody,	black greasewood, Wyoming big sagebrush,	Range, 0–4	4,000–5,500	Fuel break

Table A-2 Winnemucca District Office Ecological Sites

MP (7/10/09)	County	NRCS ID	Annual Precip. (inches)	Ecological Site Name	Dominant Graminoid	Dominant Forb	Dominant Shrub	Slope (%)	Elevation (ft)	Seed Mix
					Indian ricegrass	milkvetch	basin big sagebrush			
417	Humboldt	R024XY005 NV	8–10.0	Loamy	Thurber's needlegrass, bluebunch wheatgrass, Indian ricegrass	globemallow, phlox, eriogonum	Wyoming big sagebrush, spiny hopsage, common pricklygilia	Range, 2–50 Average, 4–30	5,000–6,500	Fuel break
418	Humboldt	R024XY005 NV	8–10.0	Loamy	Thurber's needlegrass, bluebunch wheatgrass, Indian ricegrass	globemallow, phlox, eriogonum	Wyoming big sagebrush, spiny hopsage, common pricklygilia	Range, 2–50 Average, 4–30	5,000–6,500	Fuel break
419	Humboldt	R024XY028 NV	8–12.0	South Slope	bluebunch wheatgrass,	tapertip hawksbeard, arrowleaf balsamroot, lupine	Wyoming big sagebrush,	Range, 15–75 Average, 30–50	5,500–7,000	Fuel break
					Thurber's needlegrass, Sandberg's		mountain big sagebrush,			
					bluegrass		spiny hopsage			
420	Humboldt	R024XY028 NV	8–12.0	South Slope	bluebunch wheatgrass,	tapertip hawksbeard, arrowleaf balsamroot, lupine	Wyoming big sagebrush,	Range, 15–75 Average, 30–50	5,500–7,000	Fuel break
					Thurber's needlegrass, Sandberg's		mountain big sagebrush,			
					bluegrass		spiny hopsage			
421	Humboldt	R024XY028 NV	8–12.0	South Slope	bluebunch wheatgrass,	tapertip hawksbeard, arrowleaf balsamroot, lupine	big sagebrush (Wyoming big sagebrush, mountain big sagebrush)	Range, 15–75 Average, 30–50	5,500–7,000	Fuel break
					Thurber's needlegrass, Sandberg's		spiny hopsage			

Table A-2 Winnemucca District Office Ecological Sites

MP (7/10/09)	County	NRCS ID	Annual Precip. (inches)	Ecological Site Name	Dominant Graminoid	Dominant Forb	Dominant Shrub	Slope (%)	Elevation (ft)	Seed Mix
					bluegrass		green ephedra			
422	Humboldt	R024XY035 NV	10–14.0	Shallow Loam	bluebunch wheatgrass,	tapertip hawksbeard,	big sagebrush (Wyoming big sagebrush, mountain big sagebrush)	Range, 4–75 Average, 15–50	5,000–7,000	Fuel break
					Thurber's needlegrass	arrowleaf balsamroot,	Utah serviceberry			
					Sandberg's bluegrass	lupine	Anderson's peachbrush			
423	Humboldt	R024XY005 NV	8–10.0	Loamy	Thurber's needlegrass, bluebunch wheatgrass,	globemallow,	Wyoming big sagebrush,	Range, 2–50 Average, 4–30	5,000–6,500	Fuel break
					Indian ricegrass,	phlox,	spiny hopsage,			
						eriogonum	common pricklygilia			
424	Humboldt	R024XY020 NV	8–10.0	Droughty loam	Thurber's needlegrass,	globemallow,	Wyoming big sagebrush,	Range, 2–30 Average, 4–15	4,000–6,000	Low precip. Wyoming big sagebrush
					Indian ricegrass,	phlox,	spiny hopsage,			
					bottlebrush squirreltail	biscuitroot	bud sagebrush			
425	Humboldt	R024XY002 NV	5–8.0	Loamy	Indian ricegrass,	other perennial forbs,	shadscale,	Range, 0–30 Average, 2–8	4,000–6,000	Low precip. Wyoming big sagebrush
					bottlebrush squirreltail,	globemallow,	bud sagebrush,			
					needleandthread	other annual forbs	spiny hopsage			

Table A-2 Winnemucca District Office Ecological Sites

MP (7/10/09)	County	NRCS ID	Annual Precip. (inches)	Ecological Site Name	Dominant Graminoid	Dominant Forb	Dominant Shrub	Slope (%)	Elevation (ft)	Seed Mix
426	Humboldt	R024XY002 NV	5–8.0	Loamy	Indian ricegrass, bottlebrush squirreltail, needleandthread	other perennial forbs, globemallow, other annual forbs	shadscale, bud sagebrush, spiny hopsage	Range, 0–30 Average, 2–8	4,000–6,000	Fuel break
427	Humboldt	R024XY002 NV	5–8.0	Loamy	Indian ricegrass, bottlebrush squirreltail, needleandthread	other perennial forbs, globemallow, other annual forbs	shadscale, bud sagebrush, spiny hopsage	Range, 0–30 Average, 2–8	4,000–6,000	Fuel break
428	Humboldt	R024XY020 NV	8–10.0	Droughty loam	Thurber's needlegrass, Indian ricegrass, bottlebrush squirreltail	globemallow, phlox, biscuitroot	Wyoming big sagebrush, spiny hopsage, bud sagebrush	Range, 2–30 Average, 4–15	4,000–6,000	Fuel break
429	Humboldt	R024XY020 NV	8–10.0	Droughty loam	Thurber's needlegrass, Indian ricegrass, bottlebrush squirreltail	globemallow, phlox, biscuitroot	Wyoming big sagebrush, spiny hopsage, bud sagebrush	Range, 2–30 Average, 4–15	4,000–6,000	Fuel break
430	Humboldt	R024XY020 NV	8–10.0	Droughty loam	Thurber's needlegrass, Indian ricegrass, bottlebrush squirreltail	globemallow, phlox, biscuitroot	Wyoming big sagebrush, spiny hopsage, bud sagebrush	Range, 2–30 Average, 4–15	4,000–6,000	Big sagebrush
431	Humboldt	R024XY022 NV	8–10.0	Sodic terrace	basin wildrye,	globemallow,	black greasewood,	Range, 0–4	4,000–5,500	Big sagebrush

Table A-2 Winnemucca District Office Ecological Sites

MP (7/10/09)	County	NRCS ID	Annual Precip. (inches)	Ecological Site Name	Dominant Graminoid	Dominant Forb	Dominant Shrub	Slope (%)	Elevation (ft)	Seed Mix
					bottlebrush squirreltail,	thelypody,	Wyoming big sagebrush,			
					Indian ricegrass	milkvetch	basin big sagebrush			
432	Humboldt	R024XY011 NV	6–8.0	Sodic flat	basin wildrye,	povertyweed, miterwort,	black greasewood,	Range, 0–2	3,500–5,500	Big sagebrush
					inland saltgrass,	milkvetch	sickle saltbush,			
					alkali sacaton		Torrey's quailbush			
433	Humboldt	R024XY011 NV	6–8.0	Sodic flat	basin wildrye,	povertyweed, miterwort,	black greasewood,	Range, 0–2	3,500–5,500	Big sagebrush
					inland saltgrass,	milkvetch	sickle saltbush,			
					alkali sacaton		Torrey's quailbush			
434	Humboldt	R024XY011 NV	6–8.0	Sodic flat	basin wildrye,	povertyweed, miterwort,	black greasewood,	Range, 0–2	3,500–5,500	Big sagebrush
					inland saltgrass,	milkvetch	sickle saltbush,			
					alkali sacaton		Torrey's quailbush			
435	Humboldt	R025XY001 NV	6–10.0	Moist Floodplain	creeping wildrye,	Sierra clover,	willow	Range, 0–4	4,000–6,000	Alkali sacaton
					basin wildrye,	cinquefoil	basin big sagebrush			
					Nevada bluegrass	aster	silver sagebrush			
436	Humboldt	R024XY007 NV	6–10.0	Saline bottom	basin wildrye,	povertyweed, miterwort,	black greasewood,	Generally level, but reaching =/< 2 at perimeters	4,000–5,500	Shadscale
					alkali sacaton,	milkvetch	rubber rabbitbrush,			
					inland saltgrass		seepweed			

Table A-2 Winnemucca District Office Ecological Sites

MP (7/10/09)	County	NRCS ID	Annual Precip. (inches)	Ecological Site Name	Dominant Graminoid	Dominant Forb	Dominant Shrub	Slope (%)	Elevation (ft)	Seed Mix
437	Humboldt	R024XY007 NV	6–10.0	Saline bottom	basin wildrye,	povertyweed, miterwort,	black greasewood,	Generally level, but reaching =/< 2 at perimeters	4,000–5,500	Shadscale
					alkali sacaton,	milkvetch	rubber rabbitbrush,			
					inland saltgrass		seepweed			
438	Humboldt	R024XY002 NV	5–8.0	Loamy	Indian ricegrass,	other perennial forbs,	shadscale,	Range, 0–30 Average, 2–8	4,000–6,000	Fuel break
					bottlebrush squirreltail,	globemallow,	bud sagebrush,			
					needleandthread	other annual forbs	spiny hopsage			
439	Humboldt	R024XY022 NV	8–10.0	Sodic terrace	basin wildrye,	globemallow,	black greasewood,	Range, 0–4	4,000–5,500	Fuel break
					bottlebrush squirreltail,	thelypody,	Wyoming big sagebrush,			
					Indian ricegrass	milkvetch	basin big sagebrush			
440	Humboldt	R024XY005 NV	8–10.0	Loamy	Thurber's needlegrass, bluebunch wheatgrass,	globemallow,	Wyoming big sagebrush,	Range, 2–50 Average, 4–30	5,000–6,500	Fuel break
					Indian ricegrass,	phlox,	spiny hopsage,			
						eriogonum	common pricklygilia			
441	Humboldt	R024XY005 NV	8–10.0	Loamy	Thurber's needlegrass, bluebunch wheatgrass,	globemallow,	Wyoming big sagebrush,	Range, 2–50 Average, 4–30	5,000–6,500	Fuel break
					Indian ricegrass,	phlox,	spiny hopsage,			

Table A-2 Winnemucca District Office Ecological Sites

MP (7/10/09)	County	NRCS ID	Annual Precip. (inches)	Ecological Site Name	Dominant Graminoid	Dominant Forb	Dominant Shrub	Slope (%)	Elevation (ft)	Seed Mix
						eriogonum	common pricklygilia			
442	Humboldt	R024XY020 NV	8–10.0	Droughty loam	Thurber's needlegrass,	globemallow,	Wyoming big sagebrush,	Range, 2–30 Average, 4–15	4,000–6,000	Fuel break
					Indian ricegrass,	phlox,	spiny hopsage,			
					bottlebrush squirreltail	biscuitroot	bud sagebrush			
443	Humboldt	R024XY020 NV	8–10.0	Droughty loam	Thurber's needlegrass,	globemallow,	Wyoming big sagebrush,	Range, 2–30 Average, 4–15	4,000–6,000	Fuel break
					Indian ricegrass,	phlox,	spiny hopsage,			
					bottlebrush squirreltail	biscuitroot	bud sagebrush			
444	Humboldt	R024XY005 NV	8–10.0	Loamy	Thurber's needlegrass, bluebunch wheatgrass,	globemallow,	Wyoming big sagebrush,	Range, 2–50 Average, 4–30	5,000–6,500	Fuel break
					Indian ricegrass,	phlox,	spiny hopsage,			
						eriogonum	common pricklygilia			
445	Humboldt	R024XY005 NV	8–10.0	Loamy	Thurber's needlegrass, bluebunch wheatgrass,	globemallow,	Wyoming big sagebrush,	Range, 2–50 Average, 4–30	5,000–6,500	Fuel break
					Indian ricegrass,	phlox,	spiny hopsage,			
						eriogonum	common pricklygilia			
446	Humboldt	R024XY005 NV	8–10.0	Loamy	Thurber's needlegrass, bluebunch wheatgrass,	globemallow,	Wyoming big sagebrush,	Range, 2–50 Average, 4–30	5,000–6,500	Fuel break

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MP (7/10/09)	County	NRCS ID	Annual Precip. (inches)	Ecological Site Name	Dominant Graminoid	Dominant Forb	Dominant Shrub	Slope (%)	Elevation (ft)	Seed Mix
					Indian ricegrass,	phlox,	spiny hopsage,			
						eriogonum	common pricklygilia			
447	Humboldt	R024XY005 NV	8–10.0	Loamy	Thurber's needlegrass, bluebunch wheatgrass,	globemallow,	Wyoming big sagebrush,	Range, 2–50 Average, 4–30	5,000–6,500	Fuel break
					Indian ricegrass,	phlox,	spiny hopsage,			
						eriogonum	common pricklygilia			
448	Humboldt	R024XY020 NV	8–10.0	Droughty loam	Thurber's needlegrass,	globemallow,	Wyoming big sagebrush,	Range, 2–30 Average, 4–15	4,000–6,000	Fuel break
					Indian ricegrass,	phlox,	spiny hopsage,			
					bottlebrush squirreltail	biscuitroot	bud sagebrush			
449	Humboldt	R024XY020 NV	8–10.0	Droughty loam	Thurber's needlegrass,	globemallow,	Wyoming big sagebrush,	Range, 2–30 Average, 4–15	4,000–6,000	Fuel break
					Indian ricegrass,	phlox,	spiny hopsage,			
					bottlebrush squirreltail	biscuitroot	bud sagebrush			
450	Humboldt	R024XY020 NV	8–10.0	Droughty loam	Thurber's needlegrass,	globemallow,	Wyoming big sagebrush,	Range, 2–30 Average, 4–15	4,000–6,000	Fuel break
					Indian ricegrass,	phlox,	spiny hopsage,			
					bottlebrush squirreltail	biscuitroot	bud sagebrush			
451	Humboldt	R024XY020 NV	8–10.0	Droughty loam	Thurber's needlegrass,	globemallow,	Wyoming big sagebrush,	Range, 2–30 Average, 4–15	4,000–6,000	Fuel break

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MP (7/10/09)	County	NRCS ID	Annual Precip. (inches)	Ecological Site Name	Dominant Graminoid	Dominant Forb	Dominant Shrub	Slope (%)	Elevation (ft)	Seed Mix
					Indian ricegrass, bottlebrush squirreltail	phlox, biscuitroot	spiny hopsage, bud sagebrush			
452	Humboldt	R024XY020 NV	8–10.0	Droughty loam	Thurber's needlegrass, Indian ricegrass, bottlebrush squirreltail	globemallow, phlox, biscuitroot	Wyoming big sagebrush, spiny hopsage, bud sagebrush	Range, 2–30 Average, 4–15	4,000–6,000	Fuel break
453	Humboldt	R024XY020 NV	8–10.0	Droughty loam	Thurber's needlegrass, Indian ricegrass, bottlebrush squirreltail	globemallow, phlox, biscuitroot	Wyoming big sagebrush, spiny hopsage, bud sagebrush	Range, 2–30 Average, 4–15	4,000–6,000	Fuel break
454	Humboldt	R024XY022 NV	8–10.0	Sodic terrace	basin wildrye, bottlebrush squirreltail, Indian ricegrass	globemallow, thelypody, milkvetch	black greasewood, Wyoming big sagebrush, basin big sagebrush	Range, 0–4	4,000–5,500	Black greasewood
455	Humboldt	R024XY002 NV	5–8.0	Loamy	Indian ricegrass, bottlebrush squirreltail, needleandthread	other perennial forbs, globemallow, other annual forbs	shadscale, bud sagebrush, spiny hopsage	Range, 0–30 Average, 2–8	4,000–6,000	Black greasewood
456	Humboldt	RO24XY00 3NV	6–8”	Sodic Terrace	Bottlebrush squirreltail, Indian	Miterwort, thelypody,	Shadscale, black greasewood, bud	Range, 0–15, Average, 2–4	3,500–5,500	Black greasewood

Table A-2 Winnemucca District Office Ecological Sites

MP (7/10/09)	County	NRCS ID	Annual Precip. (inches)	Ecological Site Name	Dominant Graminoid	Dominant Forb	Dominant Shrub	Slope (%)	Elevation (ft)	Seed Mix
					ricegrass, basin wildrye	princesplume	sagebrush			
457	Humboldt	R024XY015 NV	6–10.0	Deep Sodic Fan	basin wildrye	globemallow,	Torrey's quailbush	Range, 0–4 Average, 0–2	3,500–5,500	Black greasewood
					alkali sacation	povertyweed,	black greasewood,			
					inland saltgrass	milterwort	basin big sagebrush			
458	Humboldt	R024XY015 NV	6–10.0	Deep Sodic Fan	basin wildrye	globemallow,	Torrey's quailbush	Range, 0–4 Average, 0–2	3,500–5,500	Black greasewood
					alkali sacation	povertyweed,	black greasewood,			
					inland saltgrass	milterwort	basin big sagebrush			
459	Humboldt	R024XY015 NV	6–10.0	Deep Sodic Fan	basin wildrye	globemallow,	Torrey's quailbush	Range, 0–4 Average, 0–2	3,500–5,500	Black greasewood
					alkali sacation	povertyweed,	black greasewood,			
					inland saltgrass	milterwort	basin big sagebrush			
460	Humboldt	RO24XY00 3NV	6–8.0	Sodic Terrace	Bottlebrush squirreltail, Indian ricegrass, basin wildrye	Miterwort, thelypody, princesplume	Shadscale, black greasewood, bud sagebrush	Range, 0–15, Average, 2–4	3,500–5,500	Black greasewood

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MP (7/10/09)	County	NRCS ID	Annual Precip. (inches)	Ecological Site Name	Dominant Graminoid	Dominant Forb	Dominant Shrub	Slope (%)	Elevation (ft)	Seed Mix
461	Humboldt	R024XY011 NV	6–8.0	Sodic flat	basin wildrye,	povertyweed, miterwort,	black greasewood,	Range, 0–2	3,500–5,500	Black greasewood
					inland saltgrass,	milkvetch	sickle saltbush,			
					alkali sacaton		Torrey's quailbush			
462	Humboldt	R024XY011 NV	6–8.0	Sodic flat	basin wildrye,	povertyweed, miterwort,	black greasewood,	Range, 0–2	3,500–5,500	Black greasewood
					inland saltgrass,	milkvetch	sickle saltbush,			
					alkali sacaton		Torrey's quailbush			
463	Humboldt	R024XY015 NV	6–10.0	Deep Sodic Fan	basin wildrye	globemallow,	Torrey's quailbush	Range, 0–4 Average, 0–2	3,500–5,500	Black greasewood
					alkali sacation	povertyweed,	black greasewood,			
					inland saltgrass	milterwort	basin big sagebrush			
464	Humboldt	R024XY002 NV	5–8.0	Loamy	Indian ricegrass,	other perennial forbs,	shadscale,	Range, 0–30 Average, 2–8	4,000–6,000	Black greasewood
					bottlebrush squirreltail,	globemallow,	bud sagebrush,			
					needleandthread	other annual forbs	spiny hopsage			
465	Humboldt	R024XY002 NV	5–8.0	Loamy	Indian ricegrass,	other perennial forbs,	shadscale,	Range, 0–30 Average, 2–8	4,000–6,000	Black greasewood
					bottlebrush squirreltail,	globemallow,	bud sagebrush,			

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MP (7/10/09)	County	NRCS ID	Annual Precip. (inches)	Ecological Site Name	Dominant Graminoid	Dominant Forb	Dominant Shrub	Slope (%)	Elevation (ft)	Seed Mix
					needleandthread	other annual forbs	spiny hopsage			
466	Humboldt	R024XY003 NV	6–8.0	Sodic terrace	bottlebrush squirreltail,	miterwort,	shadscale,	Range, 0–15 Average, 2–4	3,500–5,500	Black greasewood
					Indian ricegrass,	thelypody,	black greasewood,			
					basin wildrye	princesplume	bud sagebrush			
467	Humboldt	R024XY003 NV	6–8.0	Sodic terrace	bottlebrush squirreltail,	miterwort,	shadscale,	Range, 0–15 Average, 2–4	3,500–5,500	Black greasewood
					Indian ricegrass,	thelypody,	black greasewood,			
					basin wildrye	princesplume	bud sagebrush			
468	Humboldt	R024XY003 NV	6–8.0	Sodic terrace	bottlebrush squirreltail,	miterwort,	shadscale,	Range, 0–15 Average, 2–4	3,500–5,500	Black greasewood
					Indian ricegrass,	thelypody,	black greasewood,			
					basin wildrye	princesplume	bud sagebrush			
469	Humboldt	R024XY003 NV	6–8.0	Sodic terrace	bottlebrush squirreltail,	miterwort,	shadscale,	Range, 0–15 Average, 2–4	3,500–5,500	Black greasewood
					Indian ricegrass,	thelypody,	black greasewood,			
					basin wildrye	princesplume	bud sagebrush			
470	Humboldt	R024XY003 NV	6–8.0	Sodic terrace	bottlebrush squirreltail,	miterwort,	shadscale,	Range, 0–15 Average, 2–4	3,500–5,500	Black greasewood

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					Indian ricegrass,	thelypody,	black greasewood,			
					basin wildrye	princesplume	bud sagebrush			
471	Humboldt	R024XY003 NV	6–8.0	Sodic terrace	bottlebrush squirreltail,	miterwort,	shadscale,	Range, 0–15 Average, 2–4	3,500–5,500	Black greasewood
					Indian ricegrass,	thelypody,	black greasewood,			
					basin wildrye	princesplume	bud sagebrush			
472	Humboldt	R024XY011 NV	6–8.0	Sodic flat	basin wildrye,	povertyweed, miterwort,	black greasewood,	Range, 0–2	3,500–5,500	Black greasewood
					inland saltgrass,	milkvetch	sickle saltbush,			
					alkali sacaton		Torrey's quailbush			
473	Humboldt	R024XY003 NV	6–8.0	Sodic terrace	bottlebrush squirreltail,	miterwort,	shadscale,	Range, 0–15 Average, 2–4	3,500–5,500	Black greasewood
					Indian ricegrass,	thelypody,	black greasewood,			
					basin wildrye	princesplume	bud sagebrush			
474	Humboldt	R024XY003 NV	6–8.0	Sodic terrace	bottlebrush squirreltail,	miterwort,	shadscale,	Range, 0–15 Average, 2–4	3,500–5,500	Black greasewood
					Indian ricegrass,	thelypody,	black greasewood,			
					basin wildrye	princesplume	bud sagebrush			

Table A-2 Winnemucca District Office Ecological Sites

MP (7/10/09)	County	NRCS ID	Annual Precip. (inches)	Ecological Site Name	Dominant Graminoid	Dominant Forb	Dominant Shrub	Slope (%)	Elevation (ft)	Seed Mix
475	Humboldt	R024XY003 NV	6–8.0	Sodic terrace	bottlebrush squirreltail, Indian ricegrass, basin wildrye	miterwort, thelypody, princesplume	shadscale, black greasewood, bud sagebrush	Range, 0–15 Average, 2–4	3,500–5,500	Black greasewood
476	Humboldt	R024XY003 NV	6–8.0	Sodic terrace	bottlebrush squirreltail, Indian ricegrass, basin wildrye	miterwort, thelypody, princesplume	shadscale, black greasewood, bud sagebrush	Range, 0–15 Average, 2–4	3,500–5,500	Black greasewood
477	Humboldt	R024XY003 NV	6–8.0	Sodic terrace	bottlebrush squirreltail, Indian ricegrass, basin wildrye	miterwort, thelypody, princesplume	shadscale, black greasewood, bud sagebrush	Range, 0–15 Average, 2–4	3,500–5,500	Black greasewood
478	Humboldt	R024XY003 NV	6–8.0	Sodic terrace	bottlebrush squirreltail, Indian ricegrass, basin wildrye	miterwort, thelypody, princesplume	shadscale, black greasewood, bud sagebrush	Range, 0–15 Average, 2–4	3,500–5,500	Black greasewood
479	Humboldt	R024XY003 NV	6–8.0	Sodic terrace	bottlebrush squirreltail, Indian ricegrass, basin wildrye	miterwort, thelypody, princesplume	shadscale, black greasewood, bud sagebrush	Range, 0–15 Average, 2–4	3,500–5,500	Black greasewood

Table A-2 Winnemucca District Office Ecological Sites

MP (7/10/09)	County	NRCS ID	Annual Precip. (inches)	Ecological Site Name	Dominant Graminoid	Dominant Forb	Dominant Shrub	Slope (%)	Elevation (ft)	Seed Mix
480	Humboldt	R024XY003 NV	6–8.0	Sodic terrace	bottlebrush squirreltail,	miterwort,	shadscale,	Range, 0–15 Average, 2–4	3,500–5,500	Black greasewood
					Indian ricegrass,	thelypody,	black greasewood,			
					basin wildrye	princesplume	bud sagebrush			
481	Humboldt	R024XY003 NV	6–8.0	Sodic terrace	bottlebrush squirreltail,	miterwort,	shadscale,	Range, 0–15 Average, 2–4	3,500–5,500	Black greasewood
					Indian ricegrass,	thelypody,	black greasewood,			
					basin wildrye	princesplume	bud sagebrush			
482	Humboldt	R024XY003 NV	6–8.0	Sodic terrace	bottlebrush squirreltail,	miterwort,	shadscale,	Range, 0–15 Average, 2–4	3,500–5,500	Black greasewood
					Indian ricegrass,	thelypody,	black greasewood,			
					basin wildrye	princesplume	bud sagebrush			
483	Humboldt	R024XY003 NV	6–8.0	Sodic terrace	bottlebrush squirreltail,	miterwort,	shadscale,	Range, 0–15 Average, 2–4	3,500–5,500	Black greasewood
					Indian ricegrass,	thelypody,	black greasewood,			
					basin wildrye	princesplume	bud sagebrush			
484	Humboldt	R024XY003 NV	6–8.0	Sodic terrace	bottlebrush squirreltail,	miterwort,	shadscale,	Range, 0–15 Average, 2–4	3,500–5,500	Black greasewood
					Indian ricegrass,	thelypody,	black greasewood,			

Table A-2 Winnemucca District Office Ecological Sites

MP (7/10/09)	County	NRCS ID	Annual Precip. (inches)	Ecological Site Name	Dominant Graminoid	Dominant Forb	Dominant Shrub	Slope (%)	Elevation (ft)	Seed Mix
					basin wildrye	princesplume	bud sagebrush			
485	Humboldt	R024XY003 NV	6–8.0	Sodic terrace	bottlebrush squirreltail,	miterwort,	shadscale,	Range, 0–15 Average, 2–4	3,500–5,500	Black greasewood
					Indian ricegrass,	thelypody,	black greasewood,			
					basin wildrye	princesplume	bud sagebrush			
486	Humboldt	R024XY003 NV	6–8.0	Sodic terrace	bottlebrush squirreltail,	miterwort,	shadscale,	Range, 0–15 Average, 2–4	3,500–5,500	Black greasewood
					Indian ricegrass,	thelypody,	black greasewood,			
					basin wildrye	princesplume	bud sagebrush			
487	Humboldt	R023XY020 NV	10–12.0	Loamy	bluebunch wheatgrass,	arrowleaf balsamroot,	basin big sagebrush,	Range, 2–30 Average, 4–15	5,500–6,500	High precip. Wyoming big sagebrush
					Thurber's needlegrass,	tapertip hawksbeard,	mountain big sagebrush,			
					basin wildrye	white stoneseed	Wyoming big sagebrush			
488	Humboldt	R023XY020 NV	10–12.0	Loamy	bluebunch wheatgrass,	arrowleaf balsamroot,	basin big sagebrush,	Range, 2–30 Average, 4–15	5,500–6,500	Shadscale
					Thurber's needlegrass,	tapertip hawksbeard,	mountain big sagebrush,			
					basin wildrye	white stoneseed	Wyoming big sagebrush			
489	Humboldt	R024XY002 NV	5–8.0	Loamy	Indian ricegrass,	other perennial forbs,	shadscale,	Range, 0–30 Average, 2–8	4,000–6,000	Shadscale
					bottlebrush squirreltail,	globemallow,	bud sagebrush,			

Table A-2 Winnemucca District Office Ecological Sites

MP (7/10/09)	County	NRCS ID	Annual Precip. (inches)	Ecological Site Name	Dominant Graminoid	Dominant Forb	Dominant Shrub	Slope (%)	Elevation (ft)	Seed Mix
					needleandthread	other annual forbs	spiny hopsage			
490	Humboldt	R024XY002 NV	5–8.0	Loamy	Indian ricegrass,	other perennial forbs,	shadscale,	Range, 0–30 Average, 2–8	4,000–6,000	Alakli sacaton
					bottlebrush squirreltail,	globemallow,	bud sagebrush,			
					needleandthread	other annual forbs	spiny hopsage			
491	Humboldt	R027XY024 NV	4–8.0	Sodic terrace	Indian ricegrass,	thelypody,	shadscale,	Range, 0–4	3,300–4,500	Alakli sacaton
					bottlebrush squirreltail,	princesplume,	black greasewood,			
					inland saltgrass	globemallow	bud sagebrush			
492	Humboldt	R024XY007 NV	6–10.0	Saline bottom	basin wildrye,	povertyweed, miterwort,	black greasewood,	Generally level, but reaching =/< 2 at perimeters	4,000–5,500	Alakli sacaton
					alkali sacaton,	milkvetch	rubber rabbitbrush,			
					inland saltgrass		seepweed			
493	Humboldt	R024XY011 NV	6–8.0	Sodic flat	basin wildrye,	povertyweed, miterwort,	black greasewood,	Range, 0–2	3,500–5,500	Black greasewood
					inland saltgrass,	milkvetch	sickle saltbush,			
					alkali sacaton		Torrey's quailbush			
494	Humboldt	R027XY024 NV	4–8.0	Sodic terrace	Indian ricegrass,	thelypody,	shadscale,	Range, 0–4	3,300–4,500	Black greasewood
					bottlebrush squirreltail,	princesplume,	black greasewood,			

Table A-2 Winnemucca District Office Ecological Sites

MP (7/10/09)	County	NRCS ID	Annual Precip. (inches)	Ecological Site Name	Dominant Graminoid	Dominant Forb	Dominant Shrub	Slope (%)	Elevation (ft)	Seed Mix
					inland saltgrass	globemallow	bud sagebrush			
495	Humboldt	R027XY024 NV	4–8.0	Sodic terrace	Indian ricegrass,	thelypody,	shadscale,	Range, 0–4	3,300–4,500	Black greasewood
					bottlebrush squirreltail,	princesplume,	black greasewood,			
					inland saltgrass	globemallow	bud sagebrush			
496	Humboldt	R027XY024 NV	4–8.0	Sodic terrace	Indian ricegrass,	thelypody,	shadscale,	Range, 0–4	3,300–4,500	Black greasewood
					bottlebrush squirreltail,	princesplume,	black greasewood,			
					inland saltgrass	globemallow	bud sagebrush			
497	Humboldt	R027XY024 NV	4–8.0	Sodic terrace	Indian ricegrass,	thelypody,	shadscale,	Range, 0–4	3,300–4,500	Black greasewood
					bottlebrush squirreltail,	princesplume,	black greasewood,			
					inland saltgrass	globemallow	bud sagebrush			
498	Humboldt	R027XY024 NV	4–8.0	Sodic terrace	Indian ricegrass,	thelypody,	shadscale,	Range, 0–4	3,300–4,500	Black greasewood
					bottlebrush squirreltail,	princesplume,	black greasewood,			
					inland saltgrass	globemallow	bud sagebrush			
499	Humboldt	R027XY024 NV	4–8.0	Sodic terrace	Indian ricegrass,	thelypody,	shadscale,	Range, 0–4	3,300–4,500	Black greasewood
					bottlebrush squirreltail,	princesplume,	black greasewood,			

Table A-2 Winnemucca District Office Ecological Sites

MP (7/10/09)	County	NRCS ID	Annual Precip. (inches)	Ecological Site Name	Dominant Graminoid	Dominant Forb	Dominant Shrub	Slope (%)	Elevation (ft)	Seed Mix
					inland saltgrass	globemallow	bud sagebrush			
500	Humboldt	R027XY024 NV	4–8.0	Sodic terrace	Indian ricegrass,	thelypody,	shadscale,	Range, 0–4	3,300–4,500	Black greasewood
					bottlebrush squirreltail,	princesplume,	black greasewood,			
					inland saltgrass	globemallow	bud sagebrush			
501	Humboldt	R027XY024 NV	4–8.0	Sodic terrace	Indian ricegrass,	thelypody,	shadscale,	Range, 0–4	3,300–4,500	Black greasewood
					bottlebrush squirreltail,	princesplume,	black greasewood,			
					inland saltgrass	globemallow	bud sagebrush			
502	Humboldt	R027XY024 NV	4–8.0	Sodic terrace	Indian ricegrass,	thelypody,	shadscale,	Range, 0–4	3,300–4,500	Black greasewood
					bottlebrush squirreltail,	princesplume,	black greasewood,			
					inland saltgrass	globemallow	bud sagebrush			
503	Humboldt	R023XY020 NV	10–12.0	Loamy	bluebunch wheatgrass,	arrowleaf balsamroot,	basin big sagebrush,	Range, 2–30 Average, 4–15	5,500–6,500	Fuel break
					Thurber's needlegrass,	tapertip hawksbeard,	mountain big sagebrush,			
					basin wildrye	white stoneseed	Wyoming big sagebrush			
504	Humboldt	R024XY003 NV	6–8.0	Sodic terrace	bottlebrush squirreltail,	miterwort,	shadscale,	Range, 0–15 Average, 2–4	3,500–5,500	Fuel break

Table A-2 Winnemucca District Office Ecological Sites

MP (7/10/09)	County	NRCS ID	Annual Precip. (inches)	Ecological Site Name	Dominant Graminoid	Dominant Forb	Dominant Shrub	Slope (%)	Elevation (ft)	Seed Mix
					Indian ricegrass, basin wildrye	thelypody, princesplume	black greasewood, bud sagebrush			
505	Humboldt	R024XY017 NV	8–10.0	Sandy	Indian ricegrass, needleandthread, basin wildrye	evening primrose, starlily globemallow	big sagebrush (wyoming big sagebrush, basin big sagebrush) spiny hopsage, fourwing saltbrush	Range, 0–15 Average, 2–8	4,000–6,000	Fuel break
506	Humboldt	R024XY020 NV	8–10.0	Droughty loam	Thurber's needlegrass, Indian ricegrass, bottlebrush squirreltail	globemallow, phlox, biscuitroot	Wyoming big sagebrush, spiny hopsage, bud sagebrush	Range, 2–30 Average, 4–15	4,000–6,000	Fuel break
507	Humboldt	R024XY020 NV	8–10.0	Droughty loam	Thurber's needlegrass, Indian ricegrass, bottlebrush squirreltail	globemallow, phlox, biscuitroot	Wyoming big sagebrush, spiny hopsage, bud sagebrush	Range, 2–30 Average, 4–15	4,000–6,000	Little sagebrush
508	Humboldt	R024XY020 NV	8–10.0	Droughty loam	Thurber's needlegrass, Indian ricegrass, bottlebrush squirreltail	globemallow, phlox, biscuitroot	Wyoming big sagebrush, spiny hopsage, bud sagebrush	Range, 2–30 Average, 4–15	4,000–6,000	Little sagebrush
509	Humboldt	R023XY037 NV	8–12.0	Clay slope	bluebunch wheatgrass,	tapertip hawksbeard,	Lahontan sagebrush,	Range, 4–50 Average, 8–3–	4,500–6,000	Little sagebrush

Table A-2 Winnemucca District Office Ecological Sites

MP (7/10/09)	County	NRCS ID	Annual Precip. (inches)	Ecological Site Name	Dominant Graminoid	Dominant Forb	Dominant Shrub	Slope (%)	Elevation (ft)	Seed Mix
					Thurber's needlegrass,	Hooker's balsamroot,	shadscale,			
					bluegrass	eriogonum	Douglas' rabbitbrush			
510	Humboldt	R023XY037 NV	8–12.0	Clay slope	bluebunch wheatgrass,	tapertip hawksbeard,	Lahontan sagebrush,	Range, 4–50 Average, 8–3-	4,500–6,000	Little sagebrush
					Thurber's needlegrass,	Hooker's balsamroot,	shadscale,			
					bluegrass	eriogonum	Douglas' rabbitbrush			
511	Humboldt	R023XY037 NV	8–12.0	Clay slope	bluebunch wheatgrass,	tapertip hawksbeard,	Lahontan sagebrush,	Range, 4–50 Average, 8–3–	4,500–6,000	Little sagebrush
					Thurber's needlegrass,	Hooker's balsamroot,	shadscale,			
					bluegrass	eriogonum	Douglas' rabbitbrush			
512	Humboldt	R024XY020 NV	8–10.0	Droughty loam	Thurber's needlegrass,	globemallow,	Wyoming big sagebrush,	Range, 2–30 Average, 4–15	4,000–6,000	Little sagebrush
					Indian ricegrass,	phlox,	spiny hopsage,			
					bottlebrush squirreltail	biscuitroot	bud sagebrush			
513	Humboldt	R023XY037 NV	8–12.0	Clay slope	bluebunch wheatgrass,	tapertip hawksbeard,	Lahontan sagebrush,	Range, 4–50 Average, 8–3–	4,500–6,000	Little sagebrush
					Thurber's needlegrass,	Hooker's balsamroot,	shadscale,			
					bluegrass	eriogonum	Douglas' rabbitbrush			

Table A-2 Winnemucca District Office Ecological Sites

MP (7/10/09)	County	NRCS ID	Annual Precip. (inches)	Ecological Site Name	Dominant Graminoid	Dominant Forb	Dominant Shrub	Slope (%)	Elevation (ft)	Seed Mix
514	Humboldt	R023XY037 NV	8–12.0	Clay slope	bluebunch wheatgrass, Thurber's needlegrass, bluegrass	tapertip hawksbeard, Hooker's balsamroot, eriogonum	Lahontan sagebrush, shadscale, Douglas' rabbitbrush	Range, 4–50 Average, 8–3–	4,500–6,000	Mountain big sagebrush
515	Humboldt	R023XY037 NV	8–12.0	Clay slope	bluebunch wheatgrass, Thurber's needlegrass, bluegrass	tapertip hawksbeard, Hooker's balsamroot, eriogonum	Lahontan sagebrush, shadscale, Douglas' rabbitbrush	Range, 4–50 Average, 8–3–	4,500–6,000	Mountain big sagebrush
516	Humboldt	R023XY017 NV	14–16.0	Claypan	Idaho fescue, bluebunch wheatgrass, Thurber's needlegrass	aster, Hooker's balsamroot, lupine	low sagebrush, Utah serviceberry, Douglas' rabbitbrush	Range, 2–30 Average, 2–8	6,500–8,000	Mountain big sagebrush
517	Humboldt	R023XY017 NV	14–16.0	Claypan	Idaho fescue, bluebunch wheatgrass, Thurber's needlegrass	aster, Hooker's balsamroot, lupine	low sagebrush, Utah serviceberry, Douglas' rabbitbrush	Range, 2–30 Average, 2–8	6,500–8,000	Mountain big sagebrush
518	Humboldt	R023XY017 NV	14–16.0	Claypan	Idaho fescue, bluebunch wheatgrass, Thurber's needlegrass	aster, Hooker's balsamroot, lupine	low sagebrush, Utah serviceberry, Douglas' rabbitbrush	Range, 2–30 Average, 2–8	6,500–8,000	Mountain big sagebrush

Table A-2 Winnemucca District Office Ecological Sites

MP (7/10/09)	County	NRCS ID	Annual Precip. (inches)	Ecological Site Name	Dominant Graminoid	Dominant Forb	Dominant Shrub	Slope (%)	Elevation (ft)	Seed Mix
519	Humboldt	R023XY017 NV	14–16.0	Claypan	Idaho fescue,	aster,	low sagebrush,	Range, 2–30 Average, 2–8	6,500–8,000	Mountain big sagebrush
					bluebunch wheatgrass,	Hooker's balsamroot,	Utah serviceberry,			
					Thurber's needlegrass	lupine	Douglas' rabbitbrush			
520	Humboldt	R023XY017 NV	14–16.0	Claypan	Idaho fescue,	aster,	low sagebrush,	Range, 2–30 Average, 2–8	6,500–8,000	
					bluebunch wheatgrass,	Hooker's balsamroot,	Utah serviceberry,			
					Thurber's needlegrass	lupine	Douglas' rabbitbrush			
521	Humboldt	R023XY015 NV	12–14.0	Stony loam	bluebunch wheatgrass,	balsamroot,	antelope bitterbrush, mountain big sagebrush	Range, 2–30 Average, 4–15	6,000–7,200	
					western needlegrass,	tapertip hawksbeard, lupine	Utah serviceberry			
					Thurber's needlegrass					
522	Humboldt	R023XY015 NV	12–14.0	Stony loam	bluebunch wheatgrass,	balsamroot,	antelope bitterbrush, mountain big sagebrush	Range, 2–30 Average, 4–15	6,000–7,200	Mountain big sagebrush
					western needlegrass,	tapertip hawksbeard, lupine	Utah serviceberry			
					Thurber's needlegrass					

Table A-2 Winnemucca District Office Ecological Sites

MP (7/10/09)	County	NRCS ID	Annual Precip. (inches)	Ecological Site Name	Dominant Graminoid	Dominant Forb	Dominant Shrub	Slope (%)	Elevation (ft)	Seed Mix
523	Humboldt	R023XY015 NV	12–14.0	Stony loam	bluebunch wheatgrass,	balsamroot,	antelope bitterbrush, mountain big sagebrush	Range, 2–30 Average, 4–15	6,000–7,200	Mountain big sagebrush
					western needlegrass,	tapertip hawksbeard, lupine	Utah serviceberry			
					Thurber's needlegrass					
524	Humboldt	R023XY031 NV	10–14.0	Claypan	bluebunch wheatgrass,	aster,	low sagebrush,	Range, 2–30 Average, 2–15	5,500–7,000	Mountain big sagebrush
					Thurber's needlegrass,	Hooker's balsamroot,	Douglas' rabbitbrush,			
					bluegrass	tapertip hawksbeard	squawapple			
525	Humboldt	R023XY031 NV	10–14.0	Claypan	bluebunch wheatgrass,	aster,	low sagebrush,	Range, 2–30 Average, 2–15	5,500–7,000	Mountain big sagebrush
					Thurber's needlegrass,	Hooker's balsamroot,	Douglas' rabbitbrush,			
					bluegrass	tapertip hawksbeard	squawapple			
526	Humboldt	R023XY003 NV	1–14.0	Clay basin	Nevada bluegrass,	povertyweed,	silver sagebrush,	Range, <2	5,500–7,000	Mountain big sagebrush
					basin wildrye,	evening primrose,	rubber rabbitbrush,			
					creeping wildrye	dock	black greasewood			
527	Humboldt	R023XY003 NV	1–14.0	Clay basin	Nevada bluegrass,	povertyweed,	silver sagebrush,	Range, <2	5,500–7,000	Black greasewood
					basin wildrye,	evening primrose,	rubber rabbitbrush,			
					creeping wildrye	dock	black greasewood			

Table A-2 Winnemucca District Office Ecological Sites

MP (7/10/09)	County	NRCS ID	Annual Precip. (inches)	Ecological Site Name	Dominant Graminoid	Dominant Forb	Dominant Shrub	Slope (%)	Elevation (ft)	Seed Mix
528	Humboldt	R023XY039 NV	10–14.0	Loamy Slope	bluebunch wheatgrass,	arrowleaf balsamroot,	Wyoming big sagebrush,	Range, 15–50 Average, 30–50	4,500–6,000	High precip. Wyoming big sagebrush
					Thurber's needlegrass,	tapertip hawksbeard,	antelope bitterbrush, mountain big sagebrush			
					basin wildrye	eriogonum	Douglas' rabbitbrush			
529	Humboldt	R023XY066 NV	12–14.0	Stony loam	bluebunch wheatgrass,	balsamroot,	antelope bitterbrush, mountain big sagebrush	Range, 2–30 Average, 4–15	6,000–7,200	High precip. Wyoming big sagebrush
					western needlegrass,	tapertip hawksbeard, lupine	Utah serviceberry			
					Thurber's needlegrass					
530	Humboldt	R023XY020 NV	10–12.0	Loamy	bluebunch wheatgrass,	arrowleaf balsamroot,	basin big sagebrush,	Range, 2–30 Average, 4–15	5,500–6,500	High precip. Wyoming big sagebrush
					Thurber's needlegrass,	tapertip hawksbeard,	mountain big sagebrush,			
					basin wildrye	white stoneseed	Wyoming big sagebrush			
531	Humboldt	R023XY066 NV	12–14.0	Stony loam	bluebunch wheatgrass,	balsamroot,	antelope bitterbrush, mountain big sagebrush	Range, 2–30 Average, 4–15	6,000–7,200	Mountain big sagebrush
					western needlegrass,	tapertip hawksbeard, lupine	Utah serviceberry			
					Thurber's needlegrass					

Table A-2 Winnemucca District Office Ecological Sites

MP (7/10/09)	County	NRCS ID	Annual Precip. (inches)	Ecological Site Name	Dominant Graminoid	Dominant Forb	Dominant Shrub	Slope (%)	Elevation (ft)	Seed Mix
532	Humboldt	R023XY015 NV	12–14.0	Stony loam	bluebunch wheatgrass,	balsamroot,	antelope bitterbrush, mountain big sagebrush	Range, 2–30 Average, 4–15	6,000–7,200	Mountain big sagebrush
					western needlegrass,	tapertip hawksbeard, lupine	Utah serviceberry			
					Thurber's needlegrass					
533	Humboldt	R023XY015 NV	12–14.0	Stony loam	bluebunch wheatgrass,	balsamroot,	antelope bitterbrush, mountain big sagebrush	Range, 2–30 Average, 4–15	6,000–7,200	Mountain big sagebrush
					western needlegrass,	tapertip hawksbeard, lupine	Utah serviceberry			
					Thurber's needlegrass					

Table A-3 Surprise Field Office Ecological Sites

MP (7/10/09)	County	NRCS ID	Annual Precip. (inches)	Ecological Site Name	Dominant Graminoid	Dominant Forb	Dominant Shrub	Slope (%)	Elevation (ft)	Seed Mix
534	Humboldt	R023XY015 NV	12–14.0	Stony loam	bluebunch wheatgrass,	balsamroot,	antelope bitterbrush, mountain big sagebrush	Range, 2–30 Average, 4–15	6,000–7,200	Low sagebrush
					western needlegrass,	tapertip hawksbeard, lupine	Utah serviceberry			
					Thurber's needlegrass					
535	Humboldt	R023XY015 NV	12–14.0	Stony loam	bluebunch wheatgrass,	balsamroot,	antelope bitterbrush, mountain big sagebrush	Range, 2–30 Average, 4–15	6,000–7,200	Low sagebrush
					western needlegrass,	tapertip hawksbeard, lupine	Utah serviceberry			
					Thurber's needlegrass					
535	Humboldt	R023XY015 NV	12–14.0	Stony loam	bluebunch wheatgrass,	balsamroot,	antelope bitterbrush, mountain big sagebrush	Range, 2–30 Average, 4–15	6,000–7,200	Low sagebrush
					western needlegrass,	tapertip hawksbeard, lupine	Utah serviceberry			
					Thurber's needlegrass					
536	Humboldt	R023XY031 NV	10–14.0	Claypan	bluebunch wheatgrass,	aster,	low sagebrush,	Range, 2–30 Average, 2–15	5,500–7,000	Low sagebrush
					Thurber's needlegrass,	Hooker's balsamroot,	Douglas' rabbitbrush,			
					bluegrass	tapertip hawksbeard	squawapple			

Table A-3 Surprise Field Office Ecological Sites

MP (7/10/09)	County	NRCS ID	Annual Precip. (inches)	Ecological Site Name	Dominant Graminoid	Dominant Forb	Dominant Shrub	Slope (%)	Elevation (ft)	Seed Mix
537	Humboldt	R023XY031 NV	10–14.0	Claypan	bluebunch wheatgrass,	aster,	low sagebrush,	Range, 2–30 Average, 2–15	5,500–7,000	Low sagebrush
					Thurber's needlegrass,	Hooker's balsamroot,	Douglas' rabbitbrush,			
					bluegrass	tapertip hawksbeard	squawapple			
538	Humboldt	R023XY031 NV	10–14.0	Claypan	bluebunch wheatgrass,	aster,	low sagebrush,	Range, 2–30 Average, 2–15	5,500–7,000	Low sagebrush
					Thurber's needlegrass,	Hooker's balsamroot,	Douglas' rabbitbrush,			
					bluegrass	tapertip hawksbeard	squawapple			
539	Washoe	R023XY031 NV	10–14.0	Claypan	bluebunch wheatgrass	aster	low sagebrush	Range, 2–30 Average, 2–15	5,500–7,000	Low precip. Wyoming big sagebrush
					Thurber's needlegrass	Hooker's balsamroot	Douglas' rabbitbrush			
					bluegrass	tapertip hawksbeard	squawapple			
540	Washoe	R023XY031 NV	10–14.0	Claypan	bluebunch wheatgrass	aster	low sagebrush	Range, 2–30 Average, 2–15	5,500–7,000	Low precip. Wyoming big sagebrush
					Thurber's needlegrass	Hooker's balsamroot	Douglas' rabbitbrush			
					bluegrass	tapertip hawksbeard	squawapple			
541	Washoe	R023XY039 NV	10–14.0	Loamy Slope	bluebunch wheatgrass	arrowleaf balsamroot	Wyoming big sagebrush	Range, 15–>50 Average, 30–50	4,500–6,000	Low precip. Wyoming big sagebrush
					Thurber's needlegrass	tapertip hawksbeard	antelope bitterbrush			
					basin wildrye	eriogonum	mountain big sagebrush			

Table A-3 Surprise Field Office Ecological Sites

MP (7/10/09)	County	NRCS ID	Annual Precip. (inches)	Ecological Site Name	Dominant Graminoid	Dominant Forb	Dominant Shrub	Slope (%)	Elevation (ft)	Seed Mix
542	Washoe	R023XY059 NV	10–12.0	Gravelly Claypan	Thurber's needlegrass	aster	low sagebrush	Range, 2–30 Average, 2–15	5,000–6,000	Fuel break
					Webber's needlegrass	milkvetch	Douglas' rabbitbrush			
					bluegrass	Hooker's balsamroot	spiny hopsage			
543	Washoe	R023XY017 NV	14–16.0	Claypan	Idaho fescue	aster	low sagebrush	Range, 2–30 Average, 2–8	6,500–8,000	Fuel break
					bluebunch wheatgrass	Hooker's Isamroot	Utah serviceberry			
					Thurber's needlegrass	lupine	Douglas' rabbitbrush			
544	Washoe	R023XY017 NV	14–16.0	Claypan	Idaho fescue	aster	low sagebrush	Range, 2–30 Average, 2–8	6,500–8,000	Fuel break
					bluebunch wheatgrass	Hooker's Isamroot	Utah serviceberry			
					Thurber's needlegrass	lupine	Douglas' rabbitbrush			
545	Washoe	R023XY015 NV	12–14.0	Stony Loam	bluebunch wheatgrass	balsamroot	antelope bitterbrush	Range, 2–30 Average, 4–15	6,000–7,200	Mountain big sagebrush
					western needlegrass	tapertip hawksbeard	mountain big sagebrush			
					Thurber's needlegrass	lupine	Utah serviceberry			
546	Washoe	R023XY007 NV	14–16.0	Loamy	Idaho fescue	arrowleaf balsamroot	mountain big sagebrush	Range, 2–50 Average, 4–30	6,500–8,500	Mountain big sagebrush
					bluebunch wheatgrass	tapertip hawksbeard	antelope bitterbrush			

Table A-3 Surprise Field Office Ecological Sites

MP (7/10/09)	County	NRCS ID	Annual Precip. (inches)	Ecological Site Name	Dominant Graminoid	Dominant Forb	Dominant Shrub	Slope (%)	Elevation (ft)	Seed Mix
					basin wildrye	white stoneseed	Utah serviceberry			
547	Washoe	R023XY007 NV	14–16.0	Loamy	Idaho fescue	arrowleaf balsamroot	mountain big sagebrush	Range, 2–50 Average, 4–30	6,500–8,500	Low precip. Wyoming big sabebrush
					bluebunch wheatgrass	tapertip hawksbeard	antelope bitterbrush			
					basin wildrye	white stoneseed	Utah serviceberry			
548	Washoe	R023XY007 NV	14–16.0	Loamy	Idaho fescue	arrowleaf balsamroot	mountain big sagebrush	Range, 2–50 Average, 4–30	6,500–8,500	Low precip. Wyoming big sabebrush
					bluebunch wheatgrass	tapertip hawksbeard	antelope bitterbrush			
					basin wildrye	white stoneseed	Utah serviceberry			
549	Washoe	R023XY039 NV	10–14.0	Loamy Slope	bluebunch wheatgrass	arrowleaf balsamroot	Wyoming big sagebrush	Range, 15–>50 Average, 30–50	4,500–6,000	Low precip. Wyoming big sabebrush
					Thurber's needlegrass	tapertip hawksbeard	antelope bitterbrush			
					basin wildrye	eriogonum	mountain big sagebrush			
550	Washoe	R023XY006 NV	8–10.0	Loamy	Thurber's needlegrass	eriogonum	Wyoming big sagebrush	Range, 2–30 Average, 4–15	4,500–5,500	Sandy big sagebrush
					Indian ricegrass	bisquitroot	spiny hopsage			

Table A-3 Surprise Field Office Ecological Sites

MP (7/10/09)	County	NRCS ID	Annual Precip. (inches)	Ecological Site Name	Dominant Graminoid	Dominant Forb	Dominant Shrub	Slope (%)	Elevation (ft)	Seed Mix
					Webber's ricegrass	lupine	Douglas' rabbitbrush			
551	Washoe	R023XY006 NV	8–10.0	Loamy	Thurber's needlegrass	eriogonum	Wyoming big sagebrush	Range, 2–30 Average, 4–15	4,500–5,500	Sandy big sagebrush
					Indian ricegrass	bisquitroot	spiny hopsage			
					Webber's ricegrass	lupine	Douglas' rabbitbrush			
552	Washoe	R023XY020 NV	10–12.0	Loamy	bluebunch wheatgrass	arrowleaf balsamroot	big sagebrush (basin big sagebrush, mountain big sagebrush, Wyoming big sagebrush)	Range, 2–30 Average, 4–15	5,500–6,500	Sandy big sagebrush
					Thurber's needlegrass	tapertip hawksbeard	antelope bitterbrush			
					basin wildrye	white stoneseed	Douglas' rabbitbrush			
553	Washoe	R023XY082 NV	10–12.0	Loamy Fan	Cusick's bluegrass	lupine	big sagebrush (basin big sagebrush, Wyoming big sagebrush)	Range, 2–4	5,500–6,700	Sandy big sagebrush
					Nevada bluegrass	milkvetch	Douglas' rabbitbrush			
					Thurber's needlegrass	tapertip hawksbeard	rubber rabbitbrush			

Table A-3 Surprise Field Office Ecological Sites

MP (7/10/09)	County	NRCS ID	Annual Precip. (inches)	Ecological Site Name	Dominant Graminoid	Dominant Forb	Dominant Shrub	Slope (%)	Elevation (ft)	Seed Mix
554	Washoe	R023XY082 NV	10–12.0	Loamy Fan	Cusick's bluegrass	lupine	big sagebrush (basin big sagebrush, Wyoming big sagebrush)	Range, 2–4	5,500–6,700	Sandy big sagebrush
					Nevada bluegrass	milkvetch	Douglas' rabbitbrush			
					Thurber's needlegrass	tapertip hawksbeard	rubber rabbitbrush			
555	Washoe	R023XY051 NV	8–12.0	Sandy	needleandthread	eriogonum	big sagebrush (Wyoming big sagebrush, basin big sagebrush)	Average, 2–8	4,500–6,000	Sandy big sagebrush
					Indian ricegrass	common pricklygilia	spiny hopsage			
					Thurber's needlegrass	common starlily	ephedra			
556	Washoe	R023XY051 NV	8–12.0	Sandy	needleandthread	eriogonum	big sagebrush (Wyoming big sagebrush, basin big sagebrush)	Average, 2–8	4,500–6,000	Sandy big sagebrush
					Indian ricegrass	common pricklygilia	spiny hopsage			
					Thurber's needlegrass	common starlily	ephedra			
557	Washoe	R023XY016 NV	12–16.0	South Slope	bluebunch wheatgrass	arrowleaf balsamroot	mountain big sagebrush	Range, 15–75 Average, 30–50	6,500–8,000	Sandy big sagebrush
					western needlegrass	tapertip hawksbeard	antelope bitterbrush			

Table A-3 Surprise Field Office Ecological Sites

MP (7/10/09)	County	NRCS ID	Annual Precip. (inches)	Ecological Site Name	Dominant Graminoid	Dominant Forb	Dominant Shrub	Slope (%)	Elevation (ft)	Seed Mix
					Thurber's needlegrass	eriogonum	Utah serviceberry			
558	Washoe	R023XY082 NV	10–12.0	Loamy Fan	Cusick's bluegrass	lupine	big sagebrush (basin big sagebrush, Wyoming big sagebrush)	Range, 2–4	5,500–6,700	Sandy big sagebrush
					Nevada bluegrass	milkvetch	Douglas' rabbitbrush			
					Thurber's needlegrass	tapertip hawksbeard	rubber rabbitbrush			
559	Washoe	R023XY051 NV	8–12.0	Sandy	needleandthread	eriogonum	big sagebrush (Wyoming big sagebrush, basin big sagebrush)	Average, 2–8	4,500–6,000	Sandy big sagebrush
					Indian ricegrass	common pricklygilia	spiny hopsage			
					Thurber's needlegrass	common starlily	ephedra			
560	Washoe	R023XY082 NV	10–12.0	Loamy Fan	Cusick's bluegrass	lupine	big sagebrush (basin big sagebrush, Wyoming big sagebrush)	Range, 2–4	5,500–6,700	Sandy big sagebrush
					Nevada bluegrass	milkvetch	Douglas' rabbitbrush			
					Thurber's needlegrass	tapertip hawksbeard	rubber rabbitbrush			
561	Washoe	R023XY051 NV	8–12.0	Sandy	needleandthread	eriogonum	big sagebrush (Wyoming big sagebrush, basin big sagebrush)	Average, 2–8	4,500–6,000	Sandy big sagebrush

Table A-3 Surprise Field Office Ecological Sites

MP (7/10/09)	County	NRCS ID	Annual Precip. (inches)	Ecological Site Name	Dominant Graminoid	Dominant Forb	Dominant Shrub	Slope (%)	Elevation (ft)	Seed Mix
					Indian ricegrass	common pricklygilia	spiny hopsage			
					Thurber's needlegrass	common starlily	ephedra			
562	Washoe	R023XY051 NV	8–12.0	Sandy	needleandthread	eriogonum	big sagebrush (Wyoming big sagebrush, basin big sagebrush)	Average, 2–8	4,500–6,000	Sandy big sagebrush
					Indian ricegrass	common pricklygilia	spiny hopsage			
					Thurber's needlegrass	common starlily	ephedra			
563	Washoe	R023XY051 NV	8–12.0	Sandy	needleandthread	eriogonum	big sagebrush (Wyoming big sagebrush, basin big sagebrush)	Average, 2–8	4,500–6,000	Black greasewood
					Indian ricegrass	common pricklygilia	spiny hopsage			
					Thurber's needlegrass	common starlily	ephedra			
564	Washoe	R023XY051 NV	8–12.0	Sandy	needleandthread	eriogonum	big sagebrush (Wyoming big sagebrush, basin big sagebrush)	Average, 2–8	4,500–6,000	Black greasewood
					Indian ricegrass	common pricklygilia	spiny hopsage			

Table A-3 Surprise Field Office Ecological Sites

MP (7/10/09)	County	NRCS ID	Annual Precip. (inches)	Ecological Site Name	Dominant Graminoid	Dominant Forb	Dominant Shrub	Slope (%)	Elevation (ft)	Seed Mix
					Thurber's needlegrass	common starlily	ephedra			
565	Washoe	R023XY051 NV	8–12.0	Sandy	needleandthread	eriogonum	big sagebrush (Wyoming big sagebrush, basin big sagebrush)	Average, 2–8	4,500–6,000	Black greasewood
					Indian ricegrass	common pricklygilia	spiny hopsage			
					Thurber's needlegrass	common starlily	ephedra			
566	Washoe	R024XY008 NV	8–10.0	Sodic Flat	basin wildrye	povertyweed	black greasewood	Range, 0–8 Average, 0–2	4,500–6,000	Black greasewood
					bottlebrush squirreltail	princesplume	rubber rabbitbrush			
					inland saltgrass	thelypody	spiny hopsage			
567	Washoe	R024XY008 NV	8–10.0	Sodic Flat	basin wildrye	povertyweed	black greasewood	Range, 0–8 Average, 0–2	4,500–6,000	Black greasewood
					bottlebrush squirreltail	princesplume	rubber rabbitbrush			
					inland saltgrass	thelypody	spiny hopsage			
568	Washoe	R024XY008 NV	8–10.0	Sodic Flat	basin wildrye	povertyweed	black greasewood	Range, 0–8 Average, 0–2	4,500–6,000	Black greasewood
					bottlebrush squirreltail	princesplume	rubber rabbitbrush			
					inland saltgrass	thelypody	spiny hopsage			
569	Washoe	R024XY008 NV	8–10.0	Sodic Flat	basin wildrye	povertyweed	black greasewood	Range, 0–8 Average, 0–2	4,500–6,000	Black greasewood
					bottlebrush squirreltail	princesplume	rubber rabbitbrush			
					inland saltgrass	thelypody	spiny hopsage			

Table A-3 Surprise Field Office Ecological Sites

MP (7/10/09)	County	NRCS ID	Annual Precip. (inches)	Ecological Site Name	Dominant Graminoid	Dominant Forb	Dominant Shrub	Slope (%)	Elevation (ft)	Seed Mix
570	Washoe	R024XY008 NV	8–10.0	Sodic Flat	basin wildrye	povertyweed	black greasewood	Range, 0–8 Average, 0–2	4,500–6,000	Black greasewood
					bottlebrush squirreltail	princesplume	rubber rabbitbrush			
					inland saltgrass	thelypody	spiny hopsage			
571	Washoe	R024XY008 NV	8–10.0	Sodic Flat	basin wildrye	povertyweed	black greasewood	Range, 0–8 Average, 0–2	4,500–6,000	Black greasewood
					bottlebrush squirreltail	princesplume	rubber rabbitbrush			
					inland saltgrass	thelypody	spiny hopsage			
572	Washoe	R024XY022 NV	8–10.0	Sodic Terrace	basin wildrye	globemallow	black greasewood	Average, 0–4	4,000–5,500	Black greasewood
					bottlebrush squirreltail	thelypody	big sagebrush (Wyoming big sagebrush, basin big sagebrush)			
					Indian ricegrass	milkvetch	spiny hopsage			
573	Washoe	R023XY005 NV	8–12.0	Dry Floodplain	basin wildrye	povertyweed	basin big sagebrush	Average, 0–2	4,500–6,000	Low sagebrush
					western wheatgrass	thelypody	black greasewood			
					Nevada bluegrass	eriogonum	threadleaf rubber rabbitbrush			
574	Washoe	R023XY005 NV	8–12.0	Dry Floodplain	basin wildrye	povertyweed	basin big sagebrush	Average, 0–2	4,500–6,000	Low sagebrush
					western wheatgrass	thelypody	black greasewood			
					Nevada bluegrass	eriogonum	threadleaf rubber rabbitbrush			
575	Washoe	R023XY039 NV	10–14.0	Loamy Slope	bluebunch wheatgrass	arrowleaf balsamroot	Wyoming big sagebrush	Range, 15–>50 Average, 30–50	4,500–6,000	Low sagebrush
					Thurber's needlegrass	tapertip hawksbeard	antelope bitterbrush			

Table A-3 Surprise Field Office Ecological Sites

MP (7/10/09)	County	NRCS ID	Annual Precip. (inches)	Ecological Site Name	Dominant Graminoid	Dominant Forb	Dominant Shrub	Slope (%)	Elevation (ft)	Seed Mix
					basin wildrye	eriogonum	mountain big sagebrush			
576	Washoe	R023XY017 NV	14–16.0	Claypan	Idaho fescue	aster	low sagebrush	Range, 2–30 Average, 2–8	6,500–8,000	Low sagebrush
					bluebunch wheatgrass	Hooker's Isamroot	Utah serviceberry			
					Thurber's needlegrass	lupine	Douglas' rabbitbrush			
577	Washoe	R023XY017 NV	14–16.0	Claypan	Idaho fescue	aster	low sagebrush	Range, 2–30 Average, 2–8	6,500–8,000	Mountain big sagebrush
					bluebunch wheatgrass	Hooker's Isamroot	Utah serviceberry			
					Thurber's needlegrass	lupine	Douglas' rabbitbrush			
578	Washoe	R023XY017 NV	14–16.0	Claypan	Idaho fescue	aster	low sagebrush	Range, 2–30 Average, 2–8	6,500–8,000	Mountain big sagebrush
					bluebunch wheatgrass	Hooker's Isamroot	Utah serviceberry			
					Thurber's needlegrass	lupine	Douglas' rabbitbrush			
579	Washoe	R023XY016 NV	12–16.0	South Slope	bluebunch wheatgrass	arrowleaf balsamroot	mountain big sagebrush	Range, 15–75 Average, 30–50	6,500–8,000	Mountain big sagebrush
					western needlegrass	tapertip hawksbeard	antelope bitterbrush			
					Thurber's needlegrass	eriogonum	Utah serviceberry			
580	Washoe	No Data								Low sagebrush

Table A-3 Surprise Field Office Ecological Sites

MP (7/10/09)	County	NRCS ID	Annual Precip. (inches)	Ecological Site Name	Dominant Graminoid	Dominant Forb	Dominant Shrub	Slope (%)	Elevation (ft)	Seed Mix
581	Washoe	No Data								Low sagebrush
582	Washoe	No Data								Low sagebrush
583	Washoe	No Data								Low sagebrush
584	Washoe	R023XY059 NV	10–12.0	Gravelly claypan	Thurber's needlegrass	aster	low sagebrush	Range, 2–30 Average, 2–15	5,000–6,000	Low sagebrush
					Webber's needlegrass	milkvetch	Douglas' rabbitbrush			
					Canby's bluegrass	Hooker's balsamroot	spiny hopsage			
585	Washoe	No Data								Low sagebrush
586	Washoe	No Data								Low sagebrush
587	Washoe	R023XY059 NV	10–12.0	Gravelly claypan	Thurber's needlegrass	aster	low sagebrush	Range, 2–30 Average, 2–15	5,000–6,000	Low sagebrush
					Webber's needlegrass	milkvetch	Douglas' rabbitbrush			
					Canby's bluegrass	Hooker's balsamroot	spiny hopsage			
588	Washoe	R023XY059 NV	10–12.0	Gravelly claypan	Thurber's needlegrass	aster	low sagebrush	Range, 2–30 Average, 2–15	5,000–6,000	Low sagebrush

Table A-3 Surprise Field Office Ecological Sites

MP (7/10/09)	County	NRCS ID	Annual Precip. (inches)	Ecological Site Name	Dominant Graminoid	Dominant Forb	Dominant Shrub	Slope (%)	Elevation (ft)	Seed Mix
					Webber's needlegrass	milkvetch	Douglas' rabbitbrush			
					Canby's bluegrass	Hooker's balsamroot	spiny hopsage			
589	Washoe	No Data								Low sagebrush
590	Washoe	R023XY059 NV	10–12.0	Gravelly claypan	Thurber's needlegrass	aster	low sagebrush	Range, 2–30 Average, 2–15	5,000–6,000	Low sagebrush
					Webber's needlegrass	milkvetch	Douglas' rabbitbrush			
					Canby's bluegrass	Hooker's balsamroot	spiny hopsage			

Restoration and Revegetation Plan: Oregon

RUBY PIPELINE LLC

FERC Docket No. CP09-54-000

June 2010

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Acronyms and Abbreviations

AUMs	Animal Unit Months
BLM	Bureau of Land Management
BSC	biological soil crust
CFR	Code of Federal Regulations
EPA	U.S. Environmental Protection Agency
FEIS	Ruby Pipeline Project Final Environmental Impact Statement
FERC	Federal Energy Regulatory Commission
FWNF	Fremont-Winema National Forest
GPS	Global Positioning System
KFRA	Klamath Falls Resource Area
lbs	pounds
LDO	Lakeview District Office
LRA	Lakeview Resource Area
MP	milepost
NRCS	National Resources Conservation Service
ODFW	Oregon Department of Fish and Wildlife
OHV	off-highway vehicle
Plan	Restoration and Revegetation Plan
PLS	pure live seed
POD	Plan of Development
Project	Ruby Pipeline Project
Reclamation	Bureau of Reclamation
ROW	right-of-Way
Ruby	Ruby Pipeline, LLC
sq. ft.	square foot
USDA	U.S. Department of Agriculture
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service

1.0 Introduction

The Ruby Pipeline Project (Project), proposed by Ruby Pipeline, LLC (Ruby), is composed of approximately 675.2 miles of 42-inch diameter natural gas pipeline, along with associated compression and measurement facilities, located between Opal, Wyoming, and Malin, Oregon (Figure 1). The Project would include an approximate 2.6-mile lateral to be constructed in Klamath County, Oregon. In addition to the existing King Compressor Station at Opal, Wyoming, Ruby proposes to install four new compressor stations for the Project: one located near the Opal Hub, one in western Utah, one near the mid-point of the Project north of Elko, Nevada, and one northwest of Winnemucca, Nevada. Ruby would utilize a 115-foot wide construction right-of-way (ROW) for installation of both the mainline and the lateral, and the final ROW width is 50 feet. The ROW will cross through four states: Wyoming, Utah, Nevada, and Oregon. A restoration and revegetation plan (Plan) is being developed for each state the Project crosses. This Plan is for Oregon from milepost (MP) 591 to 675. Riparian and wetland reclamation is described in the Wetland Mitigation Plan, (Plan of Development [POD], Appendix Q).

Federal lands in Oregon that will be crossed include Bureau of Land Management (BLM) Lakeview Resource Area (LRA) and Klamath Falls Resource Area (KFRA) of the Lakeview District Office (LDO), Bureau of Reclamation (Reclamation), and U.S. Forest Service (USFS) Fremont-Winema National Forest (FWNF). The focus of this Plan is federal lands. The Plan will also be applicable to privately owned lands pending approval by landowners.

Ruby organized a technical team to provide input for the Oregon Plan. Team members are reclamation specialists from the LRA, KFRA, FWNF, Reclamation, and Oregon Department of Fish and Wildlife (ODFW). Team members reviewed this Plan, provided important technical restoration and revegetation guidance, and provided seed mix recommendations to revegetate the ROW.

This Plan utilizes restoration methods developed for other large-diameter pipeline projects that were approved by the Federal Energy Regulatory Commission (FERC) (Dames and Moore 1990; E & E 2007). Ruby has adapted and updated the Plan by incorporating recent technical standards and published long-term restoration monitoring information associated with similar habitats (E & E 2002, 2007). The Plan also incorporates Ruby's Noxious and Invasive Weed Control Plan and Upland Erosion Control, Revegetation, and Maintenance Plan, POD Appendices H and D, respectively.

The BLM POD for the Project will include additional reclamation measures for specific visually sensitive areas and off-highway vehicle (OHV) control, as identified by the BLM, Reclamation, and USFS. These measures include serrating the ROW edge, leaving shrubs and trees along the ROW edge to break up the perception of a straight line.

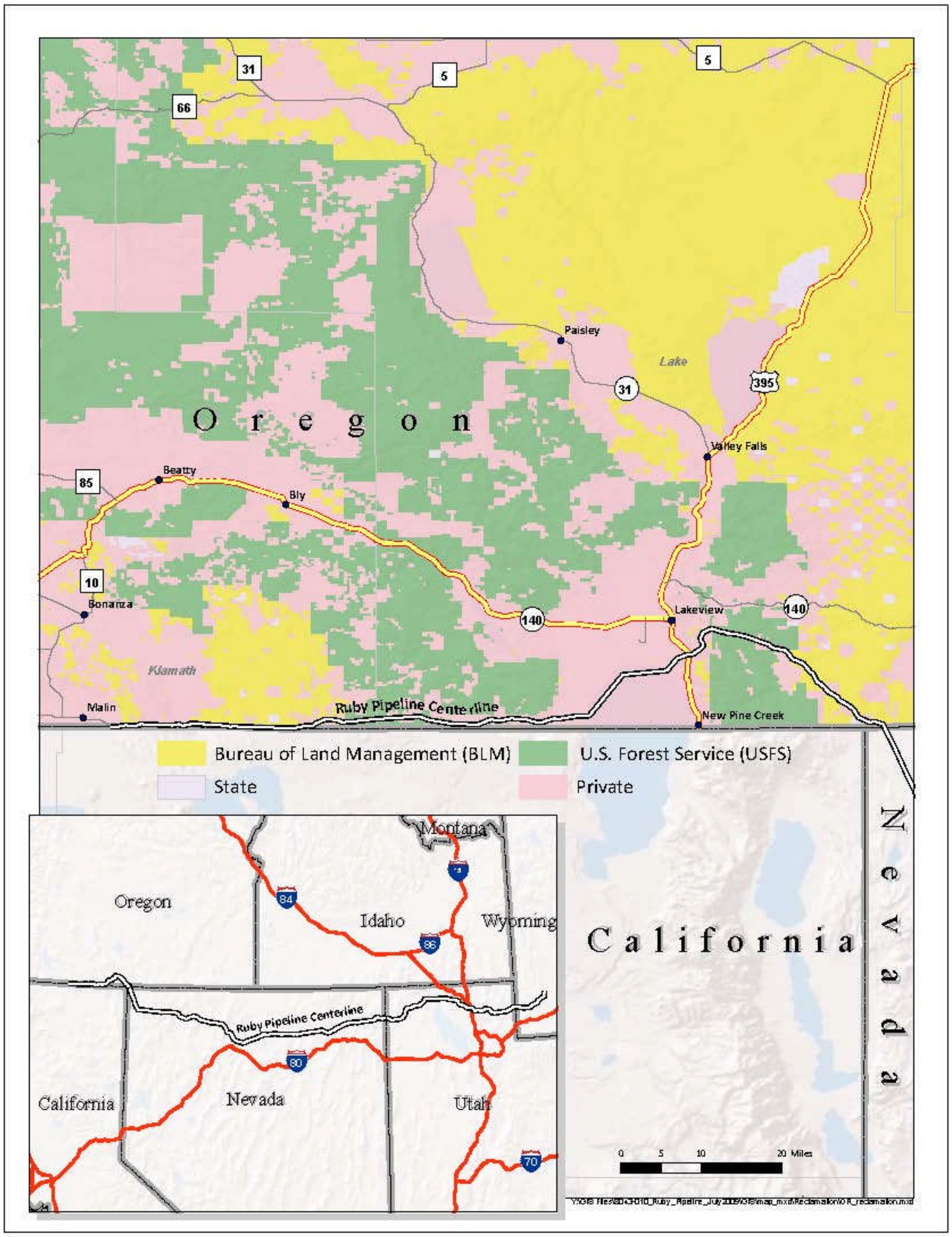

Figure 1 Ruby Pipeline Proposed Route in Oregon

2.0 Purpose

The Plan describes the processes and measures that will be implemented following construction to mitigate impacts from the Project in Lake and Klamath counties. This Plan is applicable to the ROW, extra workspace, and sections of access roads that require restoration. No eligible or unevaluated cultural sites would be disturbed during restoration without a data recovery (mitigation) plan. Revegetation criteria standards are presented to judge plant establishment success. The Plan does not address Ruby's off-site conservation measures, as they will be fully described in the Cooperative Conservation Agreement for Greater Sage-grouse and Pygmy Rabbit Conservation Measures Plan (POD, Appendix S).

The purpose of this Plan is to provide guidance for restoring lands disturbed by pipeline construction. The Project ROW in Oregon is 87.0 miles, which translates to 1,175 acres with a 115-foot-wide ROW (see POD). Extra workspace acres total 558. Access roads total approximately 303 acres.

3.0 Goals and Objectives

The short-term goal of pipeline ROW restoration is to stabilize soils by recontouring terrain, spreading stockpiled topsoil, strategically placing erosion control devices, establishing temporary vegetation cover, and abating noxious and invasive weed establishment. ROW restoration would be upon pipeline trench closure. The ROW would be recontoured to blend with adjacent undisturbed terrain. Erosion control devices such as water bars and/or Oregon certified weed-free straw bales or wattles would be strategically placed to limit and/or direct overland water flow. Herbicide control of noxious or invasive weeds may be necessary following U.S. Environmental Protection Agency (EPA), BLM, Reclamation, and USFS regulations and timing.

The long-term restoration goal is to establish a permanent vegetation cover with similar species densities and compositions of adjacent undisturbed lands in accordance with 18 Code of Federal Regulations (CFR) § 380.15 and FERC guidelines. Establishment of a perennial plant cover is essential to provide resiliency to resist invasive annual grasses and forbs. This long-term goal would be achieved through maintaining or adding new or existing erosion control devices, providing continuing noxious weed abatement, minimizing livestock and grazing, minimizing OHV travel, and implementing a monitoring program. Long-term restoration efforts would be deemed complete with successful establishment of the permanent plant cover. Determination of ROW restoration success would rest with the BLM, Reclamation, and USFS on public lands and landowners on private lands.

Ruby would employ the following restoration steps to meet short- and long-term goals.

- Pre-treat the ROW in applicable areas for noxious and invasive weeds prior to pipeline construction.
- Minimize weed dispersal by following appropriate methods of abatement (Siegel and Donaldson 2003).
- Use proper soil management techniques, including stripping, stockpiling, and reapplying topsoil to establish surface conditions that would enhance development of diverse, stable, and self-generating plant communities. Topsoil management will apply to the ditchline and spoilside areas for the LRA, Reclamation, FWNF, and KRA.
- Redistribute rocks, stockpiled from the surface of the construction ROW, across the ROW following seeding. Or, dispose of in accordance with agency requirements.

- Establish stable surface and drainage conditions and use erosion control devices to minimize soil erosion and sedimentation.
- Establish terrain compatible with the surrounding landscape.
- Use native plant species for revegetation unless it is determined that: (1) suitable native species are not available; (2) the natural biological diversity of the proposed action would not be diminished; (3) exotic and naturalized species can be confined within the proposed management area; (4) analysis of the site indicates that native species are unable to compete with invasive weeds;
- Do not plant seeds from plants that are listed by Oregon or on the U.S. Department of Agriculture (USDA) federal list (PLANTS website) as noxious or invasive weeds.
- Minimize construction impacts along the route by, where practical and safe, limiting ROW width to avoid impacts to native vegetation and wildlife habitat.
- Following the minimum five years of monitoring, where long-term impacts occur to certain sensitive environments and habitats, Ruby would work with the appropriate land management agency or landowners to develop a plan for compensatory mitigation to offset ROW impacts. The plan would include proposed types of mitigation to be performed and areas to receive treatments. The need for an appropriate level of NEPA analysis will be determined in consultation with federal agencies.

4.0 Restoration Schedule

The Project is scheduled to begin June 1, 2010. The Final Environmental Impact Statement (FEIS) was issued January 2010. The FERC Certificate of Public Convenience and Necessity and BLM Record of Decision on the selected route must be finalized before construction can begin. The POD presents specific information regarding construction procedures and timing. Pipeline construction is projected to be completed March 2011.

Ruby will commence clean-up operations immediately following backfill operations. Complete final grading, topsoil replacement, and installation of permanent erosion control structures within 20 days after backfilling the trench. If season or other weather conditions prevent compliance with these time frames, Ruby would maintain temporary erosion controls (temporary slope breakers and sediment barriers) until conditions allow completion of clean-up. Areas not seeded with native plants within 14 days of final grading, because of seasonal limitations, slopes greater than 10 percent, erosive soils, or aesthetic sensitivity, would be seeded with a sterile annual grass or slender wheatgrass immediately after seedbed preparation, in accordance with LRA, KFRA, Reclamation, or FWNF policy or with landowner input. The seeding or transplanting of native plants to establish the permanent vegetation cover will occur during late fall to early winter to take advantage of winter and spring precipitation (Monsen 2000, 2005; Plummer 1977). The temporary plant cover will be incorporated into the soil before the permanent plant cover is seeded.

5.0 Restoration Planning Process

The restoration process includes steps to satisfy the short- and long-term goals described in Section 3 of this Plan. The Plan incorporates lesson learned from the Kern Expansion Project restoration effort (Ecology and Environment, Inc. 2002, 2007) and the experiences of subject-matter experts in arid and semi-arid land restoration (Plummer 1977; Institute for Land Rehabilitation 1978; Wallace et al. 1980; Monsen 2000, 2005; EDAW 2002; Monsen et al. 2004, Sheley et al. 2008; and Bainbridge 2007).

5.1 Restoration Approach

This Plan is applicable to the ROW, extra workspaces, and access roads. Reference to ROW restoration includes extra workspaces and access roads. Measures implemented to ensure successful restoration include topsoil and subsoil segregation and stockpiling during construction, cleanup, backfilling, appropriate surface recontouring, soil erosion control, seedbed preparation, application of ecological site-specific seed mixes, plant establishment, weed abatement, and monitoring. Grasses, forbs, and shrubs will be established mainly by seed. Ponderosa pine bare-root stock will be used to establish forest trees on FWNF lands. Container-grown plants will be transplanted in key locations where successful establishment may occur. Seeds for the LRA, KFRA, and Reclamation lands will be purchased from commercial vendors from sources in proximity to the ROW. However, some seed required by the KFRA will need to be collected by professional seed collectors from as close to the ROW as possible. Seeds for the FWNF lands will be purchased from the FWNF . Trees and shrubs to be grown as bare-root stock or in containers for transplanting in appropriate sites include shrubs such as ponderosa pine, low sagebrush, Wyoming sagebrush, bitterbrush, and Saskatoon serviceberry. The ponderosa pine seedlings will be planted by the FWNF. ROW alignments will have uneven edges created by either leaving shrubs and trees in place when clearing or planting shrub and tree groupings after cleanup.

5.2.1 ROW Clearing, Grading, and Topsoil Management

Initial construction activities include surveying and staking the construction ROW, stockpiling vegetation and topsoil, and grading the ROW for safe construction passage, as described in the FEIS (Section 2.3) and POD (Section 5). Stands of noxious and invasive weeds identified during 2009 biological field surveys (Noxious and Invasive Weed Control Plan, POD, Appendix H) will be pretreated with agency-approved or landowner-approved herbicides before vegetation clearing begins. ROW surveying and staking will identify the width of excavation and blade work, including cut and fill locations. The ROW vegetation will be removed along with the topsoil and stockpiled. Merchantable and non-merchantable trees removed during ROW clearing activities will be done so in accordance to the tree management plan (Attachment A, Biological Resources Conservation Measure Plan, Appendix I, POD).

Brush hogging will remove aboveground vegetation without disturbing root systems and limited topsoil resources (Watson October 9, 2009). Many grasses, forbs, and shrubs (but not sagebrush taxa) will root sprout after pipeline construction is completed. This procedure should facilitate ROW restoration and revegetation.

Topsoil thickness varies throughout the ROW, depending on soil type. Environmental inspectors will identify surface soil thickness for removal and stockpiling. The topsoil and vegetation mixture from the entire ROW will be stripped and stockpiled separately from the subsoil stockpile in the KFRA.

Certified weed-free erosion control blankets, straw bales, wood fiber, or straw wattles will be used as appropriate to limit erosion. The topsoil-vegetation mixture and sub-soils will be replaced in the proper order during backfilling and final grading operations. The topsoil-vegetation mixture should provide propagules to support plant re-establishment along the ROW in addition to the seed mixes. Vegetation in the topsoil mixture will serve as mulch.

Surface rocks, where present and where useful for restoration, will be windrowed adjacent to the topsoil stockpile. After seeding, the rock will be separated from the topsoil and then distributed along the construction ROW in a manner that visually blends with the adjacent undisturbed area for use as erosion control (rock) mulch, or for OHV control if requested by an agency or private landowner. Salvaged rock will be used to re-create rock outcrops and rock faces, to the extent possible. Excess rock, including rock excavated to the surface in active agricultural lands, will be removed and disposed at an agency-approved location.

During construction, all vehicle travel and equipment operation will be within the ROW or on approved access roads. Cross-country vehicle travel outside the ROW or on non-approved access roads will not be allowed.

On FWNF land, ROW woody debris (including, but not limited to, root wads, tree tops, tree limbs, and un-merchantable tree pieces) may only be left on the ROW for erosion control, OHV control, and soil productivity enhancement. Stockpiling or burning of this material will not be allowed on FWNF lands.

5.2.2 Right-of-Way, Extra Workspace, and Access Road Restoration

Restoration of the ROW will involve backfilling to the excavated ditchline, replacing stockpiled subsoil and the topsoil/vegetation mixture, restoring pre-existing terrain contours, installing erosion control devices, preparing the seedbed, and seeding. ROW restoration will begin within 20 days after pipeline trench closure and final cleanup.

Extra workspace restoration will follow similar steps as ROW restoration, including contouring, preparing the seedbed, and seeding. Extra workspace restoration would begin within a few days after the area is no longer needed. The appropriate seed mix will correspond with the surrounding vegetation type.

Access roads will be restored according to landowner directions. The LRA, KFRA, FWNF, Reclamation, and ODFW have requested that all improved roads on public lands be returned to their original status after they are no longer needed. Access road restoration will include grading, preparing the seed bed, and seeding. Road restoration will begin within a few days after the road is no longer needed. The appropriate seed mix will correspond with the surrounding vegetation type.

The FWNF has specified that roads L 19C, L 19D, CT 4A, CT 43, K 1A, K 1B, K 1C, K 1D, K 1E, roads proposed for construction (CT B, CT C, CT F and CT R), and any other road designated as a maintenance level 1 by the USFS be returned to their pre-disturbance condition through revegetation methods.

Backfilling

Backfilling of subsoil materials will be required after the pipeline is aligned in the trench and padded with screened subsoil or other appropriate materials (Section 5, POD). The excavated subsoil will be used to backfill the trench. To avoid settling of surface soils below the contours of adjacent lands, the backfill material will be mounded. Excessive ditch spoil could be used in areas where ditch spoil may not be sufficient for padding the pipeline or backfilling. As a general rule, excessive ditch spoil will be feathered and blended across the construction corridor, creating a roughened surface to capture precipitation, decrease erosion, and provide safe sites for plant establishment.

Compacted Soils

Compacted soils would typically be associated with the ROW travel lane, pipe laydown locations, and access roads. Subsoil de-compaction will occur as necessary to reduce soil bulk density. Identified locations will be de-compacted to a minimum depth of 6–12 inches prior to surface soil replacement. “Soil ripping” will be used along contours to minimize soil erosion and facilitate soil-water retention to aid revegetation. Extra workspaces and access roads will also be ripped to reduce soil compaction.

Terrain Contouring

The ROW, extra workspaces, and access roads will be contoured to blend within the surrounding landscape. Contouring will emphasize restoration of existing drainage and landform patterns, to the greatest extent practicable.

Topsoil and Vegetation Mixture Replacement

The topsoil will be spread over areas where it was removed. The topsoil will provide seeds, vegetative propagules, and soil microbiota to facilitate vegetation establishment on the ROW. The mowed or brush-hogged vegetation will be spread over the ROW after seeding to serve as mulch.

Mulch

A mulch cover minimizes soil erosion, conserves soil water, and moderates surface temperatures to improve the chances of seedling establishment (Sheley et al. 2008). The native plant materials that were mixed with topsoil during its removal or from vegetation mowing and then spread over the ROW will serve as a seed source and mulch. In addition, Oregon certified weed-free straw may be used as surface mulch on terrain with a slope less than 10 percent. Mulch depth will not be greater than one inch, so as not to impede any native seed germination (Dreesen, not dated). Mulch coverage should also be porous with approximately 25% soil visible. This depth equates to about one to two tons per acre. Rate of application of the straw mulch will depend on the amount of native vegetation from the topsoiling or mowing used as mulch. The use of straw mulch will be evaluated with LRA, KFRA, WFNF, and Reclamation. On slopes greater than 15 percent, mulching materials such as certified weed-free straw, woodchips, soil tackifiers, and fabrics may be needed to manage erosion in addition to the straw mulch.

Soil Erosion Control

Soil erosion control will occur through establishing desirable vegetation, mulch, soil tackifiers, or water control devices (Institute for Land Rehabilitation 1978; Sheley et al. 2008). The Project will establish a desirable plant cover as quickly as possible after pipeline construction, according to directions by the land management agency or landowner to minimize soil erosion. Mulch, certified weed-free erosion control blankets and wattles, and certified weed-free straw bales, soil tackifiers, and/or water bars may also be used as appropriate. Water bars will likely be the main approach for controlling soil erosion because they are effective and cost efficient. All organic mulches, blankets, and wattles will be certified weed-free by the appropriate state agency or BLM.

Water bars or slope breakers are earth-berms established to control the flow of surface water (University of Minnesota Extension 1998). Water bars will be installed in all areas, except agricultural and pasture land and lawns, using spacing recommendations obtained from the local soil conservation authority or land management agency. In the absence of recommendations, Ruby will use the minimum spacing requirements outlined Ruby's Upland Erosion Control and Revegetation, and Maintenance Plan (Appendix D, POD). Additionally, permanent water bars may extend slightly (about four feet) beyond the edge of the construction ROW to effectively drain water away from the disturbed area. Where slope breakers extend beyond the edge of the construction ROW, they are subject to compliance with all applicable survey requirements.

Water bars will consist of a one-foot-high berm with an upslope swale. Water bars will be reseeded. Water bars will be gently angled downslope to divert stormwater runoff to a stable upland discharge point or to a "j" hook created at the outfall point. The purposes of water bars are to:

- Decrease overland water velocities on disturbed lands by reducing slope lengths;
- Remove water from the disturbed area in a controlled manner and at frequent intervals to reduce its erosive power;
- Direct water into a stabilized location to minimize surface scour;
- Maximize water infiltration along the Project ROW; and
- Slow water flow across the ROW to help maintain soil moisture for restoration efforts.

Noxious and Invasive Weed Abatement

Noxious and invasive weeds may reduce the success of ROW revegetation through competition for water, soil nutrients, space, and sunlight (Monsen 2000). Crews from the 2009 biological field survey identified areas where noxious and invasive weeds occur within the ROW (Appendix I, POD). Noxious and invasive weed control will occur prior to topsoil and vegetation removal. Monitoring after revegetation will identify areas of newly established weeds. The Noxious and Invasive Weed Control Plan (Appendix H, POD) will be followed for weed abatement.

Cheatgrass, medusahead ryegrass, and annual mustards are anticipated to be the prevailing weeds impacting revegetation success (Shaw and Monsen 2000). The Project will use BLM-, Reclamation-, USFS-, or landowner-approved herbicides to reduce annual weed presence and competition before seeding (Sheley et al. 2008). Application rates will follow the manufacturer's recommendations. A Pesticide Use Permit will be secured from the appropriate agencies prior to herbicide application.

Weed abatement on FWNF lands will be the responsibility of the FWNF and funded by Ruby. Ruby and the FWNF will enter into an agreement outlining the responsibilities of each party.

Wildlife Shelters

Large shrubs and trees that were removed during ROW clearing operations and stockpiled will be used to construct wildlife shelters (http://www.aces.edu/ pubs/docs/A/ANR-0785/). These shelters could be constructed after reseeding and container-grown plant placement as a wildlife habitat enhancement measure. Structure size would vary depending on the size of the shrubs and trees but will be as large as possible. The BLM and ODFW along with the environmental inspector and environmental monitor will help determine the size and locations.

Biological Soil Crusts

Biological soil crusts (BSCs) are a complex mixture of cyanobacteria, green algae, lichens, mosses, microfungi, and other bacteria that live within the top one to two inches of the soil surface (Belnap et al. 2001). BSCs are also known as crptogramic, cryptobiotic, microbiotic, or microphytic soil crusts. BSCs are important for soil-surface stabilization, nutrient recycling, water infiltration, and enhancing seed germination. Concentrations of BSCs usually occur on silt loam or very fine sandy loam soil textures in Wyoming big sagebrush and shadscale plant communities. BSC have been identified at MP 594, but they are probably more widespread on the ROW than this one site.

Areas where vegetation mowing occurs will leave the soil intact along the ROW. However, construction vehicles will disturb the soils on portions of the ROW. Pockets of undisturbed soil will provide a source of propagules to re-establish BSC on surrounding disturbed soils (Jayne Belnap, USGS, telephone communication, January 29, 2010). Re-establishment of vegetation along the ROW will also facilitate BSC restoration (Belnap 2001).

5.2.3 Revegetation

Vegetation types within the ROW vary according to soil types, topography, climatic conditions, and land management practices. Several seeding mixes are necessary to accommodate these differences (Sheley et al. 2008). The seed mixes provided by the agencies will be used to accommodate the varying vegetation and soil types along the ROW. Other resources include the USDA-Natural Resources Conservation Service (NRCS) Plants Database (http://plants.usda.gov) and VegSpec (http://vegspec.nrcs.usda.gov/ vegSpec/ index.jsp), a decision support system for planning revegetation projects. Also, there is considerable information concerning revegetation techniques through the Native Seed Network (http://www.nativeseednetwork.org). Analysis of ecological sites along the ROW also informed the development of seeding mixes and appropriate locations for their application (Attachment A).

Seeding will be the main method of reestablishing plants within the ROW, extra workspaces, and access roads. However, container-grown shrubs and bare-root ponderosa pine seedlings will be transplanted in appropriate locations. Vexar (photodegradeable) tubing with bamboo stakes will be used to protect the seeding from livestock and wildlife browsing. Reference to seeding mixes also includes container-grown plants, as appropriate. Local seeds for the seeding mixes will be purchased from commercial vendors or collected near the ROW by professional seed collectors following BLM seed collecting policy. Under agreement with Ruby, the FWNF will provide seed for purchase by Ruby to reseed USFS lands. The FWNF will be responsible for planting ponderosa pine seedlings.

The KFRA has requested that seed be obtained from growing conditions and locality as similar as possible to the area being reseeded. The KFRA also requests that seed still be collected near the ROW and on BLM lands for supplementing the seed mix after initial revegetation efforts.

The proposed seed mixtures were designed to be compatible with the dominant vegetation and land uses currently found along the ROW. The criteria used for selecting the seed mixes were based on the following:

- Erosion-control capability,
- Plant dominance of surrounding vegetation,
- Land use,
- Availability of seed,
- Wildlife habitat value,
- Livestock management, and
- Restoration of traditional food and medicine gathered by Native Americans.

Seeds will be tested for purity and viability, and certified as weed free to ensure compliance with local, state, and federal seed requirements (Monsen 2000).

Seedbed Preparation

Seedbed preparation will consist of recontouring, decompacting, and restoring surface soil as described in Section 5.2.2. The soil surface will be worked with heavy equipment to create a roughened surface (Institute for Land Rehabilitation 1978, Monsen 2000, 2005, Sheley et al. 2008). The roughened soil surface will facilitate the collection of precipitation to enhance soil water percolation, reduce erosion, and provide safe sites for seedling establishment. The seedbed will be firm but not compacted, nor will it have a crusted surface.

Seed Mix

The pipeline will cross sagebrush-steppe vegetation, salt-desert shrub, pinion-juniper, forest, riparian/wetland, and agricultural vegetation types. Native seeds mixes will be used to restore vegetation on public lands, to the extent possible. The seed mix for private lands will be based on previous or adjacent land uses and approved by the landowner. All seed mixes were provided by the LRA, KFRA, FWNR, and Reclamation.

Re-establishing vegetation in arid and semi-arid sagebrush-steppe and salt-desert shrub vegetation types can be challenging because of unpredictable precipitation and noxious or invasive weed competition (Monsen 2000). Proper seedbed preparation, mulch, adapted seed mix, mycorrhizal fungi inoculation, and weed abatement are ways to improve the chances of successful plant establishment (Institute for Land Rehabilitation 1978;, 2005; Plummer 1977; Sheley et al. 2008).

The sagebrush steppe seed mix presented in Table 5.2-1 was developed by the LRA and ODFW Lakeview Field Office. The mix is targeted to improve obligatory sage-grouse habitat with a variety of grasses and forbs that occur in the surrounding ecological sites.

Table 5.2-1 Sagebrush Steppe Seed Mix; Milepost 591-649

Species	PLS lbs/Acre	Bulk lbs/Acre	PLS/sq. ft.
Great Basin wildrye	0.9		
Bluebunch wheatgrass	0.8		
Bottlebrush squirreltail	1.0		
Western wheatgrass	1.5		
Thickspike wheatgrass	1.2		
Thurber's needlegrass	0.8		
Idaho fescue	0.8		
Sandberg bluegrass	0.5		
Lewis blue flax	0.3		
Hawksbeard	0.3		
Sulphur flower buckwheat	0.3		
Deseret parsley	0.3		
Pussytoes	0.3		
Milkvetch	0.3		

The seed mixes presented in Tables 5.2-2 to 5.2-4 were provided by the KFRA and Reclamation for seeding in specified vegetation types on their lands. The KFRA may allow minor changes to the seed mixes BLM land. If the unlikely event changes are necessary (e.g. seed availability), then Ruby will consult directly with the KFRA prior to application.

Table 5.2-2 Low Sagebrush Vegetation Type; Milepost 653-654, 657, 659-663, 665, 673-674

Species	PLS lbs/Acre	Bulk lbs/Acre	PLS/sq. ft.
Sandberg bluegrass	2.0		
Idaho fescue	2.0		
Bluebunch wheatgrass	2.0		
Onespike danthornia	1.0		
Lupine	0.25		
Oregon yampah	0.25		
Bolander's yampah	0.25		
Low beardtongue	0.25		
Nineleaf biscuitroot	0.25		
Barestem biscuitroot	0.25		
Mountain big sagebrush	0.1		
Sulphur-flower buckwheat	0.25		
Antelope bitterbrush	0.5		

Table 5.2-3 Mountain Big Sagebrush Vegetation Type; Milepost 655-656, 658, 664

Species	PLS lbs/Acre	Bulk lbs/Acre	PLS/sq. ft.
Idaho fescue	2.0		
Bluebunch wheatgrass	3.0		
Sandberg bluegrass	2.0		
Basin wildrye	1.0		
Thurber’s needlegrass	1.0		
Ross’ sedge	1.0		
Squirreltail	1.0		
Prairie junegrass	1.0		
Agoseris	0.25		
Phacelia	0.25		
Common yarroe	0.25		
Oregon yampah	0.25		
Bolander’s yampah	0.25		
Spreading phlox	0.25		
Nineleaf biscuitroot	0.25		
Barestem biscuitroot	0.25		
Antelope bitterbrush	0.5		
Basin big sagebrush	0.1		
Sulphur-flower buckwheat	0.25		
Klamath plum	1.0		
Saskatoon serviceberry	0.1		
Desert gooseberry	0.5		

Table 5.2-4 Juniper Vegetation Type; Milepost 668-671

Species	PLS lbs/Acre	Bulk lbs/Acre	PLS/sq. ft.
Idaho fescue	2.0		
Bluebuch wheatgrass	3.0		
Sandberg bluegrass	2.0		
Onespike danthornia	1.0		
Thurber's needlegrass	1.0		
Squirreltail	1.0		
Prairie junegrass	1.0		
Agoseris	0.25		

Attachment A shows by milepost the locations for planting the seed mixes. A revegetation monitor will ensure that the proper seed mix is planted at the right milepost. The seeding contractor will be required to create global positioning system (GPS) maps seeding along the ROW to ensure complete coverage.

The FWNF will conduct their own seeding and transplanting of ponderosa pine seedlings on the ROW. Tables 5.2-5 and 5.2-6 are the seed mixes the FWNF will use. In addition, the FWNF will transplant 200 ponderosa pine seedlings per acre. Ruby will fund this revegetation work to be carried out by the FWNF under an agreement that will specify each party's responsibilities.

Table 5.2-5 Mixed Conifer Forest; Milepost 605, 608-611, 638, 642-649, 650-665

Species	PLS lbs/Acre	Seed in Production
Elymus elymoides (squirreltail)	1.5	125 lbs 11/2009
Elymus glaucus (blue wildrye)	1.0	650 lbs available in 11/2010
Bromus carinatus var. marginatus (California brome) or *Elymus trachycaulus* (slender wheatgrass)	2.5	4.8 lbs, not enough to grow yet

Table 5.2-6 Mixed Conifer Forest; Milepost 612, 614

Species	PLS LBS/Acre	Seed in Production
Artemesia arbuscula (low sage)	0.05	
Elymus elymoides (squirreltail)	3.0	750 lbs available in 11/2010
Poa secunda (Sandberg bluegrass)	1.5	300 lbs available in 11/2010
Pseudoroegnaria spicata (bluebunch wheatgrass)	1.5	300 lbs available in 11/2010
Elymus elymoides (squirreltail)	3.0	750 lbs available in 11/2010

Shrub and Tree Transplants

Shrubs such as Wyoming sagebrush and mountain big sagebrush, bitterbrush, and curlleaf mountain mahogany will be grown in containers and transplanted from April 15 to May 30 into important wildlife habitat. Those areas that scored a habitat quality of "1" in the mile-by-mile habitat analysis are candidates to receive the container-grown plants (MP 632.8–657.9; 670.6–674.5). To approximate natural islands that would help reseed adjacent sites, Ruby will plant small blocks of no more than 100 shrub seedlings at 328–foot (100-meter) intervals. This equates to about 12 blocks per mile or 1,200 plants per mile of ROW or three acres of seedlings per mile of ROW. Ruby will coordinated this effort with the BLM and ODFW.

In addition, container-grown bitterbrush and mountain mahogany seedlings grown from an appropriate seed zones (local source) will be planted within mule deer winter range on BLM lands west of Adobe Flat to the end of the ROW from approximate MP 656 to 674.. Shrubs will be planted to replicate patterns of the surrounding area, to the greatest degree possible. Seedlings will be planted at 10 x 10 spacing in disturbed areas.

Ponderosa pine bare-root seedlings grown from an appropriate seed zone (local source) will be planted in the ROW outside the trench area where ponderosa pine trees were removed in the clearing operation from approximately MP 654 to 658 according to BLM specifications presented in "Ruby Pipeline Mile-By-Mile Construction / Restoration Stipulations For BLM Klamath Falls Resource Area". Planting density would be approximately the same as the number of trees removed.

Vexar (photodegradeable) tubing support with bamboo stakes will be placed around the transplants to limit livestock and wildlife grazing. The shrubs will be planted into small basins, approximately 24 inches diameter and 4 inches deep, to concentrate precipitation and surface runoff near the plant roots. Transplants will be watered-in when planted.

Seeding Methods

The NRCS guidelines for seeding native plants in arid and semi-arid rangelands will be followed (Dreesen not dated). These guidelines call for at least 20–40 pure live seeds per square foot for drilled seed. The number of pure live seed per square foot would be doubled for broadcast seedings.

The main purpose of seeding methods is to place the seed in direct contact with the soil, cover the seed with soil, and firm the soil around the seed in to eliminate air pockets (Sheley et al. 2008). Drill and broadcasting seeding techniques will be used. Most species can be successfully drill-seeded into the soil. Seeding depth in the soil depends on seed size. Grass and forb seed will be planted at a soil depth greater than 0.5 and 0.25 inch, respectively. Sagebrush seed is best planted on the soil surface because it usually germinates better from broadcast seeding.

Direct seeding will be the primary method for seeding within the ROW. Direct seeding uses specialized equipment such as a rangeland seeder. The advantages of direct seeding are efficiency at placing seed at the proper soil depth and economy of bulk seed. Its disadvantages are terrain limitations such as slopes greater than 15 percent and rocky soils.

Broadcast seeding distributes the seed on top of the soil surface using a hand-held spreader or all-terrain vehicle-mounted cyclone-type seed spreader, seed blower, hydroseeding, and/or aerial application. Broadcast seed is not as efficient as direct seeding because in this method seeds are not buried in the soil, and it requires approximately twice the bulk seed. In areas where broadcast seeding occurs, a harrow will be used to cover the seed, where possible.

Hydroseeding uses water with a slurry of seed, mulch, and tackifier that is sprayed over the restored topsoil surface. This method does not allow good soil-to-seed contact, leaves seed exposed to desiccating wind and temperatures, and increases seed loss by rodent and avian foraging. Hydroseeding is advantageous on steep, rocky terrain if equipment access is available.

Seeding and Transplanting Timing

Seeds must be planted at the correct time. The seeding window is from September 15 to January 31. The optimum seeding window for sagebrush is September 15 to December 31; sagebrush establishment decreases if planted in January. Container-grown sagebrush seedlings will be transplanted from March 15 to April 30.

Soil Amendments and Weed Control

Ruby does not anticipate the need for application of fertilizers as part of its post-construction restoration activities because elevated levels of soil nitrogen may encourage weedy plant colonization (Sheley et al. 2008). Mycorrhizal fungi will be used to inoculate seed to aid shrub establishment; soil microorganisms should remain viable during stockpiling. Mycorrhizal inoculums will be applied in accordance with manufacturer recommendations.

Pre-emergent herbicides will be used, where appropriate and approved by agencies, to minimize germination of noxious and annual weeds such as cheatgrass, medusahead wildrye, halogeton, and mustards. Herbicide selections, applications rates, and timing will be conducted in compliance with product use directions and approved by the BLM, USFS, Reclamation, or private landowner.

5.3 Restoration Treatment for Erodible Soils

Erodible soils have been identified in the Project area (See FEIS section 4.2.1). Erodible soils may require additional restorative inputs to minimize wind and water erosion. The objective will be to rapidly stabilize erodible soils by means of erosion control measures, including a vegetation cover. Erosion control measures will include one or more techniques, such as the planting of a sterile annual grass or slender wheatgrass, weed-free straw bales or wattles, silt fencing, water bars, soil tackifier, and/or wetting compounds to decrease erosion. The application of a sterile annual grass will be approved by the land management agency or landowner, as appropriate. Appropriate restoration action will begin immediately after pipeline trench closure.

6.0 Restoration Monitoring and Maintenance

The purpose of restoration monitoring is to evaluate long-term soil stability, vegetative composition and cover, and occurrence of noxious weeds within the ROW. Restoration monitoring would include both qualitative and quantitative measures. Issues such as erosion control and plant establishment failures will be identified and appropriately addressed. Ruby will insure that LRA, KFRA, Reclamation, and FWNF have the opportunity to participate in designing and carrying out restoration monitoring.

The primary objectives of monitoring and anticipated actions are listed below.

- Assess the effectiveness of temporary and permanent erosion-control structures (e.g., slope breakers) to ensure the stability of the ROW and extra workspaces and to ensure that runoff is naturally controlled in place, with no accelerated erosion or wash-outs. Locations where additional remedial work may be required should be apparent and will be identified by MP. The monitoring of the ROW for significant and/or new erosion or third-party damage is an element of Ruby's routine aerial surveillance that will be conducted throughout the life of the pipeline. It is anticipated that any active erosion will be apparent during the first two years following restoration or after the first runoff event.
- Monitor and assess, through quantitative analysis, the success of the reseeding and transplanting efforts for years 1 through 5. Vegetation sampling plots will be used to measure plant density, cover, bare ground, and plant litter in comparison with adjacent areas undisturbed by the Project.
- Monitor the survival of special plantings for visual restoration, if applicable, and the extent to which the restored ROW blends in with the adjacent undisturbed areas.
- Monitor and assess targeted weeds in accordance with the Noxious and Invasive Weed Control Plan (POD, Appendix H). Newly established weed colonies will be reported to the BLM or Reclamation. Identify places where other vegetation control may be needed. Note that with the exception of noxious and invasive weed control, vegetation maintenance, including mowing of non-agricultural lands or tree removal, is not anticipated. Ruby may selectively remove trees and large shrubs that could limit aerial surveillance or whose roots pose a risk to the integrity of the buried pipe.
- Monitor and identify other disturbances that may hinder restoration success, such as excessive livestock grazing or unauthorized OHV travel. Determine ways to take corrective actions in consultation with BLM, USFS, Reclamation, and ODFW.

- Ruby will fund an ODFW restoration project oversight position. The purpose of this position will be to monitor post-construction Project restoration and plant establishment, unauthorized OHV activity, and excessive livestock grazing. The position would be funded for a predetermined number of years following construction of the Project, the cost and number of years of which would be agreed upon by Ruby and ODFW.

6.1 Revegetation Performance Criteria

Upland revegetation of non-agriculture land will generally be considered successful when vegetation within the restored ROW supports non-noxious plants that are similar in forb, graminoid, and woody plant density and cover to those growing on adjacent lands undisturbed by the Project. Vegetation and erosion monitoring will occur for a minimum of five years. Additional monitoring will occur as necessary and agreed upon by Ruby and the BLM or Reclamation. Determination of ROW acreage restoration success will be the responsibility of the appropriate federal agency based on monitoring data provided by Ruby.

Where initial reclamation and plant establishment efforts fail to make progress towards meeting plant establishment standards after year 3, reseeding may be necessary on portions of the ROW. Ruby will re-seed areas where initial plant establishment efforts fail. The BLM or Reclamation will be consulted with regards to any proposed changes in seeding mixes and application methods on federal lands. If successful plant establishment is not achieved within ten years, appropriate compensatory mitigation will be discussed with the BLM or Reclamation.

A quantitative vegetative monitoring program will document the reclamation progress in the ROW. The BLM and Reclamation will be invited to participate in the selection of the monitoring and control plots. Monitoring plots will be established randomly within different vegetation types along the ROW and control plots on adjacent lands undisturbed by the Project. The monitoring and control plots will be similar in aspect, slope, and soils and approximately one acre in size. The control plots will have similar dimensions as the ROW monitoring plots and be established in undisturbed vegetation adjacent to the ROW. GPS coordinates will located all plots within and outside the ROW.

Vegetation sampling will occur by using a quadrant sampling (1 x 1 meter in size) method to assess species cover and density in the one-acre monitoring and control plots (Brower and Zar 1977, 69–73; Elzinga et al. 1998, 170–172). Approximately 25 quadrants will be randomly placed each in the monitoring and control plots to measure species density and cover. A one-tailed independent-sample t-test will compare grass, forb, and woody plant cover between the monitoring and control plots. Revegetation will be considered successful when ROW perennial grass crown cover is at least 80 percent when compared with the control plots. The degree of soil erosion and weed establishment will be judged in the reference and control plots using respective indicators from the rangeland health assessment procedures (Pellant et al. 2000). Negligible disturbance to soil, vegetation, and cultural resources within the ROW or control plots will occur during sampling. Sampling crews will be instructed not to disturb any cultural artifacts discovered while monitoring vegetation and soils.

6.2 Remedial Action and Maintenance

Ruby will address identified erosion problems as soon as practical based on evaluation of conditions outside the permanent ROW against the original erosion control work. Additional erosion control work will be performed as needed. It is also noted that temporary erosion control structures, such as straw bale or sediment barriers, will be removed when sites are deemed stable and restoration is determined to be successful.

Reseeding or replanting efforts, including supplemental mulching, if necessary, will occur in agreement with the BLM or Reclamation in any area where monitoring identifies a restoration failure, particularly where accompanied by observed increases in water or wind erosion or excessive OHV use. Noxious weed control is also included in maintenance and would be performed in accordance with Ruby's Noxious and Invasive Weed Control Plan (POD, Appendix H).

6.3 Reporting

Ruby will document its observations of restoration success following the field inspections and provide summary reports to the BLM, USFS, Reclamation, ODFW, and FERC. Areas that need remedial action will also be identified by MP and GPS coordinates and will include a description of additional erosion controls or revegetation work anticipated. Reports, including a summary of corrective actions proposed, will be submitted within three months of identifying these conditions. Areas where control applications for noxious and invasive weeds are needed will also be reported.

7.0 Off-highway Vehicle Control

The LRA, KFRA, Reclamation, FWNF, ODFW, and private landowners have expressed concerns that the reclaimed ROW will be used for unauthorized OHV travel, which could thwart restoration efforts and promote erosion. To minimize OHV access on the ROW, Ruby will install OHV barriers at appropriate locations in coordination with LRA, KFRA, Reclamation, FWNF, and landowners. Ruby will submit to LRA, KFRA, Reclamation, and FWNF for review and approval site-specific designs for OHV barriers. All designs will meet agency standards and may include dirt/rock berms, log barriers, vegetative screens, signs, fencing, and locked gates. The proposed OHV barriers will be constructed in a manner designed to prevent unauthorized motor vehicle/OHV use to and along the ROW. Federal agencies understand that unauthorized OHV trespass can be difficult to control in remote, heavy OHV use areas. Efforts to control unauthorized OHV use will be monitored throughout the life of the Project and additional measures implemented as necessary to control OHV use.

To discourage OHV use of the ROW, Ruby will use the following deterrents, in consultation with the LRA, KFRA, Reclamation, FWNF, and ODFW:

- Leave the ROW surface in a roughened condition;
- Establish “keep off” signs with an explanation at entryways onto the ROW;
- Install rock barriers, earthen berms, or other barricades at existing authorized OHV routes that cross the ROW; and
- Work closely with the BLM, Reclamation, and private landowners, grazing lessees, local law enforcement personnel, and adjacent landowners to monitor and eliminate unauthorized access to the ROW.

Ruby will coordinate with the LRA, KFRA, FWNF, Reclamation, USFWS, ODFW, landowners, and appropriate law enforcement personnel to determine the adequacy and appropriateness of proposed countermeasures. Ruby will maintain, repair, or replace countermeasures during the life of the Project.

8.0 Livestock Control

The ROW will cross through livestock grazing allotments on BLM land. Succulent grass and forb growth will attract these grazing animals. Excessive grazing may cause plant establishment efforts to fail. The following management practices for livestock grazing will be implemented:

- Leave the ROW surface in a roughened condition;
- Include low palatable plant species in the seeding mix such as sagebrush and western yarrow; and
- Negotiate with allotment permittees to limit livestock grazing in the ROW by using one or more of the following options: herding or placing salt licks and/or protein blocks one mile from the ROW, fencing crucial habitat areas, deferring grazing for two to three years, closing pasture, implementing seasonal deferment, and/or reducing stocking preference. Ruby may compensate permittees if reduced stocking preference or pasture closure occurs.

Ruby's preference for livestock grazing on the restored ROW is to seed and then inspect the ROW during annual monitoring to see if problems occur. Based on Ruby's past experience with other pipeline projects, livestock grazing has not been an issue for reclamation success. However, if it appears that livestock grazing become problematic and threaten revegetation success, Ruby will be work with the landowner or land management agency to resolve the problem. The following information was provided to Ruby by the BLM regarding livestock grazing allotments the ROW will traverse.

Ruby will be responsible for reclamation success along the Project. Within the LRA, the ROW crosses through three pastures of two grazing allotments (Lane Plan I and Round Mountain) with about 2,000 animal unit months (AUMs) of forage. Depending on reclamation success Ruby may, at its own option may choose to rest these allotments for a minimum of two growing seasons. Ruby would then need to compensate the permittees to find forage on private lands (if available) at an estimated cost of $10–20 per AUM or, as an alternative, would need to install an estimated 13.25 miles of temporary two-strand electric fence at a cost of $2,000–3,000 per mile.

Within the KFRA, the pipeline will pass through four livestock grazing allotments: Willow Valley, Timber Hill, Rock Creek, and Loveness. The Willow Valley allotment has four pastures, and the pipeline will pass through three of these. The allotment has a rest rotation system so the average pasture AUMs that will possibly be impacted are Willow Valley

Chaining (421 AUMs); Woolen Canyon (210 AUMs); and Notch Corral (405 AUMs). There may be a need to rest these pastures for one to two years depending on reclamation success. The Timber Hill allotment has a preference of 270 AUMs. The Rock Creek allotment has a preference of 216 AUMs. The Loveness allotment has a preference of 490 AUMs. These three allotments could also need to be rested depending on reclamation success. Ruby may need to compensate the permittees to find forage on private lands (if available) at an estimated cost of $10–20 per AUM. Due to the smaller size of these allotments, temporary electric fencing may not be a viable option.

9.0 References

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Attachment A Ecological Site Occurrence and Descriptive Information Along the ROW in Oregon

Table A-1 BLM Lakeview Resource Area (Lake County) Ecological Sites and Seed Mix by Milepost

MP (7/10/09)	NRCS ID	Precipitation (inch)	Ecological Site	Dominant Graminoid, Forb	Dominant Shrub	Dominant Tree	Slope (%)	Elevation (ft)	Landform	Seed Mix
591	R023XY218 0R	10-16	Thin Surface Claypan	*Grass:* Sanberg bluegrass, Thurber's needlegrass squirreltail *Forb*: tapertip hawksbeard, dwarf yellow fleabane, phlox	little sagebrush, yellow rabbitbrush	NA	2-15	4,800-6,500	Alluvial Ridge	Sagebrush steppe
592	R023XY218 0R	10-16	Thin Surface Claypan	*Grass:* Sanberg bluegrass, Thurber's needlegrass squirreltail *Forb*: tapertip hawksbeard, dwarf yellow fleabane, phlox	little sagebrush, yellow rabbitbrush	NA	2-15	4,800-6,500	Alluvial Ridge	Sagebrush steppe
593	R021XY212 OR	14-18	Shallow Loam	*Grass:* Idaho fescue, bluebunch wheatgrass, Thurber's needlegrass *Forb*: milkvetch, desertparsley, lupine	mountain big sagebrush, antelope bitterbrush, Saskatoon serviceberry	western juniper	0-30	4,000-6,000	Mountain slope Plateau	Sagebrush steppe
594	R021XY212 OR	14-18	Shallow Loam	*Grass:* Idaho fescue, bluebunch wheatgrass, Thurber's needlegrass *Forb*: milkvetch, desertparsley, lupine	mountain big sagebrush, antelope bitterbrush, Saskatoon serviceberry	western juniper	0-30	4,000-6,000	Mountain slope Plateau	Sagebrush steppe
595	R021XY212 OR	14-18	Shallow Loam	*Grass:* Idaho fescue, bluebunch wheatgrass, Thurber's needlegrass *Forb*: milkvetch, desertparsley, lupine	mountain big sagebrush, antelope bitterbrush, Saskatoon serviceberry	western juniper	0-30	4,000-6,000	Mountain slope Plateau	Sagebrush steppe
596	R021XY212 OR	14-18	Shallow Loam	*Grass:* Idaho fescue, bluebunch wheatgrass, Thurber's needlegrass *Forb*: milkvetch, desertparsley, lupine	mountain big sagebrush, antelope bitterbrush, Saskatoon serviceberry	western juniper	0-30	4,000-6,000	Mountain slope Plateau	Sagebrush steppe
597	R021XY212 OR	14-18	Shallow Loam	*Grass:* Idaho fescue, bluebunch wheatgrass, Thurber's needlegrass *Forb*: milkvetch, desertparsley, lupine	mountain big sagebrush, antelope bitterbrush, Saskatoon	western juniper	0-30	4,000-6,000	Mountain slope Plateau	Sagebrush steppe

Table A-1 BLM Lakeview Resource Area (Lake County) Ecological Sites and Seed Mix by Milepost

MP (7/10/09)	NRCS ID	Precipitation (inch)	Ecological Site	Dominant Graminoid, Forb	Dominant Shrub	Dominant Tree	Slope (%)	Elevation (ft)	Landform	Seed Mix
					serviceberry					
598	R021XY212 OR	14-18	Shallow Loam	*Grass:* Idaho fescue, bluebunch wheatgrass, Thurber's needlegrass	mountain big sagebrush, antelope bitterbrush, Saskatoon serviceberry	western juniper	0-30	4,000-6,000	Mountain slope	Sagebrush steppe
				Forb: milkvetch, desertparsley, lupine					Plateau	
599	R021XY212 OR	14-18	Shallow Loam	*Grass:* Idaho fescue, bluebunch wheatgrass, Thurber's needlegrass	mountain big sagebrush, antelope bitterbrush, Saskatoon serviceberry	western juniper	0-30	4,000-6,000	Mountain slope	Sagebrush steppe
				Forb: milkvetch, desertparsley, lupine					Plateau	
600	R023XY216 OR	12-16	Claypan	*Grass:* Idaho fescue, bluebunch wheatgrass, Thurber's needlegrass	little sagebrush, yellow rabbitbrush	western juniper	2-30	5,500-6,500	Alluvial fan	Sagebrush steppe
				Forb: phlox, desertparsley, agoseris					Escarpment	
601	R023XY216 OR	12-16	Claypan	*Grass:* Idaho fescue, bluebunch wheatgrass, Thurber's needlegrass	little sagebrush, yellow rabbitbrush	western juniper	2-30	5,500-6,500	Alluvial fan	Sagebrush steppe
				Forb: phlox, desertparsley, agoseris					Escarpment	
602	R023XY216 OR	12-16	Claypan	*Grass:* Idaho fescue, bluebunch wheatgrass, Thurber's needlegrass	little sagebrush, yellow rabbitbrush	western juniper	2-30	5,500-6,500	Alluvial fan	Sagebrush steppe
				Forb: phlox, desertparsley, agoseris					Escarpment	
603	R023XY216 OR	12-16	Claypan	*Grass:* Idaho fescue, bluebunch wheatgrass, Thurber's needlegrass	little sagebrush, yellow rabbitbrush	western juniper	2-30	5,500-6,500	Alluvial fan	Sagebrush steppe
				Forb: phlox, desertparsley, agoseris					Escarpment	
604	R021XY212 OR	14-18	Shallow Loam	*Grass:* Idaho fescue, bluebunch wheatgrass, Thurber's needlegrass	mountain big sagebrush, antelope	western juniper	0-30	4,000-6,000	Mountain slope	Sagebrush steppe

Table A-1 BLM Lakeview Resource Area (Lake County) Ecological Sites and Seed Mix by Milepost

MP (7/10/09)	NRCS ID	Precipitation (inch)	Ecological Site	Dominant Graminoid, Forb	Dominant Shrub	Dominant Tree	Slope (%)	Elevation (ft)	Landform	Seed Mix
				Forb: milkvetch, desertparsley, lupine	bitterbrush, Saskatoon serviceberry				Plateau	
605	N/A									FWNF Mixed Conifer Forest
606	R021XY216 OR	14-18	Stony Claypan	*Grass:* Idaho fescue, bluebunch wheatgrass, onespike danthonia *Forb*: Hooker's balsamroot, agoseris, onion	little sagebrush, slender buckwheat, mountain big sagebrush	western juniper	1-40	4,000-6,500	Terrace	Sagebrush steppe
607	R021XY216 OR	14-18	Stony Claypan	*Grass:* Idaho fescue, bluebunch wheatgrass, onespike danthonia *Forb*: Hooker's balsamroot, agoseris, onion	little sagebrush, slender buckwheat, mountain big sagebrush	western juniper	1-40	4,000-6,500	Terrace	Sagebrush steppe
608	Ecological site description not available									FWNF Mixed Conifer Forest
609	Ecological site description not available									FWNF Mixed Conifer Forest
610	Ecological site description not available									FWNF Mixed Conifer Forest
611	Ecological site description not available									FWNF Mixed Conifer Forest

Table A-1 BLM Lakeview Resource Area (Lake County) Ecological Sites and Seed Mix by Milepost

MP (7/10/09)	NRCS ID	Precipitation (inch)	Ecological Site	Dominant Graminoid, Forb	Dominant Shrub	Dominant Tree	Slope (%)	Elevation (ft)	Landform	Seed Mix
612	R021XY306 OR	14-18	Stony Claypan South	*Grass:* Idaho fescue, bluebunch wheatgrass, Thurber's needlegrass *Forb*: snow buckwheat, woolly plantain, desertparsley	little sagebrush, Wyoming big sagebrush, slender buckwheat	NA	30-70	4,000-6,000	Mountain Slope	FWNF low sagebrush
613	R021XY306 OR	14-18	Stony Claypan South	*Grass:* Idaho fescue, bluebunch wheatgrass, Thurber's needlegrass *Forb*: snow buckwheat, woolly plantain, desertparsley	little sagebrush, Wyoming big sagebrush, slender buckwheat	NA	30-70	4,000-6,000	Mountain Slope	Sagebrush steppe
614	R021XY216 OR	14-18	Stony Claypan	*Grass:* Idaho fescue, bluebunch wheatgrass, onespike danthonia *Forb*: Hooker's balsamroot, agoseris, onion	little sagebrush, slender buckwheat, mountain big sagebrush	western juniper	1-40	4,000-6,500	Terrace	FWNF low sagebrush
615	R021XY306 OR	14-18	Stony Claypan South	*Grass:* Idaho fescue, bluebunch wheatgrass, Thurber's needlegrass *Forb*: snow buckwheat, woolly plantain, desertparsley	little sagebrush, Wyoming big sagebrush, slender buckwheat	NA	30-70	4,000-6,000	Mountain Slope	Sagebrush steppe
616	R021XY214 OR	14-18	Claypan	*Grass:* Idaho fescue, bluebunch wheatgrass, Sandberg bluegrass *Forb*: Hooker's balsamroot, desertparsley, phlox	little sagebrush, mountain big sagebrush, slender buckwheat	western juniper	0-15	4,000-6,500	Terrace Plateau	Sagebrush steppe
617	R024XY002 OR	6-11	Sodic Meadow	*Grass:* saltgrass, alkali sacaton, alkali cordgrass *Forb*: camas, povertyweed, dock	rubber rabbitbrush, greasewood, silver buffaloberry	NA	0-3	4,000-4,500	Basin floor Valley Lakebed	Sagebrush steppe
618	R021XY104 OR	10-18	Saline Meadow	*Grass:* Nuttall's alkaligrass, sedge, saltgrass	rubber rabbitbrush, green rabbitbrush, greasewood	NA	0-2	4,000-4,700	Basin floor	Sagebrush steppe

Table A-1 BLM Lakeview Resource Area (Lake County) Ecological Sites and Seed Mix by Milepost

MP (7/10/09)	NRCS ID	Precipitation (inch)	Ecological Site	Dominant Graminoid, Forb	Dominant Shrub	Dominant Tree	Slope (%)	Elevation (ft)	Landform	Seed Mix
				Forb: aster					Flood plain	
619	R021XY406 OR	14-40	Wet Meadow	*Grass:* reedgrass, Nebraska sedge, small floating mannagrass	silver sagebrush, wax current	quaking aspen, willow	0-2	4,100-7,000	Flood plain	Sagebrush steppe
				Forb: buttercup, western aster, clover						
620	R021XY104 OR	10-18	Saline Meadow	*Grass:* Nuttall's alkaligrass, sedge, saltgrass	rubber rabbitbrush, green rabbitbrush, greasewood	NA	0-2	4,000-4,700	Basin floor	Sagebrush steppe
				Forb: aster					Flood plain	
621	R021XY104 OR	10-18	Saline Meadow	*Grass:* Nuttall's alkaligrass, sedge, saltgrass	rubber rabbitbrush, green rabbitbrush, greasewood	NA	0-2	4,000-4,700	Basin floor	Sagebrush steppe
				Forb: aster					Flood plain	
622	R021XY104 OR	10-18	Saline Meadow	*Grass:* Nuttall's alkaligrass, sedge, saltgrass	rubber rabbitbrush, green rabbitbrush, greasewood	NA	0-2	4,000-4,700	Basin floor	Sagebrush steppe
				Forb: aster					Flood plain	
623	R021XY104 OR	10-18	Saline Meadow	*Grass:* Nuttall's alkaligrass, sedge, saltgrass	rubber rabbitbrush, green rabbitbrush, greasewood	NA	0-2	4,000-4,700	Basin floor	Sagebrush steppe
				Forb: aster					Flood plain	
624	Ecological site description not available									Sagebrush steppe
625	R021XY104 OR	10-18	Saline Meadow	*Grass:* Nuttall's alkaligrass, sedge,	rubber rabbitbrush, green rabbitbrush,	NA	0-2	4,000-4,700	Basin floor	Sagebrush steppe

Table A-1 BLM Lakeview Resource Area (Lake County) Ecological Sites and Seed Mix by Milepost

MP (7/10/09)	NRCS ID	Precipitation (inch)	Ecological Site	Dominant Graminoid, Forb	Dominant Shrub	Dominant Tree	Slope (%)	Elevation (ft)	Landform	Seed Mix
				saltgrass	greasewood					
				Forb: aster					Flood plain	
626	R021XY104 OR	10-18	Saline Meadow	*Grass:* Nuttall's alkaligrass, sedge, saltgrass	rubber rabbitbrush, green rabbitbrush, greasewood	NA	0-2	4,000-4,700	Basin floor	Sagebrush steppe
				Forb: aster					Flood plain	
627	R021XY104 OR	10-18	Saline Meadow	*Grass:* Nuttall's alkaligrass, sedge, saltgrass	rubber rabbitbrush, green rabbitbrush, greasewood	NA	0-2	4,000-4,700	Basin floor	Sagebrush steppe
				Forb: aster					Flood plain	
628	Ecological site description not available									Sagebrush steppe
629	R021XY104 OR	10-18	Saline Meadow	*Grass:* Nuttall's alkaligrass, sedge, saltgrass	rubber rabbitbrush, green rabbitbrush, greasewood	NA	0-2	4,000-4,700	Basin floor	Sagebrush steppe
				Forb: aster					Flood plain	
630	R021XY104 OR	10-18	Saline Meadow	*Grass:* Nuttall's alkaligrass, sedge, saltgrass	rubber rabbitbrush, green rabbitbrush, greasewood	NA	0-2	4,000-4,700	Basin floor	Sagebrush steppe
				Forb: aster					Flood plain	
631	R021XY214 OR	14-18	Claypan	*Grass:* Idaho fescue, bluebunch wheatgrass, Sandberg bluegrass	little sagebrush, mountain big sagebrush, slender buckwheat	western juniper	0-15	4,000-6,500	Terrace	Sagebrush steppe
				Forb: Hooker's balsamroot, desertparsley, phlox					Plateau	

Table A-1 BLM Lakeview Resource Area (Lake County) Ecological Sites and Seed Mix by Milepost

MP (7/10/09)	NRCS ID	Precipitation (inch)	Ecological Site	Dominant Graminoid, Forb	Dominant Shrub	Dominant Tree	Slope (%)	Elevation (ft)	Landform	Seed Mix
632	R021XY214 OR	14-18	Claypan	*Grass:* Idaho fescue, bluebunch wheatgrass, Sandberg bluegrass	little sagebrush, mountain big sagebrush, slender buckwheat	western juniper	0-15	4,000-6,500	Terrace	Sagebrush steppe
				Forb: Hooker's balsamroot, desertparsley, phlox					Plateau	
633	R021XY216 OR	14-18	Claypan	*Grass:* Idaho fescue, bluebunch wheatgrass, Sandberg bluegrass	little sagebrush, mountain big sagebrush, slender buckwheat	western juniper	0-15	4,000-6,500	Terrace	Sagebrush steppe
				Forb: Hooker's balsamroot, desertparsley, phlox					Plateau	
634	R021XY216 OR	14-18	Claypan	*Grass:* Idaho fescue, bluebunch wheatgrass, Sandberg bluegrass	little sagebrush, mountain big sagebrush, slender buckwheat	western juniper	0-15	4,000-6,500	Terrace	Sagebrush steppe
				Forb: Hooker's balsamroot, desertparsley, phlox					Plateau	
635	R021XY308 OR	14-18	South Slopes	*Grass:* bluebunch wheatgrass, Thurber's needlegrass, Idaho fescue	mountain big sagebrush, antelope bitterbrush, Saskatoon serviceberry	western juniper	15-70	4,400-6,500 ft		Sagebrush steppe
				Forb: arrowleaf balsamroot, tapertip hawksbeard, lupine						
636	R021XY214 OR	14-18	Claypan	*Grass:* Idaho fescue, bluebunch wheatgrass, Sandberg bluegrass	little sagebrush, mountain big sagebrush, slender buckwheat	western juniper	0-15	4,000-6,500	Terrace	Sagebrush steppe
				Forb: Hooker's balsamroot, desertparsley, phlox					Plateau	
637	R021XY100 OR	10-14	Dry Flooodplain	*Grass:* basin wildrye, Sandberg bluegrass, slender wheatgrass	basin big sagebrush, antelope bitterbrush, green rabbitbrush	NA	0-2	400-5,200	Flood plain	Sagebrush steppe
				Forb: common yarrow, lupine, Brown's peony						
638	Ecological site description not									FWNF Mixed Conifer Forest

Table A-1 BLM Lakeview Resource Area (Lake County) Ecological Sites and Seed Mix by Milepost

MP (7/10/09)	NRCS ID	Precipitation (inch)	Ecological Site	Dominant Graminoid, Forb	Dominant Shrub	Dominant Tree	Slope (%)	Elevation (ft)	Landform	Seed Mix
	available									
639	Ecological site description not available									Sagebrush steppe
640	Ecological site description not available									Sagebrush steppe
641	Ecological site description not available									Sagebrush steppe
642-649	Ecological site description not available									FWNF Mixed Conifer Forest

Table A-2 BLM Klamath Falls Resource Area (Klamath County) Ecological Sites and Seed Mix by Milepost

MP (7/10/09)	NRCS ID	Precipi-tation (inch)	Ecological Site	Dominant Graminoid, Forb	Dominant Shrub	Dominant Tree	Slope (%)	Elevation (feet)	Landform	Seed Mix
650-665										USFS forested
653	R021XY505OR	12–16	Juniper Claypan	Grass: bluebunch wheatgrass, Thurber's needlegrass, Idaho fescue Forb: common yarrow, spagoseris, milkvetch	Little sagebrush, slender buckwheat, antelope bitterbrush	NA	0–10	4,200–5,000	Plateau	Low sagebrush
654	R021XY505OR	12–16	Juniper Claypan	Grass: bluebunch wheatgrass, Thurber's needlegrass, Idaho fescue Forb: common yarrow, spagoseris, milkvetch	Little sagebrush, slender buckwheat, antelope bitterbrush	NA	0–10	4,200–5,000	Plateau	Low sagebrush
655	R021XY508OR	14–16	Juniper Dry Pine	Grass: Idaho fescue, bluebunch wheatgrass, western needlegrass Forb: common yarrow, agoseris, pussytoes	Mountain big sagebrush, curl-leaf mountain mahogany, antelope bitterbrush	Western juniper, ponderosa pine	1–45	4,100–5,500	Plateau, Ridge	Mountain big sagebrush
656	R021XY508OR	14–16	Juniper Dry Pine	Grass: Idaho fescue, bluebunch wheatgrass, western needlegrass Forb: common yarrow, agoseris, pussytoes	Mountain big sagebrush, curl-leaf mountain mahogany, antelope bitterbrush	Western juniper, ponderosa pine	1–45	4,100–5,500	Plateau, Ridge	Mountain big sagebrush
657	R021XY505OR	12–16	Juniper Claypan	Grass: bluebunch wheatgrass, Thurber's needlegrass, Idaho fescue	Little sagebrush, slender buckwheat, antelope bitterbrush	NA	0–10	4,200–5,000	Plateau	Low sagebrush

Table A-2 BLM Klamath Falls Resource Area (Klamath County) Ecological Sites and Seed Mix by Milepost

MP (7/10/09)	NRCS ID	Precipi-tation (inch)	Ecological Site	Dominant Graminoid, Forb	Dominant Shrub	Dominant Tree	Slope (%)	Elevation (feet)	Landform	Seed Mix
				Forb: common yarrow, spagoseris, milkvetch						
658	R021XY508OR	14–16	Juniper Dry Pine	Grass: Idaho fescue, bluebunch wheatgrass, western needlegrass	Mountain big sagebrush, curl-leaf mountain mahogany, antelope bitterbrush	Western juniper, ponderosa pine	1–45	4,100–5,500	Plateau, Ridge	Mountain big sagebrush
				Forb: common yarrow, agoseris, pussytoes						
659	R021XY505OR	12–16	Juniper Claypan	Grass: bluebunch wheatgrass, Thurber's needlegrass, Idaho fescue	Little sagebrush, slender buckwheat, antelope bitterbrush	NA	0–10	4,200–5,000	Plateau	Low sagebrush
				Forb: common yarrow, spagoseris, milkvetch						
660	R021XY505OR	12–16	Juniper Claypan	Grass: bluebunch wheatgrass, Thurber's needlegrass, Idaho fescue	Little sagebrush, slender buckwheat, antelope bitterbrush	NA	0–10	4,200–5,000	Plateau	Low sagebrush
				Forb: common yarrow, spagoseris, milkvetch						
661	R021XY505OR	12–16	Juniper Claypan	Grass: bluebunch wheatgrass, Thurber's needlegrass, Idaho fescue	Little sagebrush, slender buckwheat, antelope bitterbrush	NA	0–10	4,200–5,000	Plateau	Low sagebrush
				Forb: common yarrow, spagoseris, milkvetch						

Table A-2 BLM Klamath Falls Resource Area (Klamath County) Ecological Sites and Seed Mix by Milepost

MP (7/10/09)	NRCS ID	Precipi-tation (inch)	Ecological Site	Dominant Graminoid, Forb	Dominant Shrub	Dominant Tree	Slope (%)	Elevation (feet)	Landform	Seed Mix
662	R021XY505OR	12–16	Juniper Claypan	Grass: bluebunch wheatgrass, Thurber's needlegrass, Idaho fescue	Little sagebrush, slender buckwheat, antelope bitterbrush	NA	0–10	4,200–5,000	Plateau	Low sagebrush
663	R021XY505OR	12–16	Juniper Claypan	Forb: common yarrow, spagoseris, milkvetch Grass: bluebunch wheatgrass, Thurber's needlegrass, Idaho fescue	Little sagebrush, slender buckwheat, antelope bitterbrush	NA	0–10	4,200–5,000	Plateau	Low sagebrush
664	R021XY308OR	14–18	South Slopes	Forb: common yarrow, spagoseris, milkvetch Grass: bluebunch wheatgrass, Thurber's needlegrass, Idaho fescue	Mountain big sagebrush, antelope bitterbrush, Saskatoon serviceberry	NA	15–70	4,400–6,500		Mountain big sagebrush
665	R021XY505OR	12–16	Juniper Claypan	Forb: arrowleaf balsamroot, tapertip hawksbeard, lupine Grass: Idaho fescue, bluebunch wheatgrass, Thurber's needlegrass	Little sagebrush, slender buckwheat, antelope bitterbrush	NA	0–10	4,200–5,000	Plateau	Low sagebrush
666	R021XY200OR	10–14	Loamy	Forb: common yarrow, spagoseris, milkvetch	Wyoming big sagebrush, antelope	NA	2–20	4,100–4,800	Alluvial fan	Low sagebrush

Table A-2 BLM Klamath Falls Resource Area (Klamath County) Ecological Sites and Seed Mix by Milepost

MP (7/10/09)	NRCS ID	Precipitation (inch)	Ecological Site	Dominant Graminoid, Forb	Dominant Shrub	Dominant Tree	Slope (%)	Elevation (feet)	Landform	Seed Mix
				Grass: bluebunch wheatgrass, Thurber's needlegrass, Idaho fescue	bitterbrush, green rabbitbrush					
667	R021XY200OR	10–14	Loamy	Grass: bluebunch wheatgrass, Thurber's needlegrass, Idaho fescue Forb: tapertip hawksbeard, buckwheat, lupine	Wyoming big sagebrush, antelope bitterbrush, green rabbitbrush	NA	2–20	4,100–4,800	Alluvial fan Lake terrace Hill	Low sagebrush
668	Ecological site not known									Juniper
669	Ecological site not known									Juniper
670	Ecological site not known									Juniper
671	Ecological site not known									Juniper

Table A-2 BLM Klamath Falls Resource Area (Klamath County) Ecological Sites and Seed Mix by Milepost

MP (7/10/09)	NRCS ID	Precipi-tation (inch)	Ecological Site	Dominant Graminoid, Forb	Dominant Shrub	Dominant Tree	Slope (%)	Elevation (feet)	Landform	Seed Mix
672	Ecological site not known									Low sagebrush
673 674	R021XY505OR	12–16	Juniper Claypan	Grass: bluebunch wheatgrass, Thurber's needlegrass, Idaho fescue Forb: common yarrow, spagoseris, milkvetch	Little sagebrush, slender buckwheat, antelope bitterbrush	NA	0–10	4,200–5,000	Plateau	Low sagebrush
674	R021XY505OR	12–16	Juniper Claypan	Grass: bluebunch wheatgrass, Thurber's needlegrass, Idaho fescue Forb: common yarrow, spagoseris, milkvetch	Little sagebrush, slender buckwheat, antelope bitterbrush	NA	0–10	4,200–5,000	Plateau	Low sagebrush
675–676	Ecological site not known									Agriculture – landowner defined