

APPENDIX A

**BUREAU OF LAND MANAGEMENT
BUFFALO FIELD OFFICE**

**FORTIFICATION CREEK PLANNING AREA RECLAMATION
MONITORING AND REPORTING GUIDE**

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**BUREAU OF LAND MANAGEMENT
BUFFALO FIELD OFFICE
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MONITORING AND REPORTING GUIDE**

It is the mission of the Bureau of Land Management (BLM) to sustain the health, diversity, and productivity of the public lands for the use and enjoyment of present and future generations.

This reclamation guide is designed to be used as direction for reclamation implementation, monitoring, and reporting within the Fortification Creek Planning Area (FCPA) of the Buffalo Field Office (BFO). It applies to all federally authorized actions which disturb vegetation and/or mineral/soil resources. This policy is intended to be compatible with all BLM program objectives and tiers to and is an extension of the Wyoming Reclamation Policy.

This monitoring plan is designed to answer specific questions pertaining to reclamation of surface disturbances, including well pads, roads, rights-of-way (ROW's), pipelines, power lines and other disturbances. The analysis of collected data should determine if reclamation success has been achieved, as well as providing information on the success of various reclamation techniques and timeframes.

I. Required Documentation

A Reclamation Plan

A reclamation plan shall be developed for all surface disturbing activities and will become part of the proposed action in the NEPA document used to analyze each specific project. The level of detail for the reclamation plan shall reflect: the complexity of the project (i.e., topography, soil limitations, unusual plant composition, etc.), the environmental concerns, and the reclamation potential for the site. These plans shall also incorporate any program or regulatory-specific requirements for reclamation. The reclamation plan shall address short-term stabilization to facilitate long term reclamation. Reclamation plans will need to include an initial soil analysis (i.e., topsoil depth, texture, pH, etc.) that adequately represents the various soil types that are found within a project area's disturbance.

If necessary to ensure timely re-vegetation, the well pads and associated surface disturbance will be fenced to BLM standards to exclude livestock grazing for the first two growing seasons or until seeded species become firmly established, whichever comes later. Fencing will meet standards found on page 18 of the Gold Book, 4th Edition, or will be fenced with operational electric fencing. Resting grazing allotments for two or more seasons is an acceptable alternative to fencing.

The reclamation plan is considered complete when all the reclamation requirements described in the Wyoming Reclamation Policy have been addressed, the techniques to meet the reclamation requirements are described in detail, and the BLM concurs with the reclamation plan. The Wyoming Reclamation Policy can be found on the web at <http://www.blm.gov/style/medialib/blm/wy/resources/efoia/IMs/2009.Par.54664.File.dat/wy2009-022.pdf>.

B Monitoring Report

The project proponent will be responsible for monitoring each individual Application for Permits to Drill (APD) and ROW including; well pads, associated access roads, power lines, pipelines, and other disturbances. Monitoring and reporting will take place annually, with reports due to the BLM by December 31 of each year. It is assumed that the proponent will complete reclamation monitoring during the same field season as the operators for comparison.

C Integrated Pest Management Plan

An Integrated Pest Management Plan (IPMP) will be developed and submitted by each project proponent to the BLM BFO. Weed surveys will be conducted annually after disturbance takes place. Monitoring will include identifying noxious and invasive weeds by species and the extent of surface disturbance.

An initial weed survey before disturbance occurs is beneficial to weed management practices. Pre-treatment of weeds may be necessary to minimize the potential for spread and to minimize post-construction treatment costs. Surveys may need to be conducted more than once per year to allow for variation of each species' growing periods (e.g., cool-season vs. warm-season species).

II. Monitoring Guidelines

A Monitoring intensity

Monitoring and reporting will take place annually, with reports due to the BLM by December 31 of each year. BLM projects are required to make annual monitoring reports on all surface disturbances as defined in the Wyoming Reclamation Policy.

This schedule will allow everyone to track their own success and provide a concerted effort and involvement in timely and efficient restoration. It would also provide a verifiable means to track and review reclamation methods and results, as well as the amount of disturbance taking place within the FCPA by various entities.

BLM will perform follow-up monitoring on a percentage of the sites annually to ensure compliance, as well as to ensure quality control to maintain the integrity of the data.

B Monitoring methods

When ascertaining if reclamation success criteria have been met, the BFO BLM will evaluate basal cover, canopy cover, species diversity, and soil stability to make their determination. The operator may use any BLM approved monitoring method to examine reclamation success. These methods are described in BLM Technical Reference 4400-4, 1996 and can be located on the web at <http://www.blm.gov/nstc/library/pdf/sampleveg.pdf>. However, BFO BLM will utilize image-based monitoring with SamplePoint software for vegetation (see Section V—*BLM Monitoring Methodology*), line intercept and soil surface factor (SSF) methods for site stability as the primary monitoring methods to determine when reclamation standards have been met. BFO BLM strongly encourages the use of this protocol. Qualitative ocular estimates are not an approved BLM methodology.

See Attachment 3 as a monitoring report example.

C Site selection

Site selection must include representative sections of all areas of the disturbed environment. Monitoring points need to be located in every ecological site identified in the Natural Resource Conservation Service (NRCS) Class 3 Soil Survey that is present within the disturbance.

D Well pads and similar shaped disturbances

If employing a monitoring method that requires transects, those transects should be configured to include edge effects, pits, and general resource conditions, as much as practicable. If employing image-based monitoring, plots should be located on a grid across the disturbed site. A minimum of one monitoring location will be identified on each well pad or similarly shaped disturbance that is representative of the Ecological Site Description (ESD0. Monitoring sites will be located in each ecological site present within the disturbance. Standardization will assure repeatability and allow comparison of data.

E Linear features

Linear features include roads, power lines, pipelines, and fiber optic lines, etc. associated with APD's or ROW's. Monitoring sites will be established in each ecological site present along the disturbance at regular intervals. A minimum of one monitoring location will be required every 0.25 mile or change of soil site as defined by NRCS ESD, whichever comes first.

F Timing and duration

Monitoring should be conducted at the same time every year, within two weeks of the date of the first measurement for a given site, and between the dates of May 15 to August 15. When sampling vegetation in the latter half of the growing season, care should be taken when evaluating senescent (i.e., dead) plant matter. If the plant matter is recently senesced, implying that it grew in the current growing season, it should be recorded as live, and the species or functional group should be identified. If the plant matter is older than one year (i.e., the current growing season), it should be recorded as litter. This will aid in producing comparable information for sites evaluated at different times during the growing season. Monitoring and reporting of reclamation will be required from the time reclamation is initiated until success is achieved and agreed to by BLM.

G Photographs

Digital photographs provide a visual record of conditions over time. Digital photographs will be used to document conditions of vegetation, site stability, erosion, and other features or conditions subject to change over time. Photographs should be taken at the same time every year, within two weeks of the date of the photograph taken in the first year for a given site, and all photographs must be taken between May 15 and August 15. Photograph locations should be geo-referenced for repeatability and mapping purposes. Digital photos must be taken from each corner of a well pad facing the well head or facility. Photos must have sufficient clarity and focus to determine general conditions on the pad. More than four photographs can be taken to capture important features. In

addition, a ground cover photograph should be taken from a height of approximately 1.5 meters. Identify photo location on a field monitoring form to record photos, include direction of photo (compass) and where photo was taken from. Also record what the photo is capturing i.e., noxious weeds (or lack thereof), a fence, grass stand, certain forbs or shrubs, etc. Be sure the field of view and focus are similar in subsequent photos. The operators will submit subsequent reports to BLM with photo copies of seed tags georeferenced to the treatment site(s). Photos should be part of the annual reporting for that year's planting. If no seed planting takes place, there is no need to include a copy of the seed tags.

III. Interim Reclamation, Year 1-3

Interim reclamation is to be initiated within 30 days of initiating surface disturbing activities, and includes disturbed areas that may be re-disturbed during operations and will be re-disturbed at final reclamation to achieve restoration of the original landform and a natural vegetative community.

A Goals

Immediately stabilize disturbed areas and provide conditions necessary to achieve the long-term reclamation goals.

B Objectives

The objective of interim reclamation is to restore desirable vegetative cover and a portion of the landform sufficient to maintain biologically active topsoil, control erosion, and minimize habitat and forage loss as well as visual impacts during the life of the well or facilities.

- The operator will submit a subsequent report by Sundry Notice to BLM once stabilization measures have been implemented. This initiates the reclamation timeline.

C Indicators

- Erosion control methods shall be in place to mitigate any erosive features, including rills and sheet erosion.
- Disturbed areas not needed for active, long-term production operations or vehicle travel have been re-contoured, protected from erosion, and re-vegetated with a self-sustaining, vigorous, diverse, native (or as otherwise approved by the BLM) plant community sufficient to provide forage, stabilize soils, impede the invasion of noxious, invasive, and non-native weeds as well as minimize visual impacts.
- During initial well pad, production facility, road, pipeline, and utility corridor construction, pre-interim reclamation stormwater management actions will be taken to ensure disturbed areas are quickly stabilized to control surface water flow and to protect both the disturbed and adjacent areas from erosion and siltation.

D Success Criteria

Private surface owner rights will be respected when considering revegetation methods, including specific seed mix(s) (pounds pure live seed/acre) and soil treatments (seedbed preparation, fertilization, mulching, etc.). On private surface, the landowner should be

consulted for the specific seed mix. However, the standards for successful reclamation set forth in this document for soil stability and ground cover must be met.

- i. Year 1: The site must be in stable condition as indicated by the Erosion Control Classification System (BLM Tech Note 346).
 - a. The operator has ensured that 100% of the disturbance site is in a stable condition as indicated by the Erosion Control Classification System (BLM Tech Note 346). The site is stable as defined with a SSF factor range 1-20.
 - b. The disturbance area has been seeded with the approved seed mix. See Attachment 5.
- ii. Year 2: 100% of the disturbance area is stable (as defined above) and native, perennial vegetation is becoming established with desirable species and trending towards long-term goal(s).
- iii. Year 3: 100% of the disturbance area is stable (as defined above) and re-vegetated to within 80% of the ESD reference sheet for bare ground, as outline in the table below.

	ESD BARE GROUND (reference sheet)	Year 3 allowable BARE GROUND (65% of ESD)	Year 3+ allowable BARE GROUND (80% of ESD)
Very Shallow \geq 10" Precipitation Zone, Northern Plains	40-50%	54-67.5%	48-60%
Shallow Loamy \geq 10" Precipitation Zone, Northern Plains	20-25%	27-33.75%	24-30%
Shallow Sandy \geq 10" Precipitation Zone, Northern Plains	30-50%	40.5-67.5%	36-60%
Shallow Clayey \geq 10" Precipitation Zone, Northern Plains	25-40%	33.75-54%	30-48%
Loamy \geq 10" Precipitation Zone, Northern Plains	15-20%	20.25-27%	18-24%
Sandy \geq 10" Precipitation Zone, Northern Plains	20-25%	27-33.75%	24-30%
Clayey \geq 10" Precipitation Zone, Northern Plains	5-15%	6.75-20.25%	6-18%
Lowland \geq 10" Precipitation Zone, Northern Plains	0-1%	0-1.35%	0-1.2%

- iv. All of Year 3 requirements for each plan of development must be met prior to the operator(s) proceeding with phased development of the FCPA. The Fortification Creek Planning Area Monitoring Team (BLM, WGFD, UW, Industry Representative and Private Surface Owner[s]) will meet bi-annually to review the reclamation reports and determine if reclamation success criteria are being met.
 - a. Native Grasses: Reclaimed sites must have a minimum of 3 native perennial grass species within the overall data summary established in the disturbance area, 1 of which must be a bunchgrass species.

- b. Native Forbs: Reclaimed sites must have a minimum of 2 native forbs within the overall data summary.
- c. Native Shrubs: Reclaimed sites must have a minimum of 1 native shrub within the overall data summary.
- d. Weeds: Sites must be free of all listed species on the County, Wyoming, or Federal noxious weed list. All state and federal laws regarding noxious weeds must be followed. Other highly competitive invasive, non-native species such as cheatgrass and halogeton will not exceed 5% of the basal cover.
 - The Wyoming Noxious Weed List is available at:
<http://plants.usda.gov/java/noxious?rptType=State&statefips=56> or
<http://www.wyoweed.org/>.
 - The Federal Noxious Weed List is available at:
<http://plants.usda.gov/java/noxious?rptType=Federal>.
 - County weed and pest district information is available at:
<http://www.wyoweed.org/>.
- e. Plant Vigor: Plants must be resilient as evidenced by well-developed root systems, flowers, and seed heads. All sites must exhibit the sustainability of the above desired attributes after the removal of external influences (i.e., irrigation, fencing, matting, etc.).

IV. Reclamation, Year 3+

A Goals

- The FCPA Monitoring Team will evaluate the annual monitoring reports and determine whether successful reclamation criteria have been met to allow phase development to progress.
- Facilitate eventual ecosystem reconstruction to maintain a safe and stable landscape and meet the desired outcomes of the land use plan.
- Vegetative communities within CBNG development mirror those of healthy communities as described by the ESD.

B Objectives

The objectives of reclamation are to:

- Restore a disturbed area to a state containing sufficient biotic and abiotic resources to continue its development and interactions without further assistance or subsidy.
- Demonstrate resilience to normal ranges of environmental stress and disturbance. Achieving this level of ecosystem function requires the establishment of self-sustaining, desirable vegetative cover over the reconstructed landform. Reclamation is complete once the disturbance area is considered stable and functioning to allow optimum production of vegetation, control of undesirable species, conservation of water and control of erosion.

Further disturbance of an area for maintenance, spills, infill, etc. will be measured against reclamation success criteria of the associated plan of development. Minimizing the re-disturbance within a project area promotes the progression of phased development.

C Indicators

Refer to the Wyoming Reclamation Policy – Instruction Memorandum No. WY-2009-022 available at:

<http://www.blm.gov/style/medialib/blm/wy/resources/efoia/IMs/2009.Par.54664.File.dat/wy2009-022.pdf>

D Success Criteria

i. General guidelines

- a. Native Grasses: Reclaimed sites must have a minimum of 3 native perennial grass species within the overall data summary established in the distance area, 1 of which must be a bunchgrass species.
- b. Native Forbs: The average density or frequency of forbs must be a minimum of 3 native forb species within the overall data summary.
- c. Native Shrubs: The average density or frequency of forbs must be a minimum of 2 native shrub species within the overall data summary.
- d. Weeds: Sites must be free from all species listed on the Wyoming or Federal noxious weed list. All state and federal laws regarding noxious weeds must be followed. Other highly competitive invasive species such as cheatgrass will not exceed 5%.
- e. Plant Vigor: Plants must be resilient as evidenced by well-developed root systems, flowers, and seed heads. All sites must exhibit the sustainability of the above desired attributes after the removal of external influences (i.e., irrigation, fencing, matting, etc.).

ii. Specific Guidelines

Reclamation success criteria are based on the ESDs for the Northern Great Plains as defined by the Natural Resources Conservation Service (NRCS) (Attachment 7). A separate standard applies to each ESD. The data contained within the NRCS's ESDs pertain to historical climax systems. The success criteria for reclamation were derived by taking 65% of the numbers listed in the ESDs. This would be equivalent to a rangeland in a mid-seral stage, or within the "good" condition class.

The BLM will monitor and document basal cover and/or canopy cover to determine reclamation success in addition to species diversity, and soil stability. The success criteria are defined as follows:

Ground cover can be measured by either basal cover, or by canopy cover. Both are listed below by soil type. These numbers are accurate estimates for the Powder River Basin from Wyoming into Montana. They are from the NRCS Ecological Sites MLRA 58A.

<http://esis.sc.egov.usda.gov/Welcome/pgReportLocation.aspx?type=Reference%20Sheet>

Note: Success criteria are calculated by multiplying values listed in the EDS by the by the offset: (100%-65%).

Example:

To calculate the minimum percentage of bare ground allowed to meet the success criteria for within a loamy site multiply the offset for 65% allowable bare ground by the upper range allowed and then add the value for the range:

$$[20\%(100\%-65\%)/100]+20\% \text{ or } [0.2(1-0.65)100]+20\% = 27\%$$

27% is the upper threshold of bare ground allowed to meet success criteria for bare ground at a loamy site.

ESD: Loamy >10" Northern Plains Precipitation Zone								
% Basal Cover			% Ground Cover			% Canopy Cover		
<u>Grasses</u>	<u>Forbs</u>	<u>Shrubs</u>	<u>Litter</u>	<u>Rock</u>	<u>Bare Ground</u>	<u>Grasses</u>	<u>Forbs</u>	<u>Shrubs</u>
10 to 15	1 to 3	0 to 1	50 to 60	0 to 1	15 to 20	60 to 85	1 to 5	0 to 1

ESD: Sandy >10" Northern Plains Precipitation Zone								
% Basal Cover			% Ground Cover			% Canopy Cover		
<u>Grasses</u>	<u>Forbs</u>	<u>Shrubs</u>	<u>Litter</u>	<u>Rock</u>	<u>Bare Ground</u>	<u>Grasses</u>	<u>Forbs</u>	<u>Shrubs</u>
10 to 15	1 to 4	1 to 2	40 to 50	0 to 4	20 to 25	70 to 85	5 to 10	1 to 5

ESD: Clayey >10" Northern Plains Precipitation Zone								
% Basal Cover			% Ground Cover			% Canopy Cover		
<u>Grasses</u>	<u>Forbs</u>	<u>Shrubs</u>	<u>Litter</u>	<u>Rock</u>	<u>Bare Ground</u>	<u>Grasses</u>	<u>Forbs</u>	<u>Shrubs</u>
5 to 15	1 to 4	1 to 2	35 to 60	0 to 4	5 to 15	55 to 85	5 to 10	1 to 5

ESD: Shallow Loamy >10" Northern Precipitation Zone								
% Basal Cover			% Ground Cover			% Canopy Cover		
<u>Grasses</u>	<u>Forbs</u>	<u>Shrubs</u>	<u>Litter</u>	<u>Rock</u>	<u>Bare Ground</u>	<u>Grasses</u>	<u>Forbs</u>	<u>Shrubs</u>
5 to 15	1 to 4	1 to 3	40 to 48	0 to 4	20 to 25	60 to 70	1 to 5	5 to 10

ESD: Shallow Sandy >10" Northern Plains Precipitation Zone								
% Basal Cover			% Ground Cover			% Canopy Cover		
<u>Grasses</u>	<u>Forbs</u>	<u>Shrubs</u>	<u>Litter</u>	<u>Rock</u>	<u>Bare Ground</u>	<u>Grasses</u>	<u>Forbs</u>	<u>Shrubs</u>
5 to 10	1 to 4	1 to 5	15 to 25	0 to 5	30 to 50	20 to 30	1 to 5	10 to 15

ESD: Shallow Clayey >10" Northern Precipitation Zone								
% Basal Cover			% Ground Cover			% Canopy Cover		
<u>Grasses</u>	<u>Forbs</u>	<u>Shrubs</u>	<u>Litter</u>	<u>Rock</u>	<u>Bare Ground</u>	<u>Grasses</u>	<u>Forbs</u>	<u>Shrubs</u>
5 to 15	1 to 4	1 to 5	20 to 30	0 to 4	25 to 40	20 to 40	1 to 5	10 to 15

ESD: Very Shallow >10" Northern Precipitation Zone								
% Basal Cover			% Ground Cover			% Canopy Cover		
<u>Grasses</u>	<u>Forbs</u>	<u>Shrubs</u>	<u>Litter</u>	<u>Rock</u>	<u>Bare Ground</u>	<u>Grasses</u>	<u>Forbs</u>	<u>Shrubs</u>
5 to 10	1 to 4	1 to 5	10 to 15	10 to 15	40 to 50	15 to 20	1 to 5	15 to 25

ESD: Lowland >10" Northern Precipitation Zone								
% Basal Cover			% Ground Cover			% Canopy Cover		
<u>Grasses</u>	<u>Forbs</u>	<u>Shrubs</u>	<u>Litter</u>	<u>Rock</u>	<u>Bare Ground</u>	<u>Grasses</u>	<u>Forbs</u>	<u>Shrubs</u>
30 to 40	1 to 3	1 to 5	>50	0 to 1	0 to 1	55 to 70	1 to 5	5 to 10

V. Final Reclamation

Reclamation Year 3+ success criteria pertains to all final reclamation. Final reclamation includes disturbed areas where the original landform and the native vegetative community have been restored.

VI. BLM Monitoring Protocol & Methodologies

Monitoring for interim or final reclamation will follow the same monitoring protocols; when basal vegetation is observed along the transects the species will be recorded. This will allow for a determination of species diversity and abundance. This standard applies to all disturbance features well locations, pad associated with facilities, roads, corridors, staging areas, etc.

A SamplePoint

BLM will employ image-based photo monitoring, utilizing the SamplePoint software developed by the USDA Agricultural Research Service (ARS) to monitor basal cover on reclaimed sites. SamplePoint is a manual image-analysis program designed to facilitate vegetation cover measurements from nadir digital images of any scale. Operating essentially as a digital point frame, the software loads images, places classification points on the image, and stores classification data to a database as the user classes each point. Functional use is not limited to vegetation classification. Although developed to measure canopy cover of vegetation, a reasonable estimate of basal cover can also be determined using this method.

This method was chosen because it is time effective, cost effective, and utilizes the best available science. Data analysis can be conducted in the office, at any time of the year. This monitoring method also provides a visual confirmation of the quantitative data gathered. The results gained from this type of sampling are comparable to those gained from more traditional monitoring sources such as the line-intercept methods.

SamplePoint software can be downloaded at no cost at:

<http://www.ars.usda.gov/services/software/download.htm?softwareid=246>

i. Sampling design

a. Aerial sampling

Capture color (red, green, blue [RGB]) 1-mm ground sample distance (GSD; a measure of digital image resolution defined as the linear dimension of a pixel on the ground) digital images using at least a 10 megapixel camera with 840-mm

(equivalent) lens mounted in a sport aircraft (225-kg empty weight). The aircraft should be equipped with a navigation and camera-triggering system and a laser range-finder for measuring altitude above ground level (AGL; Booth and Cox 2006a). The navigation system should be powered by a laptop computer interfaced with (1) a central navigation box, (2) a WAAS-enabled GPS (the Wide Area Augmentation System improves the accuracy of Global Positioning Systems for aircraft en route), and (3) a 15-cm in-cockpit LCD display. Raw images with a 3 x 4-meter field of view to be systematically captured from 100 meter AGL at 80-meter intervals, via automatic triggering using planned GPS coordinates in a sampling grid that covered the study area. Images should be stored on an onboard laptop.

b. Ground sampling

Capture color (RGB) 1-mm-GSD digital images using at least a 5 megapixel camera mounted on a camera base that positioned the camera for nadir images at 2 meters (AGL; Booth *et al.* 2004). Images are acquired with GPS coordinates and aspect recorded for each station. Images are cropped to 1 square meter prior to their analysis.

ii. Line-intercept

a. Well locations

Each well location will be sampled using 4 transects 100 feet long, with a reading every foot. Transect lines should be oriented North, South, East, and West of the well bore or, in the case of constructed pads, the transect lines may radiate from the well bore to the pad corners. Using a straight, fine wire, such as a pin flag, carefully lower the wire so that it is perpendicular with the ground surface or straight up and down and at each 1 foot interval along one side of the tape; record hits on the field form. Optical sighting devices such as a laser pointer may also work well. Only basal vegetation will be recorded. If foliage is encountered, insert wire through foliage and record hit at ground surface (bare ground, litter, grass, etc.). The process of a randomized start with a systematic process should, over time, record representative samples from the entire area.

b. Linear disturbance

Linear features will be similarly monitored by selecting representative portions consisting of a minimum of one monitoring location every ¼ mile or change of ecological site (as defined by NRCS soil survey), whichever comes first. Specific monitoring locations may be modified as approved by the BLM Authorized Officer. Additionally, multiple pipeline rights-of-way will be monitored by each “linear layer” based on date of disturbance/reclamation. Pipeline operators will provide a reclamation monitoring plan detailing how each pipeline company will comply with reclamation monitoring criteria.

Monitoring will consist of a minimum of four 100’ transects run from disturbed edge to disturbed edge, with a reading every two feet.

Definitions:

Bare ground – Areas of mineral soil with no vegetation or litter.

Basal Area (plants) – The cross-sectional area of the stem or the stems of all plants in a stand.

Herbaceous and small woody plants are measured at the near ground level; larger woody plants are measured at breast or other designate height. *Interpreting Indicators of Rangeland Health – Technical Reference 1734-6*

Bunchgrass – A grass having the characteristic growth habit of forming a bunch; lacking stolons or rhizomes (SRM 1999).

Contamination – The presence of man-made chemicals or other alterations in the natural soil or water environment (pesticides, hazardous substances, petroleum, salts). *Adapted from various sources.*

Erosion Control – To protect soil surface and prevent soil particles from being detached by rainfall, snowmelt or wind. Erosion control works to keep the soil in place.

Dominant species – No single species will account for more than 30% total vegetative composition unless it is evident at higher levels in the adjacent landscape. Vegetation canopy cover and species diversity and type shall approximate the surrounding undisturbed area. Exception may be granted where this standard conflicts with the desires of a private landowner.

Ecosystem – Includes all the organisms of an area, their environment, and the linkages or interactions among all of them; all parts of an ecosystem are interrelated. The fundamental unit in ecology, containing both organisms and abiotic environments, each influencing the properties of the other and both necessary for the maintenance of life. *Vegetation Treatments Using Herbicides in 17 Western States, Programmatic Environmental Impact Statement (BLM 2007)*

Edge Effect – The influence of one adjoining plant community upon the margin of another affecting the composition and density of the populations.

Federal Action – Approval of specific projects, such as construction or management activities located in a defined geographic area. Projects include actions approved by permit or other regulatory decision as well as federal and federally assisted activities. *National Environmental Policy Act (NEPA) [42 U.S.C. 4321 et seq.]*

Forb – Non-grassy herbaceous (non-woody) plant.

Grass – Any of a large family gramineae of monocotyledonous, mostly herbaceous plants, with a jointed stem, slender sheathing leaves and flowers borne on spikelet's or bracts.

Gravel – less than 2" at the intermediate axis.

Invasive Species – A species that is not native to the ecosystem under consideration and whose introduction causes or is likely to cause economic or environmental harm or harm to human health. See BLM Invasive Species List, *Executive Order 13112*.

Litter – Litter provides a source of organic matter for incorporation into the underlying mineral soil, acts as a source of carbon for organisms carrying out decomposing functions, and insulates the soil from extreme air temperatures. Litter also plays a critical role in watershed protection by promoting water infiltration and protecting the soil from the erosive energy of raindrops and surface runoff. Ground cover has typically been defined as the area of ground covered by vegetation and litter. Plant litter such as hay, straw, wood chips, or matting that is mechanically fixed to the soil surface.

Limited Reclamation Potential Areas (LRP) – There are areas (e.g., alkali flats, badlands, dunes, rocky outcrops) where reclamation may be more difficult than in traditional landscapes. LRP areas are characterized by highly erodible soils; steep slopes; sites having physical, biological, and/or chemical limitations, low precipitation rates; or areas which have characteristics that make traditional reclamation practices impractical or unfeasible. Because reclamation in LRP areas is more difficult, LRP areas should be avoided. However, if LRP areas have been previously leased or permitted, additional bonding may be required. Alternatives to development in LRPs should be carefully analyzed using information from the reclamation plan and documented in the NEPA process.

Persistent Litter – Litter has been defined by some authorities as dead organic matter lying on the mineral soil; others have included standing dead material and dead fallen organic material. On the basis of these definitions, litter in sagebrush steppe ecosystems includes fallen dead leaves; stems; bark; flowers; and seeds of shrubs, forbs, and grasses; dead cushion plants and moss; detached lichen; animal feces and dead insects; and unidentifiable amorphous woody organic matter (humic litter) lying on the mineral soil surface. Litter seems to be the most prevalent ground cover component in sagebrush steppe ecosystems.

Reclamation Plan – A written document that addresses the reconstruction of disturbed ecosystems by returning the land to a stable and productive condition compatible with the land use plan. This Plan shall address the Goals and Objectives described in the Wyoming Reclamation Policy.

Rills – A small, intermittent water course with steep sides, usually only several centimeters deep. Rills generally are linear erosion features.

Scenic Quality – The overall impression of a landscape retained after driving or walking through, or flying over an area. The Scenic Quality of an area is rated as Class A (outstanding visual characteristics), Class B (combination of outstanding and common visual characteristics), and Class C (common visual characteristics). See *BLM Handbook H-8410 Visual Resource Inventory and BLM Handbook H-8431 Visual Resource Contrast Rating*.

Sediment Control – To trap soil particles after they have been dislodged and moved by wind or water. Sediment controls generally rely on filtering or settling soil particles out of water or wind that is transporting them.

Shrub – A woody plant which branches below or near ground level into several main stems, so has no clear trunk. It may be deciduous or evergreen. At the end of the growing season there is no die-back of the axis.

Soil Surface Factor (SSF) – Numerical expression of surface erosion activity caused by wind and water as reflected by soil movement, surface litter, erosion pavement, pedestalling, rills, flow patterns, and gullies. Values vary from 0 for stable erosion condition to 100 for a severe condition. *Technical Note #346, Erosion Condition Classification System*

Surface Disturbing Activities – An action that alters the vegetation, surface/near surface soil resources, and/or surface geologic features, beyond natural site conditions and on a scale that affects other Public Land values. Examples of surface disturbing activities may include: operation of heavy equipment to construct well pads, roads, pits and reservoirs; installation of pipelines and power lines; and the conduct of several types of vegetation treatments (e.g., prescribed fire, etc.). Surface disturbing activities may be either authorized or prohibited. *Wyoming Information Bulletin 2007-029, Guidance for Use of Standardized Surface Use Definitions*

Topsoil – The biologically active, upper part of the soil profile, being the most favorable material for plant growth. *Adapted from U.S.D.A., NRCS*

Tree – Perennial, woody plant with a single stem (trunk), normally greater than 4 to 5 meters (13 to 16 feet) in height; under certain environmental conditions, some tree species may develop a multi-stemmed or short growth form (less than 4 meters or 13 feet in height).

Weed – A plant considered undesirable, unattractive, or troublesome, especially one growing where it is not wanted. We are generally interested in noxious and non-native invasive species.

Waste materials – Any discarded or abandoned material that can interfere with successful reclamation, safety, and long term stability of a site (contaminated soil or water, drilling mud, solid waste). *Adapted from various sources*

ATTACHMENT 1

Tech Note #346 U.S. Department of the Interior- Bureau of Land Management Erosion Condition Classification System by Ronnie Clark

Operator: _____ Collector: _____

Well name/number AND Legal description: _____

Coordinates(UTMs): _____ Date: _____

Erosional Feature	Potentially Present Yes/No	Identified Factors (Form 7310-12)	Possible Factor
Soil Movement			
Surface Litter			
Surface Rock Fragments			
Pedestalling			
Flow Patterns			
Rills			
Gullies			
Column Totals			
Soil Surface Factor Totals			
Class			

Erosion Control Classification System Values	
SSF	Class
1-20%	Stable
21-40%	Slight
41-60%	Moderate
61-80%	Critical
81-100%	Severe

ATTACHMENT 2

FORM 7310-12 DETERMINATION OF EROSION CONDITION CLASS

Erosion Control Classification System Determinations					
Soil Surface Factor (SSF)					
Soil Movement	Depth of recent deposits around obstacles, or in microterraces; and/or depth of truncated areas, is 0 – 0.1 in (0 – 2.5 mm). 0 or 3	Depth of recent deposits around obstacles, or in microterraces; and/or depth of truncated areas, is 0.1 – 0.2 in (2 – 5 mm). 5	Depth of recent deposits around obstacles, or in microterraces; and/or depth of truncated areas, is 0.2 – 0.4 in. (5 – 10 mm) 8	Depth of recent deposits around obstacles, or in microterraces; and/or depth of truncated areas, is 0.4 – 0.8 in. (10 – 20 mm) 11	Depth of recent deposits around obstacles, or in microterraces; and/or depth of truncated areas, is > 0.8 in. (20 mm) 14
Surface Litter	No movement, or if present, < 2% of the litter has been translocated and redeposited against obstacles. 0 or 3	2 – 10% of the litter has been translocated and redeposited against obstacles. 6	10 – 25% of the litter has been translocated and redeposited against obstacles. 8	25 – 50% of the litter has been translocated and redeposited against obstacles. 11	> 50% of the litter has been translocated and redeposited against obstacles. 14
Surface Rock Fragments	Depth of soil removal around the fragments, and/or depth of recent deposits around the fragments is < 0.1 in (2.5 mm). 0 or 2	Depth of soil removal around the fragments, and/or depth of recent deposits around the fragments is 0.1 – 0.2 in. (2.5 – 5 mm). 5	Depth of soil removal around the fragments, and/or depth of recent deposits around the fragments is 0.2 – 0.4 in. (5 – 10 mm). 8	Depth of soil removal around the fragments, and/or depth of recent deposits around the fragments is 0.4 – 0.8 in. (10 – 20 mm). 11	Depth of soil removal around the fragments, and/or depth of recent deposits around the fragments is > 0.8 in. (20 mm). 14
Pedestals	Pedestals are mostly < 0.1 in (2.5 mm) high and/or have a frequency < 2 pedestals/100 ft. 0 or 3	Pedestals are mostly 0.1 – 0.3 in. (2.5 – 8 mm) high and/or have a frequency of < 2 – 5 pedestals/100 ft. 6	Pedestals are mostly 0.3 – 0.6 in. (8 – 15 mm) high and/or have a frequency of < 5 – 7 pedestals/100 ft. 9	Pedestals are mostly 0.6 – 1 in. (15 – 25 mm) high and/or have a frequency of < 7 – 10 pedestals/100 ft. 11	Pedestals are mostly > 1 in. (25 mm) high and/or have a frequency of > 10 pedestals/100 ft. 14
Flow Patterns	If present, < 2% surface area shows evidence of recent translocation and deposition of soil & litter.	2 – 10% surface area shows evidence of recent translocation and deposition of soil & litter. 6	10 – 25% surface area shows evidence of recent translocation and deposition of soil & litter.	25 – 50% surface area shows evidence of recent translocation and deposition of soil & litter.	> 50% surface area shows evidence of recent translocation and deposition of soil & litter.

Erosion Control Classification System Determinations					
	0 or 3		9	12	15
Rills	If present, are < 0.5 in (13 mm) deep and at intervals > 10 ft. 0 or 3	Rills are mostly 0.5 – 1 in. (13 – 25 mm) deep, and at intervals >10 ft. 6	Rills are mostly 1 – 1.5 in. (25 – 38 mm) deep, and at intervals > 10 ft. 9	Rills are mostly 1.5 – 3 in. (38 – 76 mm) deep, and at intervals >10 ft. 12	Rills are mostly 3 – 6 in. (76 – 152 mm) deep, and at intervals > 5 ft. 14
Gullies	If present, < 2% of the channel bed and walls show active erosion (no vegetation), gullies make up <2% total area. 0 or 3	2 – 5% of the channel bed and walls show active erosion (no vegetation), gullies make up 2 – 5% total area. 6	5 – 10% of the channel bed and walls show active erosion (no vegetation), gullies make up 5 – 10% total area. 9	10 – 50% of the channel bed and walls show active erosion (no vegetation), gullies make up 10 – 50% total area. 12	Over 50% of the channel bed and walls show active erosion (no vegetation), gullies make up >50% total area.

ATTACHMENT 3 EXAMPLE MONITORING SUMMARY REPORT

Once 100 points of data at a transect are collected, the sum of the forb, shrub, grass component is entered by species and life form. Then calculate the percentages of desirable species by life form, add the percentages of all desirable vegetation species of grass, forb, and shrub from your raw monitoring data.

Operator: _____ Collector: _____

Well name/number AND Legal description: _____

Coordinates (UTMs): _____ Date: _____

Species	Life form	Raw data from monitoring field sheet (# of hits)	% by life form			% of total desirable vegetation by species
			Forb	Shrub	Grass	
Green rabbit brush	Shrub	1				4.5%
Scarlet globemallow	Forb	1				4.5%
Western wheatgrass	Grass	3				13.6%
Indian ricegrass	Grass	1				4.5%
Bluebunch wheatgrass	Grass	2				9%
Fourwing saltbush	Shrub	1				4.5%
Big sagebrush	Shrub	2				9%
Thickspike wheatgrass	Grass	1				4.5%
Totals		22	4.5%	18%	31%	

Calculations for percent of desirable vegetation by life form and species

**ATTACHMENT 4
COVER BY LIFEFORM TRANSECT**

Operator: _____ Collector: _____

Well name/number AND Legal description: _____

Coordinates (UTMs): _____ Date: _____

	Grasses	Forbs	Shrubs	Litter	Rock	Bare Ground	Other (i.e. cactus)
Perennial							
Annual							
Noxious							
Other							
Total (=100)							

**Litter includes standing dead matter, moss, lichen, biological crust, and scat.*

ATTACHMENT 5
BLM RECOMMENDED SEED MIXES BASED ON ECOLOGICAL SITES

Shallow Loamy Ecological Site Seed Mix	
Species	Lbs PLS*
<i>Thickspike wheatgrass (Elymus lanceolatus ssp. lanceolatus)</i>	7
<i>Bluebunch wheatgrass (Pseudoroegneria spicata ssp. Spicata)</i>	4.6
<i>Blue grama (Bouteloua gracilis)</i> Or <i>Needleandthread (Hesperostipa comate)</i>	1.0
<i>Prairie coneflower (Ratibida columnifera)</i>	0.8
<i>White or purple prairie clover (Dalea candidum, purpureum)</i>	0.8
<i>Rocky Mountain beeplant (Cleome serrulata)</i>	0.8
<i>Fourwing saltbush (Atriplex canescens)</i> Or <i>Wyoming big sagebrush (Artemisia tridentate)</i> Or <i>Winterfat (Krascheninnikovia lanata)</i>	0.5
<i>Rubber rabbitbrush (Ericameria nauseosus)</i> Or <i>Green rabbitbrush (Chrysothamnus viscidiflorous)</i>	0.5
Totals	16 lbs/acre

Shallow Sandy Ecological Site Seed Mix	
Species	Lbs PLS*
<i>Thickspike wheatgrass</i> (<i>Elymus lanceolatus</i> ssp. <i>lanceolatus</i>)	3.5
<i>Bluebunch wheatgrass</i> (<i>Pseudoroegneria spicata</i> ssp. <i>Spicata</i>)	3.5
<i>Blue grama</i> (<i>Bouteloua gracilis</i>) Or <i>Needleandthread</i> (<i>Hesperostipa comate</i>)	1.0
<i>Prairie sandreed</i> (<i>Calamovilfa longifolia</i>)	4.6
<i>Prairie coneflower</i> (<i>Ratibida columnifera</i>)	0.8
<i>White or purple prairie clover</i> (<i>Dalea candidum, purpureum</i>)	0.8
<i>Blue flax</i> (<i>Linum lewisii</i>)	0.8
<i>Fourwing saltbush</i> (<i>Atriplex canescens</i>) Or <i>Wyoming big sagebrush</i> (<i>Artemisia tridentate</i>) Or <i>Winterfat</i> (<i>Krascheninnikovia lanata</i>)	0.5
<i>Rubber rabbitbrush</i> (<i>Ericameria nauseosus</i>) Or <i>Green rabbitbrush</i> (<i>Chrysothamnus viscidiflorous</i>)	0.5
Totals	16 lbs/acre

Clayey Ecological Site Seed Mix	
Species	Lbs PLS*
<i>Western wheatgrass (Pascopyrum smithii)</i>	4.6
<i>Green needlegrass (Nassella viridula)</i>	5.2
<i>Slender wheatgrass (Elymus trachycaulus ssp. trachycaulus)</i>	1.8
<i>Blue grama (Bouteloua gracilis)</i> Or <i>Needleandthread (Hesperostipa comate)</i>	1.0
<i>Prairie coneflower (Ratibida columnifera)</i>	0.8
<i>White or purple prairie clover (Dalea candidum, purpureum)</i>	0.8
<i>Rocky Mountain beeplant (Cleome serrulata)</i>	0.8
<i>Fourwing saltbush (Atriplex canescens)</i> Or <i>Wyoming big sagebrush (Artemisia tridentate)</i> Or <i>Winterfat (Krascheninnikovia lanata)</i>	0.5
<i>Rubber rabbitbrush (Ericameria nauseosus)</i> Or <i>Green rabbitbrush (Chrysothamnus viscidiflorous)</i>	0.5
Totals	16 lbs/acre

Loamy Ecological Site Seed Mix	
Species	Lbs PLS*
<i>Western wheatgrass (Pascopyrum smithii)</i> Or <i>Thickspike wheatgrass (Elymus lanceolatus ssp. lanceolatus)</i>	3.9
<i>Bluebunch wheatgrass (Pseudoroegneria spicata ssp. Spicata)</i>	1.5
<i>Green needlegrass (Nassella viridula)</i>	3.4
<i>Slender wheatgrass (Elymus trachycaulus ssp. trachycaulus)</i>	2.8
<i>Blue grama (Bouteloua gracilis)</i> Or <i>Needleandthread (Hesperostipa comate)</i>	1.0
<i>Prairie coneflower (Ratibida columnifera)</i>	0.8
<i>White or purple prairie clover (Dalea candidum, purpureum)</i>	0.8
<i>Rocky Mountain beeplant (Cleome serrulata)</i>	0.8
<i>Fourwing saltbush (Atriplex canescens)</i> Or <i>Wyoming big sagebrush (Artemisia tridentate)</i> Or <i>Winterfat (Krascheninnikovia lanata)</i>	0.5
<i>Rubber rabbitbrush (Ericameria nauseosus)</i> Or <i>Green rabbitbrush (Chrysothamnus viscidiflorous)</i>	0.5
Totals	16 lbs/acre

Sandy Ecological Site Seed Mix	
Species	Lbs PLS*
<i>Thickspike wheatgrass (Elymus lanceolatus ssp. lanceolatus)</i>	3.5
<i>Prairie sandreed (Calamovilfa longifolia)</i>	4.6
<i>Indian ricegrass (Achnatherum hymenoides)</i>	3.5
<i>Blue grama (Bouteloua gracilis)</i> Or <i>Needleandthread (Hesperostipa comate)</i>	1.0
<i>Prairie coneflower (Ratibida columnifera)</i>	0.8
<i>White or purple prairie clover (Dalea candidum, purpureum)</i>	0.8
<i>Blue flax (Linum lewisii)</i>	0.8
<i>Fourwing saltbush (Atriplex canescens)</i> Or <i>Wyoming big sagebrush (Artemisia tridentate)</i> Or <i>Winterfat (Krascheninnikovia lanata)</i>	0.5
<i>Rubber rabbitbrush (Ericameria nauseosus)</i> Or <i>Green rabbitbrush (Chrysothamnus viscidiflorous)</i>	0.5
Totals	16 lbs/acre

Shallow Clayey Ecological Site Seed Mix	
Species	Lbs PLS*
<i>Western wheatgrass (Pascopyrum smithii)</i>	2.4
<i>Green needlegrass (Nassella viridula)</i>	2.4
<i>Blue grama (Bouteloua gracilis)</i> Or <i>Needleandthread (Hesperostipa comate)</i>	1.0
<i>American vetchz (Vicia Americana)</i>	1.0
<i>Blue flax (Linum lewisii)</i>	0.2
<i>Fourwing saltbush (Atriplex canescens)</i> Or <i>Wyoming big sagebrush (Artemisia tridentate)</i> Or <i>Winterfat (Krascheninnikovia lanata)</i>	0.5
<i>Rubber rabbitbrush (Ericameria nauseosus)</i> Or <i>Green rabbitbrush (Chrysothamnus viscidiflorous)</i>	0.5
Totals	8.0 lbs/acre

Very Shallow Ecological Site Seed Mix	
Species - Cultivar	Lbs PLS*
<i>Thickspike wheatgrass</i> (<i>Elymus lanceolatus</i> ssp. <i>lanceolatus</i>) Or <i>Western wheatgrass</i> (<i>Pascopyrum smithii</i>)	1.2
<i>Bluebunch wheatgrass</i> (<i>Pseudoroegneria spicata</i> ssp. <i>Spicata</i>)	3.5
<i>Needleandthread</i> (<i>Hesperostipa comate</i>)	0.9
<i>Blue grama</i> (<i>Bouteloua gracilis</i>) Or <i>Buffalo grass</i> (<i>Buchloe dactyloides</i>)	1.0
<i>American vetch</i> (<i>Vicia Americana</i>) OR <i>Milkvetches</i> (<i>Astragalus</i>)	0.7
<i>Blue flax</i> (<i>Linum lewisii</i>)	0.2
<i>Fourwing saltbush</i> (<i>Atriplex canescens</i>) Or <i>Wyoming big sagebrush</i> (<i>Artemisia tridentate</i>) Or <i>Winterfat</i> (<i>Krascheninnikovia lanata</i>)	0.5
<i>Rubber rabbitbrush</i> (<i>Ericameria nauseosus</i>) Or <i>Green rabbitbrush</i> (<i>Chrysothamnus viscidiflorous</i>)	0.5
Totals	8.5 lbs/acre

Lowland Ecological Site Seed Mix	
Species	Lbs PLS*
<i>Thickspike wheatgrass</i> (<i>Elymus lanceolatus</i> ssp. <i>lanceolatus</i>) Or <i>Western wheatgrass</i> (<i>Pascopyrum smithii</i>)	4.8
<i>Green needlegrass</i> (<i>Nassella viridula</i>)	4.1
<i>Basin wildrye</i> (<i>Leymus cinereus</i>)	3.5
<i>Blue grama</i> (<i>Bouteloua gracilis</i>) Or <i>Needleandthread</i> (<i>Hesperostipa comate</i>)	1.0
<i>Prairie coneflower</i> (<i>Ratibida columnifera</i>)	0.8
<i>White or purple prairie clover</i> (<i>Dalea candidum, purpureum</i>)	0.8
<i>Fourwing saltbush</i> (<i>Atriplex canescens</i>) Or <i>Wyoming big sagebrush</i> (<i>Artemisia tridentate</i>) Or <i>Winterfat</i> (<i>Krascheninnikovia lanata</i>)	0.5
<i>Rubber rabbitbrush</i> (<i>Ericameria nauseosus</i>) Or <i>Green rabbitbrush</i> (<i>Chrysothamnus viscidiflorous</i>)	0.5
Totals	16 lbs/acre

ATTACHMENT 6

FORTIFICATION CREEK PLANNING AREA PLANT SPECIES LIST

COMMON NAME/ GROUP NAME	SCIENTIFIC NAME
GRASSES/GRASSLIKES	
<i>RHIZOMATOUS WHEATGRASSES:</i>	
thickspike wheatgrass	<i>Elymus lanceolatus</i>
western wheatgrass	<i>Pascopyrum smithii</i>
<i>OTHER GRASSES</i>	
green needlegrass	<i>Nassella viridula</i>
bluebunch wheatgrass	<i>Pseudoroegneria spicata</i>
Cusick's bluegrass	<i>Poa cusickii</i>
needleandthread	<i>Hesperostipa comata</i>
little bluestem	<i>Schizachyrium scoparium</i>
threadleaf sedge	<i>Carex filifolia</i>
<i>MISCELLANEOUS GRASSES/GRASSLIKES*</i>	
blue grama	<i>Bouteloua gracilis</i>
hairy grama	<i>Bouteloua hirsuta</i>
Canby bluegrass	<i>Poa canbyi</i> (syn. to <i>Poa secunda</i>)
plains reedgrass	<i>Calamagrostis montanensis</i>
needleleaf sedge	<i>Carex duriuscula</i>
buffalo grass	<i>Buchloe dactyloides</i>
prairie junegrass	<i>Koeleria macrantha</i>
Sandberg bluegrass	<i>Poa secunda</i>
plains muhly	<i>Muhlenbergia cuspidata</i>
threadleaf sedge	<i>Carex filifolia</i>
bottlebrush squirreltail	<i>Elymus elymoides</i>
sideoats grama	<i>Bouteloua curtipendula</i>
Fendler threeawn	<i>Aristida purpurea</i>
Indian ricegrass	<i>Achnatherum hymenoides</i>
sand dropseed	<i>Sporobolus cryptandrus</i>
FORBS	
<i>MISCELLANEOUS FORBS*</i>	
American vetch	<i>Vicia americana</i>
prairie coneflower	<i>Ratibida columnifera</i>
asters	<i>Asters</i>
biscuitroots	<i>Lomatium spp.</i>
breadroot scurfpea	<i>Pediomelum esculentum</i>
western yarrow	<i>Achillea lanulosa</i>
rosy pussytoes	<i>Antennaria rosea</i>
milkvetches	<i>Astragalus</i>
scarlet gaura	<i>Gaura coccinea</i>
purple prairie clover	<i>Dalea purpurea</i>
white prairie clover	<i>Dalea candida</i>
bluebells	<i>Mertensia</i>
wild onion	<i>Allium textile</i>
prairie thermopsis	<i>Thermopsis rhombifolia</i>

COMMON NAME/ GROUP NAME	SCIENTIFIC NAME
stemless goldenweed	<i>Haplopappus acaulis</i>
twogrooved milkvetch	<i>Astragalus bisulcatus</i>
hawksbeard	<i>Crepis acuminata</i>
sulphur flower buckwheat	<i>Eriogonum umbellatum</i>
TREES, SHRUBS & HALF-SHRUBS	
Wyoming big sagebrush	<i>Artemisia tridentata</i>
birdfoot sagebrush	<i>Artemisia pedatifida</i>
winterfat	<i>Krascheninnikovia lanata</i>
rubber rabbit brush	<i>Ericameria nauseosus</i>
silver sagebrush	<i>Artemisia cana</i>
skunkbush sumac	<i>Rhus trilobata</i>
green rabbit brush	<i>Chrysothamnus viscidiflorus</i>
yucca	<i>Yucca glauca</i>
ponderosa pine	<i>Pinus ponderosa</i>
junipers	<i>Juniperus scopulorum</i>
western snowberry	<i>Symphoricarpos occidentalis</i>

