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Subject:
Reclamation Summary Report
Silvertip Pipeline Incident, Laurel, Montana

ENVIRONMENT

Dear Ms. Olsen:

Date:
November 21, 2011

On behalf of ExxonMobil Environmental Services (EMES), ARCADIS is submitting *Reclamation Summary Report (November 21, 2011)*. We will contact you, once the 2012 reclamation monitoring implementation is scheduled.

Contact:
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We appreciate your support and continued cooperation on this important project. Please do not hesitate to contact us if you have any questions.

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Sincerely,

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Imagine the result

ExxonMobil Pipeline Company

Reclamation Summary Report

Silvertip Pipeline Incident
Laurel, Montana

November 21, 2011

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Acronyms and Abbreviations

| | |
|-------|---|
| ASRF | Area Specific Reclamation Form |
| ASRP | Area Specific Reclamation Plan |
| ATV | All Terrain Vehicle |
| BLM | Bureau of Land Management |
| CTR | Combined Treatment Recommendations |
| Exxon | ExxonMobil Environmental Services |
| GIS | Global Information System |
| GPS | Geographic Positioning System |
| MDEQ | Montana Department of Environmental Quality |
| MFWP | Montana Fish, Wildlife, and Parks |
| RCF | Reclamation Completion Form |
| RFF | Reclamation Field Form |
| SCAT | Shoreline Cleanup Assessment Technique |
| SCF | Segment Completion Form |
| SSRP | Segment Specific Reclamation Plan |
| TRG | The Response Group |
| UTV | Utility Vehicle |

1. Introduction

This Reclamation Summary Report provides the details associated with field characterization and site-specific reclamation activities that were implemented by ExxonMobil Environmental Services (EMES) in vegetated areas that were disturbed during emergency response actions associated with the Silvertip Pipeline Incident. These field characterization and reclamation activities were performed in accordance with the *Framework Document for the Reclamation of Disturbed Vegetation* (Framework Document, ARCADIS, September 24, 2011), which was approved by the Montana Department of Environmental Quality (MDEQ) on September 26, 2011.

A flowchart that outlines the reclamation process that was used for this project, as presented in the Framework Document, is shown on Figure 1. This flowchart lays out the overall process for reclamation of the various categories of disturbances from the emergency response activities that were conducted (i.e., foot paths, rest areas, woody debris piles, boat storage areas, main staging areas, and stacked wood piles) for the Silvertip Pipeline Incident.

The majority of the land disturbances involved in the reclamation process were State of Montana-owned land and for those lands, the potentially impacted areas were characterized jointly by a team of State of Montana and ExxonMobil representatives. This team determined the reclamation strategy at the time of the characterization, and came to a joint agreement as to the area to be reclaimed, assessed the area and adjacent areas to determine the type and approximate density of existing vegetation, and determined the appropriate seed mix to be used in the area. The information that was collected during this field characterization effort was recorded on a Reclamation Field Form (RFF) and signed by the team representatives. The forms for each zone within a segment were summarized and then compiled to comprise the Area Specific Reclamation Plans (ASRPs). The reclamation actions prescribed by those ASRPs were implemented, and the detailed methodology and results of those activities are presented herein.

The RFF's in the ASRPs will be used again during the vegetation monitoring activities proposed to be conducted by EMES in the spring/summer of 2012 as the guide to evaluate the success of the reclamation. Monitoring of the reclaimed areas will be undertaken by a similar joint State of Montana/EMES team. The RFF's in the ASRPs will be signed by the team members indicating that the reclamation for each segment is complete, if the monitoring supports that conclusion. If additional reclamation is indicated to be needed by the monitoring, the details of this additional

reclamation will be determined and agreed to by the team in the field during the monitoring process.

1.1 Report Organization

This Reclamation Summary Report is divided into the following sections:

- **Section 1: Introduction** – Summarizes the reclamation process as presented in the Framework Document and provides the introduction and organization of this report.
- **Section 2: Characterization Methodology and Reclamation Strategies** – Presents the methodologies used to characterize disturbed vegetation and identifies the reclamation strategies that were used for the project.
- **Section 3: Results of Zone-Specific Reclamation Characterization** – Presents the results of the characterization of disturbed vegetation and habitats.
- **Section 4: Reclamation Implementation** – Presents the methodology used to implement the reclamation of disturbed vegetation, as prescribed in the characterization process.
- **Section 5: Reclamation Monitoring and Approval** – Presents the plan for monitoring reclamation activities to determine success and process for closure.

2. Characterization Methodology and Reclamation Strategies

The objective of the characterization activities was to visit areas within Divisions A, B, and C that were disturbed as a result of the emergency response operations completed by ExxonMobil. Consistent with the Framework Document, preliminary characterization visits were conducted by ARCADIS in August 2011 on public lands in Divisions A and B to establish an initial understanding of the habitat types that were present along the Yellowstone River. Divisions A, B, and C consist of the following areas within and bordering Yellowstone River:

- Division A encompasses the area from the point of the pipeline release in the city of Laurel, Montana, downstream to the intersection of Rudio Road and Duck Creek Road, for a distance of approximately 7 miles.
- Division B encompasses the area from the intersection of Rudio Road and Duck Creek Road to Alkali Creek, for a distance of approximately 13 miles.
- Division C encompasses the area from Alkali Creek to Yellowstone County-Treasure County border, for a distance of approximately 65 miles.

A map of the divisions included in the Yellowstone River Study Area is shown in Figure 2. This section summarizes the methods used for characterizing potentially impacted vegetation habitats, evaluating the extent of vegetation disturbance, and identifying the applicable reclamation strategies to address disturbed vegetated habitats.

Upon the completion of the preliminary characterization visits, the final field characterization methodology was identified and agreed upon with the state agencies, for State-owned land, as discussed further in Section 2.4.

2.1 Identification of Habitat Types

Consistent with the Framework Document, ARCADIS biologists conducted preliminary vegetation characterization surveys in August 2011 to characterize habitats that were potentially impacted by emergency response team operations. Based on the results of these surveys, a habitat characterization methodology was identified, which formed the development of the ultimate reclamation strategy that was used for disturbed habitats resulting from the operations.

Based on the vegetative communities that were identified during this initial characterization, ARCADIS biologists identified six typical habitat types, which included:

- High Energy and Channel Areas
- Invasive Weed Areas
- Riparian Corridors
- Dry Meadows
- Wetlands

A description for each of these habitats is presented below.

2.1.1 High Energy and Channel Areas

The high energy and channel areas were dominated by sand bars and located below flooding levels. In most cases, these areas were fully inundated when emergency response crews began operations. Common species in these areas include sandbar willow (*Salix exigua*); however, high energy areas had limited established vegetation. The lack of established vegetation in these areas suggest that these areas are regularly inundated by high flows or flooding conditions.

2.1.2 Riparian Corridors

Riparian corridors are the dominant habitat type encountered during the characterization effort. Dominant plant species for this habitat type include cottonwood (*Populus deltoides*), peachleaf willow (*Salix amygdaloides*), Russian olive (*Eleagnus angustifolia*), and Western snowberry (*Symphoricarpos occidentalis*).

2.1.3 Dry Meadows

Dry meadow habitats were encountered adjacent to riparian corridors and had a limited canopy cover. Dominant species included smooth brome (*Bromus inermis*), wild rye (*Lolium multiflorum*), and slender wheatgrass (*Elymus trachycaulus*).

2.1.4 Wetlands

Wetlands were encountered in a few limited areas where ponded conditions were maintained, despite retreat of the river levels. This habitat type was dominated by sedges (*Carex* sp), wild licorice (*Glycyrrhiza lepidota*), common rush (*Juncus effusus*), and cattail (*Typha latifolia*).

2.1.5 High Invasive Weed Areas

High invasive weed areas were often encountered in upland communities with limited canopy. Invasive weeds encountered in upland communities included leafy spurge (*Euphorbium esula*), tansy (*Tanacetum vulgare*), and thistle (*Cirsium arvense*). Based on guidance provided by MDEQ, these areas were identified as separate habitat types due to the concern that invasive weeds would spread quickly in areas disturbed by response crew operations.

2.2 Identification of Disturbance Areas

Disturbances observed during the preliminary surveys revealed a much more limited set of impact categories than initially envisioned in the Framework Document. Disturbance types that were observed during reclamation characterization consisted of the three following categories:

- Trails
- Rest Areas
- Duck Creek Staging Area

A description for each of these areas is presented below.

2.2.1 Trails

Trails appear to have been created by response operations utilizing vehicles such as utility vehicles (UTVs), Marooka track vehicles, or airboats. Additionally, trails appear to have been also created by heavy pedestrian use. Criteria for documentation of a disturbed trail requiring reclamation characterization include a width of approximately 5 to 10 feet and vegetative cover of less than 25 percent observed on the day of characterization. Much of the riparian corridor has existing all-terrain vehicle (ATV)

trails that are maintained by hunters and for recreational use. Aerial photography from Google Earth 2008 and 2010, depending on the area, was used to help identify these permanent trails. Additionally, many of the trails that were made and established over several years were fairly easily distinguishable from the newly made trails created during the emergency response operations. Trails that were clearly identified as the result of continually recreational use of the area were not identified for further reclamation, which would be futile due to their continued use.

2.2.2 Rest Areas

Rest areas were established to support the emergency response activities and typically consisted of a rectangular area, up to a few thousand square feet, that may have had tents, storage areas, portable rest rooms, sitting areas, and other operations that may have compacted soils to a limited degree and created vegetation disturbances and bare areas. Staging areas were established where there was a limited woody shrub layer and were delineated by cutting the grass to the edges of the staging area.

Disturbance in these areas varied based on the duration of time the response crews were present in a given segment. Staging areas varied in size with widths ranging from 25 feet to 50 feet. As with trail documentation, criterion for documenting a staging area was a vegetative cover of less than 25 percent cover observed on the day of characterization. These areas, although larger in size, had very similar impacts to vegetation as the trails and were subjected to the same operational activities as the staging areas.

2.2.3 Duck Creek Staging Area

Staging areas were unique in that each one had different types and degrees of impacts, depending on their location and the degree and type of operations conducted at the staging area. The only staging area that was evaluated using this process was the facility at the Duck Creek Fishing Access Area, as this area is owned by the State of Montana. Reclamation of the other staging areas (all private property) used during response operations was completed, as necessary, to the satisfaction of the property owner.

The Duck Creek site is a local fishing access area operated by the Montana Fish, Wildlife and Parks (MFWP). It is approximately a 27-acre area and consists of parking facilities, boat ramp, and restroom facility that offers access to the Yellowstone River waterfront. Except for the improved facilities, the surrounding vegetation community is

typical of riparian habitats. The vegetated areas adjacent to the roadway entry and parking areas are dominated by brome, where the soils have been compacted and disturbed, and with some sage brush that is beginning to develop.

The facility consists of a gated entry way and access roadway that leads to a parking lot that is located outside of the floodplain. From the parking lot, the roadway slopes down to a concrete boat ramp leading into the river bottom. This ramp is protected upstream by a short jetty, and the surrounding banks are protected with rock placed along the banks. From the boat ramp area, there is a large trail that parallels the river and provides access to the river bank via smaller trails leading away from it.

2.3 Identification of Reclamation Strategies

Basic reclamation strategies were developed in September 2011, based on the observed vegetation types and disturbances identified along the river corridor during the preliminary characterization. Reclamation strategies were developed based on the methodology established in the Framework Document and as accepted by the stakeholders.

Each reclamation strategy was based on a characterization of the surrounding vegetation types, and was selected to support the reestablishment of native species and prevent the spread of noxious weeds. A decision chart summarizing the process utilized in the field to identify reclamation strategies is included on Figure 3. The reclamation strategies prescribed included:

- No Action for High Energy Un-Vegetated Sand Banks
- Raking in Other Sand Bars
- Seeding in Trails and Rest Areas
- Duck Creek Staging Area

2.3.1 No Action for High Energy Un-Vegetated Sand Banks

Based on the assumption that high river flows associated with 1- to 2-year floods would result in regular inundation of these areas, ExxonMobil, ARCADIS, and MDEQ agreed that No Action was identified for areas within the high energy flood plain area. Raking or any additional reclamation of these areas would be unnecessary because during

these high flows that will periodically occur, sediment is expected to scour or accumulate in these areas.

2.3.2 Raking in Other Sand Banks

Raking was identified for areas dominated by un-vegetated sand but not within the high energy/flood plain areas. The objective of raking was to smooth visible impacts to soils. ExxonMobil, ARCADIS, and MDEQ agreed that in these sandy soil areas, it was unlikely that vegetation would reestablish, and therefore seeding was not the identified reclamation strategy.

2.3.3 Seeding in Trails and Rest Areas

Seeding was identified for the majority of disturbed areas. The seed mix strategy was based on several factors, which included presence of noxious weeds, sufficient canopy cover, and the presence of smooth brome. Based on the habitat types identified during the preliminary vegetation characterization surveys, preliminary reclamation seed mixes were evaluated for applicability based on the observed habitat types and included:

- brome mix;
- dry meadow mix;
- native riparian mix; and
- wetland mix.

If the disturbed area had predominant noxious weed cover, a mix including smooth brome was recommended to establish quickly and perhaps limit further introduction of noxious weeds into more naturalized areas. In areas with less than 25% tree cover, the dry meadow mix was selected as the preferred strategy, and in wetland areas, a wetland seed mix was recommended. In the riparian corridors, where there was already an established prevalence of smooth brome, the brome mix was again recommended to establish a quick ground cover to make sure that noxious weeds did not become dominant in these areas. Where a lesser amount of brome (<25%) coverage, a native riparian grass mix was recommended.

The preliminary seed mixes described above were initially identified with input from local seeding vendors and seeding contractors. Mixes included native species that were observed in each habitat type, as well as native species readily available from local seed providers. In cooperation with the State of Montana representatives, the Reclamation Team reviewed and further developed the seed mixes to identify a mix of native species that would successfully reestablish each native habitat in disturbed areas. Consistent with guidance provided by the State of Montana, smooth brome was the only non-native species approved for use in order to limit invasion of noxious weeds. Therefore, the brome mix was developed as a seed mix for disturbed areas with a high percentage of noxious weeds in the surrounding vegetation. Based on desired seeds per square foot, the ratio of species was identified. Final seed mixes did not include extraneous materials such as fertilizer, mulch, or tackifier, and are listed in Table 1.

2.3.4 Duck Creek Staging Area

Due to the significant use of the Duck Creek Staging Area, a reclamation strategy specific to this area was developed. In addition to seeding consistent with the reclamation strategy at other riparian areas, the Duck Creek Staging Area was also identified for weed removal, improvements to roads, and re-grading of the boat launch and riverfront areas as required by MFWP.

2.4 Field Characterization Methodology

The field characterization process consisted of the following components:

- Identification of Potential Disturbed Areas
- Field Characterization Methodology

A description for each of these components is provided below.

2.4.1 Identification of Potential Disturbed Areas

The identification of potential disturbed areas was primarily based on our understanding of where cleanup and staging operations had taken place and where there was the potential for some disturbance to have taken place as a result of cleanup operations along the Yellowstone River. The following process was used to identify areas to be characterized for possible reclamation. This process used a conservative

approach such that any reasonable lines of evidence that suggested operations may have caused disturbances to vegetation were included in the characterization process.

1. If the CTR stated no further treatment, or no treatment required, or no oil observed, those areas (or portions thereof) were not characterized since this designation indicates that no mechanized operations or intense foot operations (operations that have been identified as the main cause of vegetation impacts requiring reclamation) in the area that would have been necessary.
2. Shoreline Cleanup Assessment Technique (SCAT) oiling conditions summary was reviewed and areas where there was no oil observed were not characterized as this designation indicates that no operations were necessary.
3. The Situation Unit Leader maintained a spreadsheet to track where cleanup operations were completed updated daily during cleanup operations and field operations mapped where operations had been completed each day. This data was reviewed and used to eliminate characterization of areas where there was never any cleanup operations completed.
4. The equipment summary reports were reviewed and if ATVs or any tracked equipment was used in an area/segment, those locations were included in the characterization activities.
5. Operations supplied man-power spreadsheet. If more than 15 man-days were spent in a location, we included those areas, as this was an indication that operations may have caused impacts to vegetation requiring reclamation.
6. If the access coordinator said operations wasn't allowed in an area due to property access issues then these areas were excluded as were lands with claims against XOM or land with owners in litigation with XOM. Reclamation, as necessary, of these locations was/will be addressed during the access and claims/litigation resolution processes.

Once the areas/segments were identified that require characterization, the reclamation planning team created a schedule of properties for the characterization team to visit along with aerial photos of post cleanup operations mapping and pre-incident mapping obtained from Google Earth to assist the team in locating the areas/segments for characterization.

2.4.2 Field Characterization Methodology

The field characterization activities consisted of a series of field teams that were combined with stewards of public lands (MDEQ representatives for State-owned land) and qualified ARCADIS scientists (EMES representatives). In addition, when evaluating Duck Creek Boat Launch, MFWP was present and for Bureau of Land Management (BLM) owned land, characterization of select (as determined by BLM) BLM-owned land was completed with a BLM representative. For privately owned land, characterization was completed with land-owner permission. In general, the methodology consisted of mapping the disturbed areas (referred to as zones in this document) and vegetative community characterization field efforts. The Agency representatives participated in the identification of zones requiring reclamation, vegetative community characterization, and reclamation design. Specific details related to the mapping and characterization field efforts are presented below.

Based on the zones that were identified to have potential disturbed vegetation, these areas were walked by the field teams with the aid of in-field electronic mapping. The Silvertip Incident Response Team was supported by TRG, who used data collection devices with ArcGIS software to track areas that were cleaned by the Incident Response Team. TRG provided these same devices to the reclamation characterization field teams to track segments evaluated, habitat types encountered, and to record zones identified. The data collection devices had Geographic Positioning System (GPS) capabilities as well as photographing capabilities to document the field conditions associated with each zone identified. Information recorded in the field was automatically uploaded to the TRG servers to facilitate immediate access to data collected. Additionally, the characterization team was supported with GPS for tracking the movements of the team to document coordinates where the team had conducted characterization and surveyed zones within each segment.

2.4.3 Field Characterization Documentation

Within a given segment, field characterization teams evaluated each disturbance against the evaluation criteria. Each disturbance that met the evaluation criteria was identified as a zone, and each zone was labeled with a unique zone identification number (e.g., Zone A01-1). In each area that contains segments with identified disturbances (zones), the following forms were completed:

- Area Specific Reclamation Form (ASRF) – This document contains the area ID, and lists any segments that were evaluated by the field characterization team. It

also lists the property ownership of the segment visited. In some instances, there may be two identical segments listed if there were different property owners (i.e., State and BLM, or State and Private). The ASRF also contains three signature blocks, one that was signed once all of the zone and segment information was verified and compiled, one once the reclamation was completed and it was verified that the signed forms were included, and a third signature block that will be completed once the monitoring in 2012 is completed and signed off as accepted by the field reclamation team.

- Segment Completion Form (SCF) – The SCF contains the segment ID and lists the field characterization team members and lists the zones of disturbance found in that segment. It also contains a sign off block for the members of the characterization team to certify that the characterization of the segment is completed and that there is agreement on both the results of the characterization of the zones and the prescription of the reclamation process that was established for the zones in the segment. There is also a second block of signatures reserved for the team to sign once the monitoring is conducted in 2012 and it is agreed that the reclamation was successful. Attached to the SCF is the segment ID photo showing the GPS tracks of the areas visited by the field characterization team.
- RFF – The RFF contains the Zone ID for any areas of disturbance found in a segment. It contains the basic information about the characterization of the zone and surrounding vegetation and habitat type. The percent cover of the dominant trees, shrubs and Herbs, and any noxious weeds are listed, as well as the photo number of the photo that was taken of the zone. This form also contains the seed mix type recommended based on the surrounding habitat and vegetation type, and any notes for specific reclamation measures, including disassembling stacked wood, bank stabilization, and raking. The form contains two signature blocks, one that is filled out by the reclamation team that there was agreement on the zone characterization and prescription for reclaiming the disturbed area and the second to be used once there is agreement that the reclamation is successful after the monitoring is completed in 2012. Attached to the reclamation form is a habitat characterization aerial photo showing the location of the zone, as well as an insert photograph of the zone conditions taken in the field.

The signed RFFs form the basis of the final reclamation plan to specify what actions were taken within each segment and to document which segments were evaluated and do not require any further evaluation. The signed RFF is combined with representative zone photographs and a global information system (GIS) map generated from the zone

mapping coordinates recorded in the field for all zones within an area. The combined RFF's within a segment create a Segment Specific Reclamation Plan (SSRP). The combined SSRPs then create an ASRP for each area, which were provided to the seeding subcontractor(s) in preparation for seeding activities. See Section 4 for information on how the ASRPs provided additional documentation information during the implementation of reclamation activities.

3. Results of Zone Specific Reclamation Characterization

A total of 156 segments in 82 areas were evaluated by the field characterization teams within Divisions A, B, and C. A total of 54 zones were identified where disturbances required utilization of a seed mix as the reclamation strategy. This included approximately 17,149 linear feet (or approximately 3.2 miles) of trails, and approximately 35,000 square feet (or approximately 0.8 acres) of polygon areas associated with rest areas. The individual disturbances ranged from very small areas, such as a wetland approximately 10 feet long, to larger extended disturbed trails that may have been in excess of 1,000 feet long. Additionally, consistent with the reclamation strategy developed for the Duck Creek Staging Area, characterization identified reclamation for various portions of this area. Tables 2a, 2b, and 2c provide a summary of the zones characterized, and the ASRPs prepared as part of the Reclamation Characterization effort are included in Appendix A.

3.1 Trail and Rest Area Characterization

The trails and rest areas that were characterized within Divisions A, B, and C are presented below.

3.1.1 Division A

Division A includes the source location of the Silvertip Pipeline Incident; therefore, significant emergency response action activities were performed by crews within Division A. Emergency response crews regularly mobilized foot teams and heavy equipment in Division A between July and September 2011 and therefore had disturbances to vegetation.

Within Division A, reclamation seed mixes included the brome mix and the native riparian mix. Brome mix was selected for approximately 4,356 linear feet of trails and approximately 3,000 square feet of rest areas. Native riparian mix was selected for approximately 1,887 linear feet of trails. This information is summarized in Table 3, and the zones that were characterized in Division A are graphically represented in Figure 4.

3.1.2 Division B

Division B was immediately downstream of Division A and had comparable impacts from the Silvertip Pipeline Incident. Emergency response crews regularly mobilized

foot teams and heavy equipment in this division between July and September 2011, and therefore had disturbances to vegetation.

Within Division B, reclamation seed mixes included the brome mix, dry meadow mix, native riparian mix, and wetland mix. Brome mix was selected for approximately 422 linear feet of trails. The dry meadow mix was selected for approximately 2,710 linear feet of trails and approximately 7,000 square feet of rest areas. The native riparian mix was selected for approximately 3,896 linear feet of trails and approximately 25,000 square feet of rest areas. The wetland mix was selected for approximately 1,691 linear feet of trails. This information is summarized in Table 3, and the zones that were characterized in Division B are graphically represented in Figure 5.

3.1.3 Division C

Emergency response crews began mobilizing to Division C in September 2011. Impacts from the Silvertip Pipeline Incident in this division were less than that of Division A and B, and therefore response crews were mobilized when impacts were observed and emergency response was requested. The majority of crews that were mobilized to Division C were foot teams, although heavy equipment was periodically also used. Because of the decreased effort and duration, Division C had lesser disturbances to vegetation. As the team progressed east through Division C, it became evident, based on the limited emergency response operations in those areas, that further characterization was not necessary. Characterization activities were discontinued at area C-50.

Within Division C, brome mix was the selected reclamation seed mix. Brome mix was selected for approximately 722 linear feet of trails. This information is summarized in Table 3, and the zones that were characterized in Division C are graphically represented in Figure 6.

3.2 Duck Creek Characterization

The Duck Creek Staging Area was used for boat operations during the cleanup activities along the river. The characterization of this area was conducted in a similar manner as the other sites, with representatives of both the State (MFWP and MDEQ) and EMES. However, the impacts were different than those experienced in the undeveloped riparian areas and included structural damages, as well as vegetative impacts. These impacts included greatly expanded parking along the entire length of the entry road that compacted soils and disturbed the natural vegetation, which

resulted in extensive brome and some noxious weeds and invasive species to become established. In addition, several large boulders were removed to allow the parking areas to be extended, and access into the interior of the site along the boat ramp, which resulted in some trail compaction. Extensive siltation resulted along the boat ramp area from its heavy use during the cleanup operations, which may also have exacerbated bank sloughing in the immediate vicinity of the ramp. A few other disturbances were noted such as stakes left along the bank, barrier rocks relocated, and disturbed fencing.

A seed mix specific to the Duck Creek Staging Area was selected for approximately 13,750 linear feet of trails and approximately 30,000 square feet of polygons of staging area. This information is summarized in Table 3, and the location of the Duck Creek Staging Area is shown on Figure 5.

4. Reclamation Implementation

The Reclamation Completion Form (RCF) prepared by the Reclamation Team for each zone specified the zone length, reclamation habitat type/seed mix and the total pounds of seed proposed for planting in the specified zone. The RCFs were compiled into ASRPs which were then used in preparation for implementation. Terra Contracting was hired as the ARCADIS subcontractor to assist in the implementation of the reclamation plans. They provided equipment, personnel, and obtained the gravel, large stones and mulch for the reclamation of the Duck Creek area. They also assisted ARCADIS in the development of appropriate procedures for the seeding to ensure that reclamation activities would run safely and efficiently. Boat operations to transport crews to the Island areas and areas inaccessible by roads was provided by Whitewater Rescue Inc.

ARCADIS worked with Circle S seeds located in Three Forks, Montana to provide input to the seed selection and commercial availability of the suggested seed mixes using local sources. Final seed mixes were purchased from Circle S. Seeds. Willow stakes were purchased from Blackfoot Native Plants nursery in Bonner, Montana to assure local stocks were used.

Implementation of the areas that required re-vegetation was typically carried out using a harrow rake pulled by an ATV to scarify the soil followed by seeding with a broadcast or hand seeder, raking the seed into place and rolling it to compact the seed into the soil. In much of the seeding operations sand was used to mix with the seed as a carrier to assist in the mechanized seeding with the broadcast spreader. Variations of these methods were used in specific sites that were either already becoming re-vegetated or were very small and not accessible with the mechanized equipment. In these areas, hand raking and re-seeding may have been the only methods used.

Reclamation teams consisted of Terra personnel for equipment operations and other labor such as hand raking and an ARCADIS technical representative for subcontractor oversight and safety and a field scientist to assist with site specific conditions encountered and overall documentation.

Standard Operating Procedures for reclamation activities are included in Appendix B.

4.1 Summary of Completed Reclamation

In order to meet dormant seeding recommendations, reclamation was conducted between October 10 and October 17, 2011. In addition, a small percentage of annual rye was added to the mixes so that it might germinate in the fall and stabilize the seed bed over the winter. Seeding was conducted utilizing both UTVs and hand seeding equipment, depending on the length and width of the zone. Trails and rest areas that were seeded on islands presented a unique challenge to reclamation crews. UTVs that were used to seed zones on islands were mobilized on boats. A photograph log of the equipment utilized during implementation of the reclamation is included in Appendix C.

4.1.1 Reclamation of Trails and Rest Areas

Approximately 3.2 miles of trails and 0.8 acres of polygons associated with rest areas were seeded as part of reclamation activities.

4.1.2 Reclamation of Duck Creek Staging Area

Approximately 1 acre of the Duck Creek Staging Area was seeded as part of reclamation activities. Additional reclamation activities conducted at the Duck Creek Staging Area included the following:

- **Entry Way Reclamation** - Spraying areas along both sides of the entry roadway with Roundup to kill off all vegetation, since these areas became colonized by noxious weed species after the disturbance from use as a parking area. After spraying, these areas were harrowed "aggressively," as FW&P suggested since they had become very compacted. The area was tilled to a depth of approximately 3 to 4 inches, harrowed to smooth the seed bed, planted, raked, and then rolled to compact the seed into the soil. A mixture of seed (Duck Creek Mix) was prescribed for planting in that area, which included thick-spike wheatgrass, slender wheatgrass, western wheatgrass, and green-needle grass. It did not include the basin wild-rye grass at the recommended of FW&P. These areas were lined with boulders to prevent vehicular traffic on them.
- **Roadway** – The roadway surface was re-graveled with at least 2 inches of gravel, making sure the crown was maintained for runoff. Large rocks along the drive were re-aligned and additional rocks were added where necessary around the boat ramp area to keep vehicular traffic off of the trails.

- **Dirt Pile** – The dirt pile, which consisted of sediments cleaned from the boat ramp area after the heavy use, was removed by using some of it to fill in low spots around the trails and adjacent to the road, as well as to grade the remaining material into the bank. Soil erosion control (matting) was used on the river side of the bank to prevent scour and erosion of the newly graded soil. The entire area was then seeded with the Riparian Seed mix.
- **Boat Launch Area** - The pile of woody debris was removed from the boat launch area. Compacted rocky non-vegetated areas to the left and right of the boat launch area were covered with top soil, seeded (brome mix), mulched, and rocks were placed to prevent vehicular access.
- **Trails** – The main trail was smoothed where necessary and covered with bark mulch for approximately 400 linear feet from the boat launch area to the dry stream bed. Other side trails were scarified (hand raked) and seeded where there was a low percentage of existing vegetation with the brome mix.
- **River Front** – Iron posts along the river front were removed. Where the banks were sloughed, both upstream and downstream of the boat ramp area, 24 inch willow stakes were planted approximately 20 inches deep at the toe of slope, so they will grow and stabilize the bank. Over the 400 foot section of bank, approximately 100 willows were planted in the areas where sloughing had occurred. Barren areas at the top of the bank were seeded with the Riparian seed mix. However, no planting took place within 5 feet of the top of the edge of the slope for safety reasons. This area gets heavy use by fisherman also and any seeding would get trampled.

4.1.3 Documentation

In order to certify that a zone was seeded according to the selected reclamation seed mix specified in the ASRP, the following form was completed:

- **RCF** – The RCF contains the Zone ID information for each zone that was reclaimed. It also contains the Zone planting specification or seed mix type and a placeholder to record a photo of the seed mix bag. Other information noted on the form includes the zone length, total pounds of seeds to be used per 100 linear feet of trail (in case an additional trail to be reclaimed was found), total pounds of seed to be used on the specified zone, and a space to record total pounds of seed used in the final reclamation. Additionally, there is a place for the ARCADIS

representative to sign off that reclamation photos were taken of the area. Lastly, the form includes a signature block for the subcontractor and ARCADIS representative to sign off that the reclamation was completed as prescribed for the zone. Attached to the form are any photographs of the trails showing the reclamation after it was completed. Any deviations from the plan were noted.

The completed and signed RCFs were recompiled into the final ASRPs to be utilized during monitoring. Monitoring is further discussed in Section 5.

4.2 Field Observations

Although the reclamation procedures were implemented consistent with the Framework Document, actual conditions encountered in the field during reclamation implementation periodically differed from what was expected. The Silvertip Pipeline Incident occurred during high water conditions, due to flooding of the Yellowstone River in early July 2011. When characterization efforts were initiated in late August 2011, the river levels had begun to recede, which resulted in the mudflats and river rock being exposed. Reclamation was identified based on the conditions observed during characterization efforts.

Reclamation activities were initiated in October 2011, over three months after the flooding event. At this time, ARCADIS and subcontractor field teams observed significant natural re-growth of vegetation since characterization was completed, showing that deposition from flooding provides appropriate conditions for the germination of seeds in the seed bank. This suggests that reclamation activities conducted in the fall may be preemptive and that some areas of disturbances may have naturally recovered before the spring without any assistance.

5. Reclamation Monitoring and Approval

Consistent with the Framework Document, the Reclamation Team will revisit each area in the spring/summer of 2012. The ASRPs documenting the prescribed reclamation strategy for each zone will form the basis of comparison for meeting reclamation objectives for each zone.

5.1 Objectives and Performance Standards

The objective of the reclamation strategy selected for each zone is to establish adequate ground cover, to the extent practicable, to protect the area from erosion and extensive noxious weed growth. In order to meet this objective, seeding reclamation strategies were selected based on the surrounding vegetative conditions. Due to the high variability of surrounding vegetative conditions between zones, the RFF will be used as the basis of comparison to meet performance standards. Performance standards will be subjective based on conditions at each zone and will consist of the following:

- Germination of reclamation seed mix will meet or exceed the coverage of surrounding vegetative conditions in each zone. Comparison of the reclaimed zones based on monitoring in the late spring or summer of 2012, right after seed germination, must take into consideration that the plants will be immature and not necessarily reflect conditions of adjacent more mature areas. However, high seedling density may be used as an indicator of high probability of success.

5.2 Monitoring

Monitoring of the reclaimed areas will be undertaken by a joint team, similar to that of the characterization teams consisting of representatives of the State and EMES (i.e., ARCADIS). Monitoring teams will revisit every zone identified for reclamation and come to a consensus on the success of the reclamation at that time. Closure of zones that have met performance standards will be documented by the monitoring team. If monitoring teams determine that the reclamation objectives have not been met during the initial monitoring event, additional maintenance activities (e.g., reseeding or further monitoring) may be prescribed to enhance conditions in that zone. Zones subject to maintenance activities will be reevaluated for closure in Fall 2012.

5.3 Documentation of Closure

When the monitoring team reaches a consensus for reclamation closure of a zone, documentation of closure will be completed at the time of monitoring. The RFF will be again signed by team members present to confirm that the reclamation for the zone is complete and no further evaluation is required. Completed RFFs will be compiled into Segment Completion Packets and ultimately compiled into ASRP Closure Packets. Upon closure of all identified zones, EMES will submit the final ASRP Closure Report to State of MDEQ.



Table 1. Reclamation Seed Mixes.

Brome Mix

| Common Name | Species | Percent mix (%) | Desired seeds/square foot | Seeds/pound | PLS pounds/acre |
|--------------------|----------------------------|-----------------|---------------------------|-------------|-----------------|
| Smooth brome | <i>Bromus inermis</i> | 10 | 8 | 142,880 | 2.4 |
| Slender wheatgrass | <i>Elymus trachycaulus</i> | 45 | 36 | 135,000 | 11.6 |
| Basin wild rye | <i>Leymus cinereus</i> | 45 | 36 | 144,000 | 10.9 |
| Total | | 100 | 80 | | 24.9 |

Dry Meadow Mix

| Common Name | Species | Percent mix (%) | Desired seeds/square foot | Seeds/pound | PLS pounds/acre |
|--------------------------|-----------------------------|-----------------|---------------------------|-------------|-----------------|
| Thickspike wheatgrass | <i>Elymus lanceolatus</i> | 25 | 20 | 153,000 | 5.7 |
| Bluebunch wheatgrass | <i>Agropyron spicatum</i> | 25 | 20 | 117,500 | 7.4 |
| Basin wild rye | <i>Leymus cinereus</i> | 10 | 8 | 144,000 | 2.4 |
| Big bluegrass | <i>Poa ampla</i> | 25 | 20 | 1,046,960 | 0.8 |
| Rocky Mountain penstemon | <i>Penstemon strictus</i> | 5 | 4 | 489,888 | 0.4 |
| Yarrow | <i>Achillea millefolium</i> | 10 | 8 | 2,852,012 | 0.1 |
| Total | | 100 | 80 | | 16.8 |

Native Riparian Mix

| Common Name | Species | Percent mix (%) | Desired seeds/square foot | Seeds/pound | PLS pounds/acre |
|-----------------------|----------------------------|-----------------|---------------------------|-------------|-----------------|
| Tall mannagrass | <i>Glyceria grandis</i> | 25 | 20 | 200,000 | 4.4 |
| Slender wheatgrass | <i>Elymus trachycaulus</i> | 25 | 20 | 135,000 | 6.5 |
| Western wheatgrass | <i>Pascopyrum smithii</i> | 15 | 12 | 113,840 | 4.6 |
| Streambank wheatgrass | <i>Agropyron riparium</i> | 15 | 12 | 153,000 | 3.4 |
| Basin wild rye | <i>Leymus cinereus</i> | 15 | 12 | 144,000 | 3.6 |
| Annual ryegrass | <i>Lolium multiflorum</i> | 5 | 4 | 247,000 | 0.7 |
| Total | | 100 | 80 | | 23.2 |



Table 1. Reclamation Seed Mixes.

Wetland Mix

| Common Name | Species | Percent mix (%) | Desired seeds/square foot | Seeds/pound | PLS pounds/acre |
|---------------------|-------------------------------|-----------------|---------------------------|-------------|-----------------|
| Tall mannagrass | <i>Glyceria grandis</i> | 25 | 20 | 200,000 | 4.4 |
| Creeping spike rush | <i>Eleocharis palustris</i> | 25 | 20 | 900,000 | 1 |
| Baltic rush | <i>Juncus balticus</i> | 30 | 24 | 3,000,000 | 0.3 |
| Tufted hairgrass | <i>Deschampsia caespitosa</i> | 15 | 12 | 1,300,000 | 0.4 |
| Annual rye | <i>Lolium multiflorum</i> | 5 | 4 | 247,000 | 0.7 |
| Total | | 100 | 80 | | 6.8 |

Duck Creek Parking Areas

| Common Name | Species | Percent mix (%) | Desired seeds/square foot | Seeds/pound | PLS pounds/acre |
|-----------------------|----------------------------|-----------------|---------------------------|-------------|-----------------|
| Green Needle Grass | <i>Nassella viridium</i> | 25 | 20 | 181,000 | 5 |
| Slender wheatgrass | <i>Elymus trachycaulus</i> | 25 | 20 | 135,000 | 6.5 |
| Western wheatgrass | <i>Pascopyrum smithii</i> | 15 | 12 | 113,840 | 4.6 |
| Thickspike Wheatgrass | <i>Elymus lanceolatus</i> | 25 | 20 | 153,000 | 5.7 |
| Annual ryegrass | <i>Lolium multiflorum</i> | 5 | 4 | 247,000 | 0.7 |
| Total | | 100 | 80 | | 22.5 |



Table 2a. Segments and Zones Identified - Division A.

| Area | Segments | RFF # | Owner | ARCADIS Rep | Agency Rep | Date | SCF | ASRP | Photo Taken | Seed Mix | Land Operations (feet) | Water Operations (feet) | Zone Length (feet) | Notes | 1 Brome | 2 Dry Meadow | 3 Native Riparian | 4 Wetland |
|--------|----------|------------|------------|-----------------|-----------------|-----------|-----|------|------------------------|------------------------|------------------------|-------------------------|--------------------|---|---------|--------------|-------------------|-----------|
| A06 | A06-LB | | MT | C. Fenter | C. Mehus/MTDEQ | 9/21/2011 | x | x | | | | | | | | | | |
| | A06-RB | | MT/BLM | E. Ungberg | N/A | 9/22/2011 | x | | | | | | | | | | | |
| A07 | A07-LB | | MT | A. Levy | L. Ballek/MTDEQ | 9/21/2011 | x | x | | | | | | | | | | |
| | A07-RB | | MT/BLM | E. Ungberg | | 9/22/2011 | x | | | | | | | | | | | |
| A08 | A08-RB | | MT/BLM | A. Levy | L. Ballek/MTDEQ | 9/21/2011 | x | x | | | | | | | | | | |
| | A08-RB | | BLM | E. Ungberg | BLM | 9/22/2011 | X | | | | | | | | | | | |
| A11 | A11-LB | 1S | MT | A. Levy | L. Ballek/MTDEQ | 9/21/2011 | x | x | 31 | #3 Native Riparian Mix | 116 | | 116 | | | | 116 | |
| A12 | A12-LB | 1S | MT | C. Fenter | C. Mehus/MTDEQ | 9/20/2011 | x | x | x | #1 Brome Mix | | 1120 | 1120 | | 1120 | | | |
| | | 2S | MT | C. Fenter | C. Mehus/MTDEQ | 9/20/2011 | | | x | #1 Brome Mix | | 40 | 40 | | 40 | | | |
| | | 3S | MT | C. Fenter | C. Mehus/MTDEQ | 9/20/2011 | | | x | #1 Brome Mix | | 80 | 80 | | 80 | | | |
| | | 4S | MT | C. Fenter | C. Mehus/MTDEQ | 9/20/2011 | | | x | #1 Brome Mix | | 1080 | 1080 | | 1080 | | | |
| | A12-LB | | BLM | E. Ungberg | L. Padden/BLM | 9/20/2011 | x | | | | | | | | | | | |
| A12-RB | 1S | MT | A. Levy | L. Ballek/MTDEQ | 9/21/2011 | x | | x | #3 Native Riparian Mix | 306 | | 306 | | | | | 306 | |
| A13 | A13-LB | 1S | MT | C. Fenter | C. Mehus/MTDEQ | 9/20/2011 | x | x | x | #1 Brome Mix | | 146 | 146 | | 146 | | | |
| | | 2S | MT | C. Fenter | C. Mehus/MTDEQ | 9/20/2011 | | | x | #3 Native Riparian Mix | | 167 | 167 | | | | 167 | |
| A13-LB | | BLM | E. Ungberg | L. Padden/BLM | 9/20/2011 | x | | | | | | | | | | | | |
| A14 | A14-LB | 1S | MT | C. Fenter | C. Mehus/MTDEQ | 9/20/2011 | x | x | x | #3 Native Riparian Mix | | 120 | 120 | | | | 120 | |
| | A14-LB | | BLM | E. Ungberg | L. Padden/BLM | 9/20/2011 | x | | | | | | | | | | | |
| | A14-RB | 1S | MT | A. Levy | L. Ballek/MTDEQ | 9/21/2011 | x | | x | #3 Native Riparian Mix | 276 | | 276 | | | | 276 | |
| A15 | A15-RB | 1S | MT | C. Fenter | C. Mehus/MTDEQ | 9/20/2011 | x | x | x | #1 Brome Mix | 82 | | 82 | | 82 | | | |
| | A15-RB | | BLM | E. Ungberg | L. Padden/BLM | 9/20/2011 | x | | | | | | | | | | | |
| A16 | A16-RB | | MT | C. Fenter | C. Mehus/MTDEQ | 9/20/2011 | x | x | | | | | | | | | | |
| | A16-RB | | BLM | E. Ungberg | L. Padden/BLM | 9/20/2011 | x | | | | | | | | | | | |
| A17 | A17-RB | 1S | MT | A. Levy | L. Ballek/MTDEQ | 9/21/2011 | x | x | 34 | #3 Native Riparian Mix | 229 | | 229 | | | | 229 | |
| A19 | A19-RB | | MT | C. Fenter | C. Mehus/MTDEQ | 9/21/2011 | x | x | | | | | | | | | | |
| A21 | A21-IS | 1S | MT | C. Fenter | C. Mehus/MTDEQ | 9/21/2011 | x | x | | #1 Brome Mix | | 216 | 216 | 3,000 sq ft | 216 | | | |
| | A21-RB | | MT | A. Levy | L. Ballek/MTDEQ | 9/21/2011 | x | | | | | | | | | | | |
| A22 | A22-IS | 1S | MT | A. Levy | L. Ballek/MTDEQ | 9/21/2011 | x | x | 36 | #3 Native Riparian Mix | 189 | | 189 | | | | 189 | |
| | | 2S | MT | A. Levy | L. Ballek/MTDEQ | 9/21/2011 | | | 37 | #3 Native Riparian Mix | 419 | | 419 | | | | 419 | |
| | | 3S | MT | A. Levy | L. Ballek/MTDEQ | 9/21/2011 | | | 40 | #1 Brome Mix | 743 | | 743 | | 743 | | | |
| | A22-LB | | MT | A. Levy | L. Ballek/MTDEQ | 9/21/2011 | x | | | | | | | | | | | |
| A23 | A23-LB | | MT | E. Ungberg | S. Thomas/DNRC | 9/21/2011 | x | x | | | | | | | | | | |
| | A23-RB | | MT | A. Levy | L. Ballek/MTDEQ | 9/21/2011 | x | | | | | | | | | | | |
| A24 | A24-LB | | MT | E. Ungberg | S. Thomas/DNRC | 9/21/2011 | x | x | | | | | | | | | | |
| A25 | A25-LB | | MT | E. Ungberg | S. Thomas/DNRC | 9/21/2011 | x | x | | | | | | | | | | |
| | A25-IS | | MT | C. Fenter | C. Mehus/MTDEQ | 9/20/2011 | x | | | | | | | | | | | |
| A26 | A26-IS | | MT | C. Fenter | C. Mehus/MTDEQ | 9/20/2011 | x | x | | | | | | | | | | |
| | A26-LB | | MT | E. Ungberg | S. Thomas/DNRC | 9/21/2011 | x | | | | | | | | | | | |
| A28 | A28-IS | | MT | C. Fenter | C. Mehus/MTDEQ | 9/21/2011 | x | x | | | | | | | | | | |
| | A28-LB | | MT | E. Ungberg | S. Thomas/DNRC | 9/22/2011 | x | | | | | | | | | | | |
| | A28-RB | 1S | MT/Private | C. Fenter | R. Mule/MTFWP | 9/23/2011 | x | | x | Wheat grass/native mix | 65 | | 65 | A28 included as separate reclamation type - one of a kind | | | 65 | |
| | | 2S | MT/Private | C. Fenter | R. Mule/MTFWP | 9/23/2011 | x | | x | #1 Brome Mix | 539 | | 539 | | 539 | | | |
| | | 3S | MT/Private | C. Fenter | R. Mule/MTFWP | 9/23/2011 | x | | x | #1 Brome Mix | 138 | | 138 | | 138 | | | |
| A28-RB | 4S | MT/Private | C. Fenter | R. Mule/MTFWP | 9/23/2011 | x | | x | Mulch | 417 | | 417 | | | | | | |
| A29 | A29-IS | 1S | MT | C. Fenter | C. Mehus/MTDEQ | 9/21/2011 | x | x | x | #1 Brome Mix | 172 | | 172 | | 172 | | | |
| | A29-LB | | MT | E. Ungberg | S. Thomas/DNRC | 9/22/2011 | x | | | | 0 | | | | | | | |
| | A29-RB | 1S | MT | C. Fenter | R. Mule/MTFWP | 9/23/2011 | x | | x | Wheats/Custom | 0 | | 1,048 | A29 included as separate reclamation type - one of a kind | | | | |

totals 3691 2969 7708 4356 1887

Table 2b. Segments and Zones Identified - Division B.

| Area | Segments | RFF # | Owner | ARCADIS Rep | Agency Rep | Date | SCF | ASRP | Photo Taken | Seed Mix | Land operations (feet) | Water Operations (feet) | Zone Length (feet) | Notes | 1 Brome | 2Dry Meadow | 3 Native Riparian | 4 Wetland |
|------|----------|-------|-----------------------------|---------------|-----------------|-----------|-----|------|-------------|------------------------|------------------------|-------------------------|--------------------|--------------|---------|-------------|-------------------|-----------|
| B01 | B01-LB | | MT | C. Fenter | C. Mehus/MTDEQ | 9/21/2011 | x | x | | | | | | | | | | |
| | B01-RB | | MT | E. Ungberg | M. Glenn/MTDEQ | 9/18/2011 | x | | | | | | | | | | | |
| B04 | B04-RB | | MT/Private | C. Fenter | C. Mehus/MTDEQ | 9/21/2011 | x | x | | | | | | | | | | |
| B05 | B05-LB | | MT/Private | E. Ungberg | M. Glenn/MTDEQ | 9/18/2011 | x | x | | | | | | | | | | |
| B06 | B06-LB | | MT | E. Ungberg | M. Glenn/MTDEQ | 9/18/2011 | x | x | | | | | | | | | | |
| B07 | B07-IS | 1S | MT | C. Fenter | C. Mehus/MTDEQ | 9/21/2011 | x | x | x | #3 Native Riparian Mix | | 164 | 164 | 3,000 sq ft | | | 164 | |
| | B07-LB | | MT | E. Ungberg | M. Glenn/MTDEQ | 9/18/2011 | x | | | | | | | | | | | |
| B08 | B08-IS | | MT | C. Fenter | C. Mehus/MTDEQ | 9/21/2011 | x | x | | | | | | | | | | |
| | B08-LB | | MT | E. Ungberg | M. Glenn/MTDEQ | 9/18/2011 | x | | | | | | | | | | | |
| B09 | B09-LB | 1S | MT | E. Ungberg | M. Glenn/MTDEQ | 9/18/2011 | x | x | 19 | Meadow Mix | 418 | | 418 | 3,000 sq ft | | 418 | | |
| B10 | B10-LB | | MT | E. Ungberg | M. Glenn/MTDEQ | 9/18/2011 | x | x | | | | | | | | | | |
| | B10-RB | | MT | E. Ungberg | M. Glenn/MTDEQ | 9/17/2011 | x | | | | | | | | | | | |
| B11 | B11-LB | 1S | MT | E. Ungberg | M. Glenn/MTDEQ | 9/18/2011 | x | x | x | #3 Native Riparian Mix | 208 | | 208 | | | | 208 | |
| | | | | | | | | | | | | | | | | | | |
| B12 | B12-LB | 1S | MT | E. Ungberg | M. Glenn/MTDEQ | 9/18/2011 | x | x | | #1 Brome Mix | 73 | | 73 | | 73 | | | |
| | | 2S | MT | E. Ungberg | M. Glenn/MTDEQ | 9/18/2011 | x | | x | #4 Wetland Mix | 73 | | 73 | | | | | 73 |
| | B12-RB | 1S | MT | A. Levy | L. Ballek/MTDEQ | 9/17/2011 | x | | 13 | #1 Brome Mix | 290 | | 290 | | 290 | | | |
| | | 2S | MT | A. Levy | L. Ballek/MTDEQ | 9/17/2011 | x | | 14 | #2 Dry Meadow Mix | 797 | | 797 | 22,000 sq ft | | 797 | | |
| | | 3S | MT | A. Levy | L. Ballek/MTDEQ | 9/17/2011 | x | | 16 | #2 Dry Meadow Mix | 888 | | 888 | | | 888 | | |
| B13 | B13-IS | | MT | A. Levy | L. Ballek/MTDEQ | 9/17/2011 | x | x | | | | | | | | | | |
| | B13-LB | | Private | E. Ungberg | | 9/20/2011 | x | | | | | | | | | | | |
| | B13-RB | | MT | A. Levy | L. Ballek/MTDEQ | 9/17/2011 | x | | | | | | | | | | | |
| B14 | B14-LB | | Private | E. Ungberg | M. Glenn/MTDEQ | 9/20/2011 | x | x | | | | | | | | | | |
| | B14-RB | 1S | MT | E. Ungberg | M. Glenn/MTDEQ | 9/17/2011 | x | | 16/17 | #3 Native Riparian Mix | 125 | | 125 | | | | 125 | |
| B15 | B15-IS | | MT | E. Ungberg | M. Glenn/MTDEQ | 9/17/2011 | x | x | | | | | | | | | | |
| | B15-LB | | Private | E. Ungberg | | 9/20/2011 | x | | | | | | | | | | | |
| | B15-RB | | MT | E. Ungberg | M. Glenn/MTDEQ | 9/17/2011 | x | | | | | | | | | | | |
| B16 | B16-LB | | MT | C. Fenter | L. Ballek/MTDEQ | 9/19/2011 | x | x | | | | | | | | | | |
| B17 | B17-LB | | MT | C. Fenter | L. Ballek/MTDEQ | 9/19/2011 | x | x | | | | | | | | | | |
| | B17-RB | | MT | A. Levy | L. Ballek/MTDEQ | 9/20/2011 | x | | | | | | | | | | | |
| B18 | B18-IS | 1S | MT | C. Fenter | L. Ballek/MTDEQ | 9/19/2011 | x | x | x | #3 Native Riparian Mix | | 174 | 174 | 4,000 sq ft | | | 174 | |
| | | 2S | MT | C. Fenter | L. Ballek/MTDEQ | 9/19/2011 | x | | x | #3 Native Riparian Mix | | 54 | 54 | | | | 54 | |
| B19 | B19-IS | 1S | MT | C. Fenter | L. Ballek/MTDEQ | 9/19/2011 | x | x | | #4 Wetland Mix | | 45 | 45 | | | | | 45 |
| B20 | B20-LB | | MT | C. Fenter | L. Ballek/MTDEQ | 9/19/2011 | x | x | | | | | | | | | | |
| B21 | B21-LB | | MT | C. Fenter | L. Ballek/MTDEQ | 9/19/2011 | x | x | | | | | | | | | | |
| B22 | B22-LB | | Private | E. Ungberg | | 9/21/2011 | x | x | | | | | | | | | | |
| | B22-RB | | MT | C. Fenter | L. Ballek/MTDEQ | 9/19/2011 | x | | | | | | | | | | | |
| B24 | B24-IS | | MT | C. Fenter | L. Ballek/MTDEQ | 9/19/2011 | x | x | | | | | | | | | | |
| | B24-LB | | MT | E. Ungberg | M. Glenn/MTDEQ | 9/18/2011 | x | | | | | | | | | | | |
| | B24-RB | | MT | E. Ungberg | S. Thomas/DNRC | 9/21/2011 | x | | | | | | | | | | | |
| B25 | B25-LB | | MT | E. Ungberg | S. Thomas/DNRC | 9/18/2011 | x | x | | | | | | | | | | |
| | B25-RB | | MT | E. Ungberg | S. Thomas/DNRC | 9/21/2011 | x | | | | | | | | | | | |
| B26 | B26-IS | | MT | E. Ungberg | M. Glenn/MTDEQ | 9/18/2011 | x | x | | | | | | | | | | |
| | B26-LB | | MT/Private/City of Billings | E. Ungberg | M. Glenn/MTDEQ | 9/18/2011 | x | | | | | | | | | | | |
| | B26-RB | | MT | E. Ungberg | S. Thomas/DNRC | 9/21/2011 | x | | | | | | | | | | | |
| B27 | B27-LB | | MT/Private | E. Ungberg | M. Glenn/MTDEQ | 9/18/2011 | x | x | | | | | | | | | | |
| | B27-RB | 1S | MT/Private/City of Billings | E. Ungberg | C. Mehus/MTDEQ | 9/22/2011 | x | | | #3 Native Riparian Mix | 464 | | 464 | | | | 464 | |
| B28 | B28-LB | | MT | E. Ungberg | C. Mehus/MTDEQ | 9/22/2011 | x | | | #3 Native Riparian Mix | 208 | | 208 | | | | 208 | |
| | B28-RB | | MT/City of Billings | A. Levy | L. Ballek/MTDEQ | 9/18/2011 | x | x | | | | | | | | | | |
| B29 | B29-LB | | MT | E. Ungberg | S. Thomas/DNRC | 9/21/2011 | x | | | | | | | | | | | |
| | B29-RB | | MT/City of Billings | A. Levy | L. Ballek/MTDEQ | 9/18/2011 | x | x | | | | | | | | | | |
| | B29-RB | | MT | E. Ungberg | S. Thomas/DNRC | 9/21/2011 | x | | | | | | | | | | | |
| B30 | B30-LB | | BLM | E. Ungberg | S. Thomas/DNRC | 9/21/2011 | x | | | | | | | | | | | |
| | B30-RB | | MT | A. Levy | L. Ballek/MTDEQ | 9/18/2011 | x | x | | | | | | | | | | |
| B31 | B31-IS | | Private | A. Wetterskog | N/A | 9/29/2011 | x | | | | | | | | | | | |
| | B31-LB | | MT/Private | A. Levy | L. Ballek/MTDEQ | 8/18/2011 | x | x | | | | | | | | | | |
| | B31-RB | | MT | C. Fenter | L. Ballek/MTDEQ | 9/18/2011 | x | | | | | | | | | | | |
| B32 | B32-IS | | Private | A. Levy | N/A | 9/19/2011 | x | | | | | | | | | | | |
| | B32-LB | | MT | A. Levy | L. Ballek/MTDEQ | 9/18/2011 | x | x | | | | | | | | | | |
| | B32-RB | | MT/City of Billings | C. Fenter | L. Ballek/MTDEQ | 9/19/2011 | x | | | | | | | | | | | |
| B33 | B33-LB | | MT/Private | A. Levy | L. Ballek/MTDEQ | 9/18/2011 | x | | | | | | | | | | | |
| | B33-LB | | MT | A. Levy | C. Mehus/MTDEQ | 9/19/2011 | x | x | | | | | | | | | | |
| | B33-LB | | MT/Private/City of Billings | E. Ungberg | C. Mehus/MTDEQ | 9/21/2011 | x | | | | | | | | | | | |
| B34 | B34-RB | | MT | C. Fenter | L. Ballek/MTDEQ | 9/19/2011 | x | | | | | | | | | | | |
| B35 | B35-IS | | MT/Private | A. Levy | C. Mehus/MTDEQ | 9/19/2011 | x | x | | | | | | | | | | |
| | B35-LB | | MT/Private | A. Levy | C. Mehus/MTDEQ | 9/19/2011 | x | | | | | | | | | | | |



Table 2b. Segments and Zones Identified - Division B.

| Area | Segments | RFF # | Owner | ARCADIS Rep | Agency Rep | Date | SCF | ASRP | Photo Taken | Seed Mix | Land operations (feet) | Water Operations (feet) | Zone Length (feet) | Notes | 1 Brome | 2Dry Meadow | 3 Native Riparian | 4 Wetland |
|------|----------|-------|-----------------------------|-------------|-----------------|-----------|-----|------|--------------------|------------------------|------------------------|-------------------------|--------------------|-------|---------|-------------|-------------------|-----------|
| B36 | B36-LB | | MT/Private | A. Levy | C. Mehus/MTDEQ | 9/19/2011 | x | x | | | | | | | | | | |
| | B36-RB | | MT | A. Levy | L. Ballek/MTDEQ | 9/22/2011 | x | | | | | | | | | | | |
| | B36-RB | | BLM | A. Levy | L. Ballek/MTDEQ | 9/22/2011 | | | | | | | | | | | | |
| B37 | B37-RB | | MT | A. Levy | L. Ballek/MTDEQ | 9/22/2011 | x | | | | | | | | | | | |
| | B37-RB | | BLM | A. Levy | L. Ballek/MTDEQ | 9/22/2011 | x | | | | | | | | | | | |
| B38 | B38-LB | | MT/Private | A. Levy | C. Mehus/MTDEQ | 9/19/2011 | x | x | | | | | | | | | | |
| | B38-RB | | MT | A. Levy | L. Ballek/MTDEQ | 9/22/2011 | x | | | | | | | | | | | |
| B39 | B39-LB | | MT/Private/City of Billings | A. Levy | C. Mehus/MTDEQ | 9/19/2011 | x | x | | | | | | | | | | |
| B40 | B40-IS | | MT | C. Fenter | C. Mehus/MTDEQ | 9/22/2011 | x | x | | | | | | | | | | |
| | B40-LB | | MT/Private/City of Billings | C. Fenter | C. Mehus/MTDEQ | 9/22/2011 | x | | | | | | | | | | | |
| | B40-RB | | MT | A. Levy | L. Ballek/MTDEQ | 9/22/2011 | x | | | | | | | | | | | |
| | B40-RB | | BLM | C. Fenter | C. Mehus/MTDEQ | 9/22/2011 | x | | | | | | | | | | | |
| B41 | B41-LB | | MT/Private/City of Billings | A. Levy | L. Ballek/MTDEQ | 9/22/2011 | x | x | | | | | | | | | | |
| | B41-RB | | BLM | A. Levy | C. Mehus/MTDEQ | 9/22/2011 | x | | | | | | | | | | | |
| B42 | B42-IS | 1S | MT | C. Fenter | C. Mehus/MTDEQ | 9/22/2011 | x | x | | #1 Brome Mix | | 55 | 55 | | 55 | | | |
| | | 2S | MT | C. Fenter | C. Mehus/MTDEQ | 9/22/2011 | x | | | #2 Dry Meadow Mix | | 360 | 360 | | | 360 | | |
| | B42-IS | | BLM | C. Fenter | C. Mehus/MTDEQ | 9/22/2011 | | | | | | | | | | | | |
| | B42-LB | | MT | C. Fenter | C. Mehus/MTDEQ | 9/22/2011 | x | | | | | | | | | | | |
| | B42-RB | | MT | A. Levy | L. Ballek/MTDEQ | 9/22/2011 | x | | | | | | | | | | | |
| B43 | B42-RB | | BLM | A. Levy | L. Ballek/MTDEQ | 9/22/2011 | | | | | | | | | | | | |
| | B43-IS | | MT | E. Ungberg | S. Thomas/DNRC | 9/21/2011 | x | x | | | | | | | | | | |
| B44 | B43-LB | | MT/City of Billings | A. Levy | L. Ballek/MTDEQ | 9/20/2011 | x | | | | | | | | | | | |
| | B44-LB | | MT | A. Levy | L. Ballek/MTDEQ | 9/20/2011 | x | x | | | | | | | | | | |
| | B44-RB | | MT | A. Levy | L. Ballek/MTDEQ | 9/20/2011 | x | | | | | | | | | | | |
| | B44-RB | | BLM | A. Levy | L. Ballek/MTDEQ | 9/22/2011 | | | | | | | | | | | | |
| B45 | B45-LB | | MT | A. Levy | L. Ballek/MTDEQ | 9/20/2011 | x | x | | | | | | | | | | |
| | B45-RB | | MT/Private | A. Levy | L. Ballek/MTDEQ | 9/20/2011 | x | | | | | | | | | | | |
| B46 | B46-RB | 1S | MT | E. Ungberg | M. Glenn/MTDEQ | 9/17/2011 | x | x | | #3 Native Riparian Mix | 551 | | 551 | | | | 551 | |
| | | 2S | MT | E. Ungberg | M. Glenn/MTDEQ | 9/17/2011 | | | 12 on phone 9 | #3 Native Riparian Mix | 169 | | 169 | | | | 169 | |
| | | 3S | MT | E. Ungberg | M. Glenn/MTDEQ | 9/17/2011 | | | 11 on phone 9 | #4 Wetland Mix | 265 | | 265 | | | | | 265 |
| | | 4S | MT | E. Ungberg | M. Glenn/MTDEQ | 9/17/2011 | | | 12/13 on phone 33 | #3 Native Riparian Mix | 80 | | 80 | | | | | 80 |
| | | 5S | MT | E. Ungberg | M. Glenn/MTDEQ | 9/17/2011 | | | 14/15 on phone 33 | #3 Native Riparian Mix | 188 | | 188 | | | | | 188 |
| | B46-RB | | BLM | E. Ungberg | M. Glenn/MTDEQ | 9/17/2011 | | | | | | | | | | | | |
| B47 | B47-RB | 1S | MT | E. Ungberg | M. Glenn/MTDEQ | 9/17/2011 | x | x | 10/11 on Phone #33 | #4 Wetland Mix | 597 | | 597 | | | | | 597 |
| | | 2S | MT | E. Ungberg | M. Glenn/MTDEQ | 9/17/2011 | | | x | #4 Wetland Mix | 295 | | 295 | | | | | 295 |
| | | 3S | MT | E. Ungberg | M. Glenn/MTDEQ | 9/17/2011 | | | 52 | #3 Native Riparian Mix | 1246 | | 1246 | | | | | 1246 |
| | | 4S | MT | E. Ungberg | M. Glenn/MTDEQ | 9/17/2011 | | | x | #1 Brome Mix | 97 | | 97 | | 97 | | | |
| | | 5S | MT | E. Ungberg | M. Glenn/MTDEQ | 9/17/2011 | | | x | #1 Brome Mix | 197 | | 197 | | 197 | | | |
| | | 6S | MT | E. Ungberg | M. Glenn/MTDEQ | 9/17/2011 | | | x | #4 Wetland Mix | 53 | | 53 | | | | | 53 |
| | | 7S | MT | E. Ungberg | M. Glenn/MTDEQ | 9/17/2011 | | | x | #4 Wetland Mix | 338 | | 338 | | | | | 338 |
| | | 8S | MT | E. Ungberg | M. Glenn/MTDEQ | 9/17/2011 | | | 15 | #2 Dry Meadow Mix | 247 | | 247 | | | 247 | | |
| | | | | | | | | | | | 7867 | 852 | 8719 | 712 | 2710 | 3631 | 1666 | |



Table 2c. Segments and Zones Identified - Division C.

| Area | Segments | RFF # | Owner | ARCADIS Rep | Agency Rep | Date | SCF | ASRP | Photo Taken | Seed Mix | Land operations (feet) | Water Operations (feet) | Zone Length (feet) | Notes | 1 Brome | 2 Dry Meadows | 3 Native Riparian | 4 Wetland |
|------|----------|-------|---------------|---------------|-----------------|-----------|-----|------|-------------------|--------------|------------------------|-------------------------|--------------------|-------|---------|---------------|-------------------|-----------|
| C02 | C02-LB | | MT/County | A. Levy | L. Ballek/MTDEQ | 9/23/2011 | x | x | | | | | | | | | | |
| C03 | C03-IS | | MT/County | A. Levy | L. Ballek/MTDEQ | 9/25/2011 | | x | | | | | | | | | | |
| | C03-LB | | MT/County | A. Levy | L. Ballek/MTDEQ | 9/25/2011 | | | | | | | | | | | | |
| C04 | C04-IS | | MT | A. Levy | L. Ballek/MTDEQ | 9/24/2011 | x | x | | | | | | | | | | |
| | C04-LB | | County | E. Ungberg | N/A | 9/23/2011 | x | | | | | | | | | | | |
| | C04-RB | | MT/Private | E. Ungberg | N/A | 9/23/2011 | x | | | | | | | | | | | |
| C05 | C05-IS | | MT | A. Levy | L. Ballek/MTDEQ | 9/24/2011 | x | x | | | | | | | | | | |
| | C05-RB | | Private/State | A. Levy | L. Ballek/MTDEQ | 9/24/2011 | x | | | | | | | | | | | |
| C08 | C08-LB | 1S | MT/Private | A. Levy | L. Ballek/MTDEQ | 9/23/2011 | x | x | 42 | #1 Brome Mix | | | 135 | | 135 | | | |
| | | 2S | MT/Private | A. Levy | L. Ballek/MTDEQ | 9/23/2011 | | | 46 | #1 Brome Mix | | | 300 | | 300 | | | |
| C13 | C13-IS | | State/Private | A. Levy | L. Ballek/MTDEQ | 9/24/2011 | x | x | | | | | | | | | | |
| | C13-RB | | State/BLM | A. Levy | L. Ballek/MTDEQ | 9/24/2011 | x | | | | | | | | | | | |
| C18 | C18-LB | | MT | A. Levy | L. Ballek/MTDEQ | 9/26/2011 | x | x | | | | | | | | | | |
| C19 | C19-LB | | MT | A. Levy | L. Ballek/MTDEQ | 9/26/2011 | x | x | | | | | | | | | | |
| | C19-RB | | MT | A. Levy | L. Ballek/MTDEQ | 9/26/2011 | x | | | | | | | | | | | |
| C20 | C20-LB | | MT | A. Levy | L. Ballek/MTDEQ | 9/26/2011 | x | x | | | | | | | | | | |
| C23 | C23-RB | | MT | A. Levy | L. Ballek/MTDEQ | 9/23/2011 | x | x | | | | | | | | | | |
| C29 | C29-RB | | MT | A. Levy | L. Ballek/MTDEQ | 9/26/2011 | x | x | | | | | | | | | | |
| C30 | C30-LB | | MT/Private | A. Levy | L. Ballek/MTDEQ | 9/28/2011 | x | x | | | | | | | | | | |
| | C30-RB | | MT | A. Levy | L. Ballek/MTDEQ | 9/26/2011 | x | | | | | | | | | | | |
| C39 | C39-RB | | MT | A. Levy | L. Ballek/MTDEQ | 9/27/2011 | x | x | | | | | | | | | | |
| C40 | C40-RB | | MT/Private | A. Levy | L. Ballek/MTDEQ | 9/27/2011 | x | x | | | | | | | | | | |
| C42 | C42-RB | | MT | A. Wetterskog | C. Mehus/MDEQ | 9/27/2011 | x | x | | | | | | | | | | |
| C43 | C43-RB | | MT/Private | A. Wetterskog | C. Mehus/MDEQ | 9/27/2011 | x | x | | | | | | | | | | |
| C44 | C44-RB | 1S | Private | A. Wetterskog | C. Mehus/MDEQ | 9/27/2011 | x | x | 1, 2, 3 on TRG 18 | #1 Brome Mix | | | 287 | | 287 | | | |
| C47 | C47-IS | | MT | A. Levy | L. Ballek/MTDEQ | 9/26/2011 | x | x | | | | | | | | | | |
| | C47-RB | | MT | A. Levy | L. Ballek/MTDEQ | 9/26/2011 | x | | | | | | | | | | | |
| C48 | C48-IS | | MT | A. Levy | L. Ballek/MTDEQ | 9/27/2011 | x | x | | | | | | | | | | |
| | C48-RB | | MT | A. Levy | L. Ballek/MTDEQ | 9/27/2011 | x | | | | | | | | | | | |
| C50 | C50-IS | | MT | A. Levy | L. Ballek/MTDEQ | 9/27/2011 | x | x | | | | | | | | | | |

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722

722

Table 3. Summary of Zones Planted.

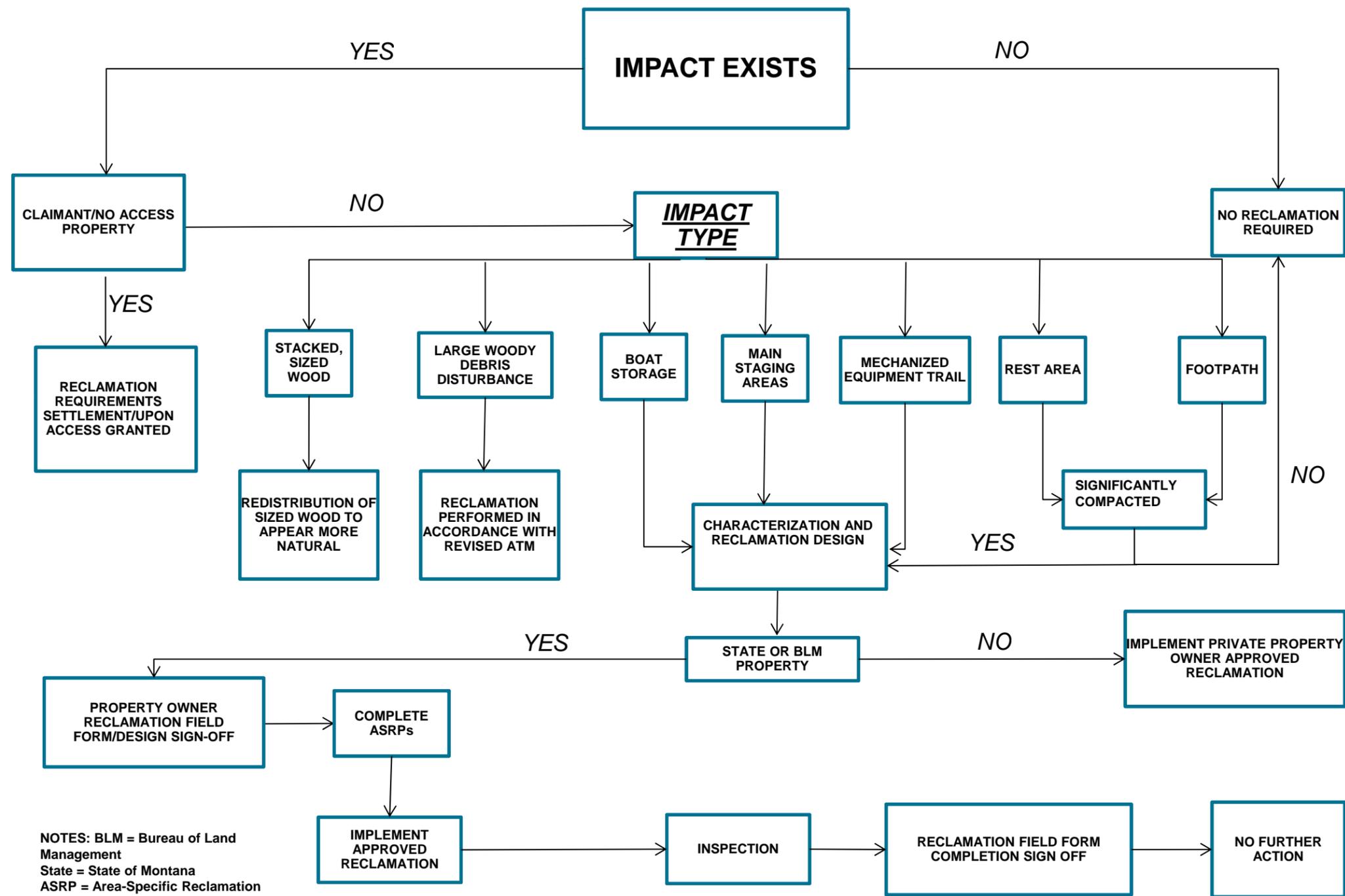
| ID (Area, Segment-Zone) | RFF # | Owner | Habitat Type/Seed Mix | Zone Length (feet) |
|-------------------------|-------|------------|------------------------|--------------------|
| Division A | | | | |
| A11-LB | 1S | MT | #3 Native Riparian Mix | 116 |
| A12-LB | 1S | MT | #1 Brome Mix | 1120 |
| | 2S | MT | #1 Brome Mix | 40 |
| | 3S | MT | #1 Brome Mix | 80 |
| | 4S | MT | #1 Brome Mix | 1080 |
| A12-RB | 1S | MT | #3 Native Riparian Mix | 306 |
| A13-LB | 1S | MT | #1 Brome Mix | 146 |
| | 2S | MT | #3 Native Riparian Mix | 167 |
| A14-LB | 1S | MT | #3 Native Riparian Mix | 120 |
| A14-RB | 1S | MT | #3 Native Riparian Mix | 276 |
| A15-RB | 1S | MT | #1 Brome Mix | 82 |
| A17-RB | 1S | MT | #3 Native Riparian Mix | 229 |
| A21-IS | 1S | MT | #1 Brome Mix | 216 |
| A22-IS | 1S | MT | #3 Native Riparian Mix | 189 |
| | 2S | MT | #3 Native Riparian Mix | 419 |
| | 3S | MT | #1 Brome Mix | 743 |
| A28-RB | 1S | MT/Private | #5 Duck Creek Mix | 65 |
| | 2S | MT/Private | #1 Brome Mix | 539 |
| | 3S | MT/Private | #1 Brome Mix | 138 |
| | 4S | MT/Private | Mulch | 417 |
| A29-IS | 1S | MT | #1 Brome Mix | 172 |
| A29-RB | 1S | MT | #5 Duck Creek Mix | 1,048 |

Table 3. Summary of Zones Planted.

| ID (Area, Segment-Zone) | RFF # | Owner | Habitat Type/Seed Mix | Zone Length (feet) |
|-------------------------|-------|------------------------------------|------------------------|--------------------|
| Division B | | | | |
| B07-IS | 1S | MT | #3 Native Riparian Mix | 164 |
| B09-LB | 1S | MT | #2 Dry Meadow Mix | 418 |
| B11-LB | 1S | MT | #3 Native Riparian Mix | 208 |
| B12-LB | 1S | MT | #1 Brome Mix | 73 |
| | 2S | MT | #4 Wetland Mix | 73 |
| B12-RB | 1S | MT | #1 Brome Mix | 290 |
| | 2S | MT | #2 Dry Meadow Mix | 797 |
| | 3S | MT | #2 Dry Meadow Mix | 888 |
| B14-RB | 1S | MT | #3 Native Riparian Mix | 125 |
| B18-IS | 1S | MT | #3 Native Riparian Mix | 174 |
| | 2S | MT | #3 Native Riparian Mix | 54 |
| B19-IS | 1S | MT | #4 Wetland Mix | 45 |
| B27-RB | 1S | MT/Private/ City of Billings | #3 Native Riparian Mix | 464 |
| | 2S | MT | #3 Native Riparian Mix | 208 |
| B42-IS | 1S | MT | #1 Brome Mix | 55 |
| | 2S | MT | #2 Dry Meadow Mix | 360 |
| B46-RB | 1S | MT | #3 Native Riparian Mix | 551 |
| | 2S | MT | #3 Native Riparian Mix | 169 |
| | 3S | MT | #4 Wetland Mix | 265 |
| | 4S | MT | #3 Native Riparian Mix | 80 |
| | 5S | MT | #3 Native Riparian Mix | 188 |
| B47-RB | 1S | MT | #4 Wetland Mix | 597 |
| | 2S | MT | #4 Wetland Mix | 295 |
| | 3S | MT | #3 Native Riparian Mix | 1246 |
| | 4S | MT | #1 Brome Mix | 97 |
| | 5S | MT | #1 Brome Mix | 197 |
| | 6S | MT | #4 Wetland Mix | 53 |
| | 7S | MT | #4 Wetland Mix | 338 |
| | 8S | MT | #2 Dry Meadow Mix | 247 |

Table 3. Summary of Zones Planted.

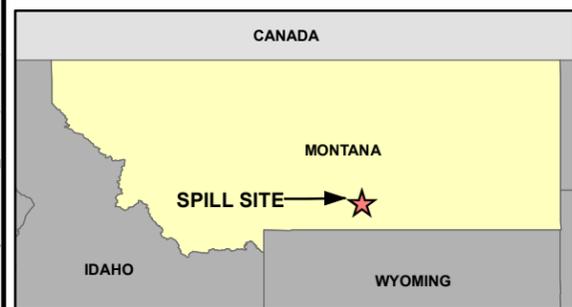
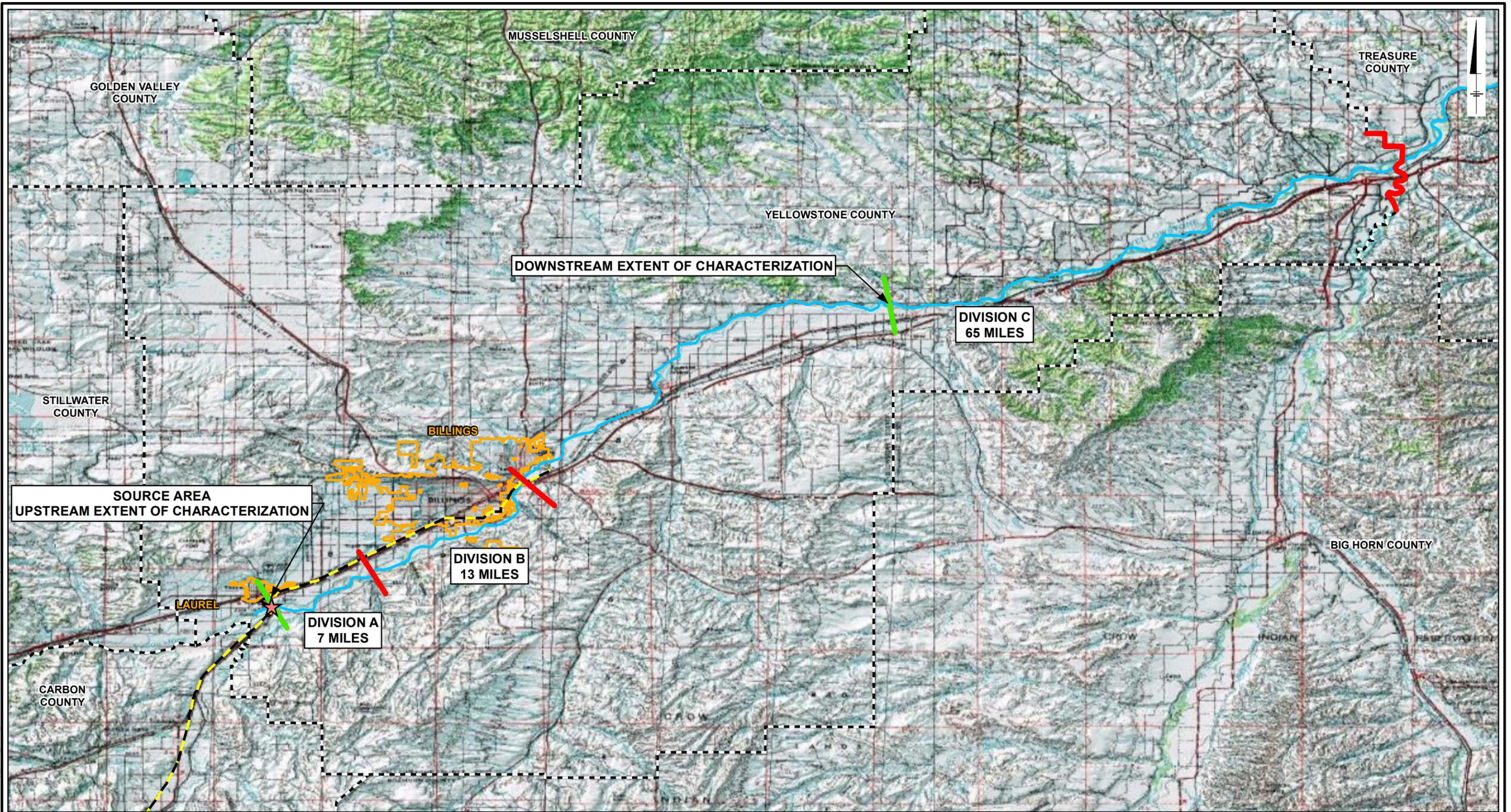
| ID (Area, Segment-Zone) | RFF # | Owner | Habitat Type/Seed Mix | Zone Length (feet) |
|-------------------------|-------|------------|-----------------------|--------------------|
| Division C | | | | |
| C08-LB | 1S | MT/Private | #1 Brome Mix | 135 |
| | 2S | MT/Private | #1 Brome Mix | 300 |
| C44-RB | 1S | Private | #1 Brome Mix | 287 |



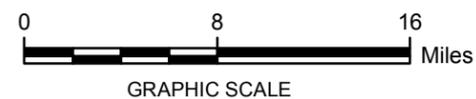
NOTES: BLM = Bureau of Land Management
 State = State of Montana
 ASRP = Area-Specific Reclamation Plan

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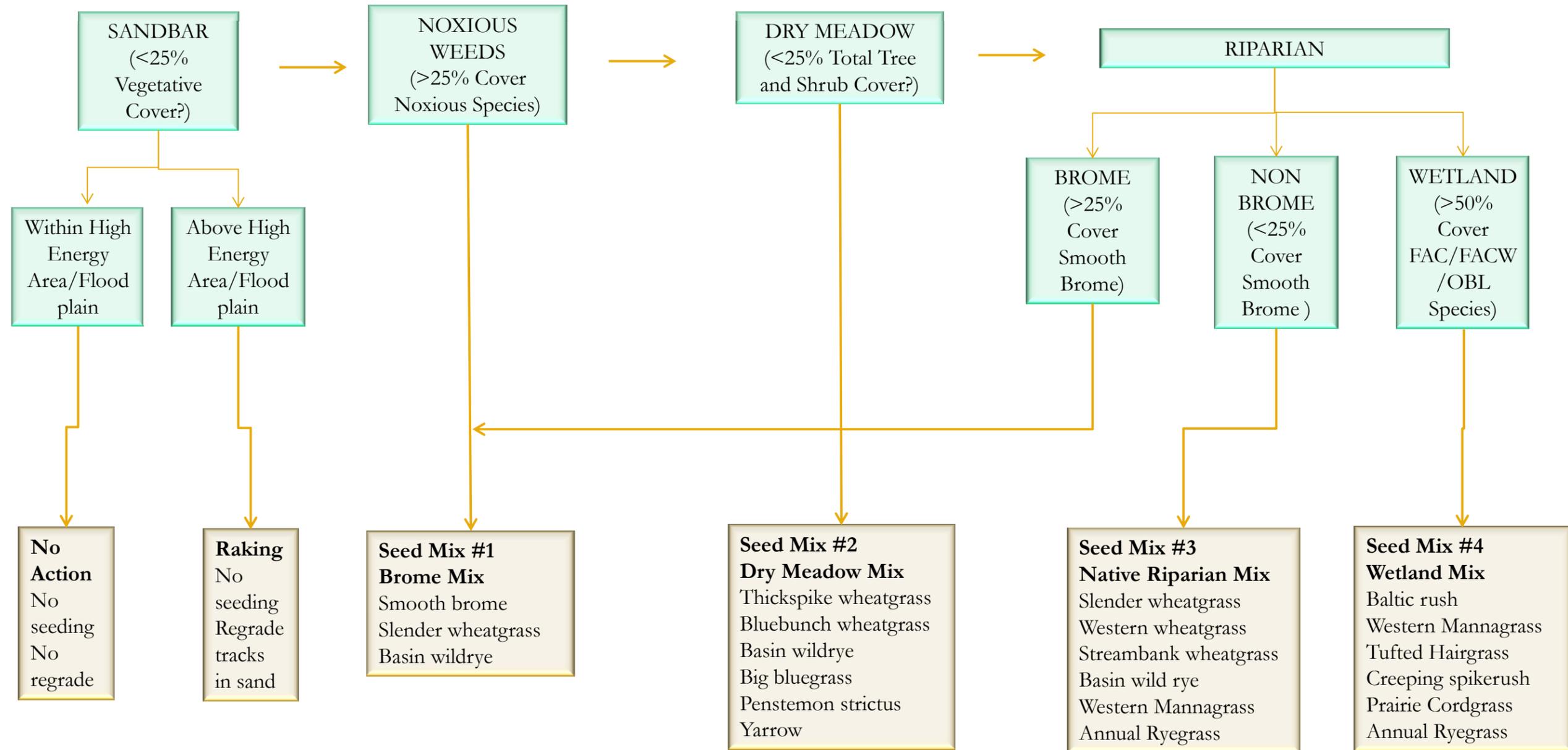
- LEGEND:**
- ★ SPILL SITE
 - PIPELINE
 - EXTENT OF CHARACTERIZATION
 - DIVISION BREAK
 - YELLOWSTONE RIVER CENTERLINE (APPROXIMATE)
 - CITY BOUNDARY
 - COUNTY BOUNDARY



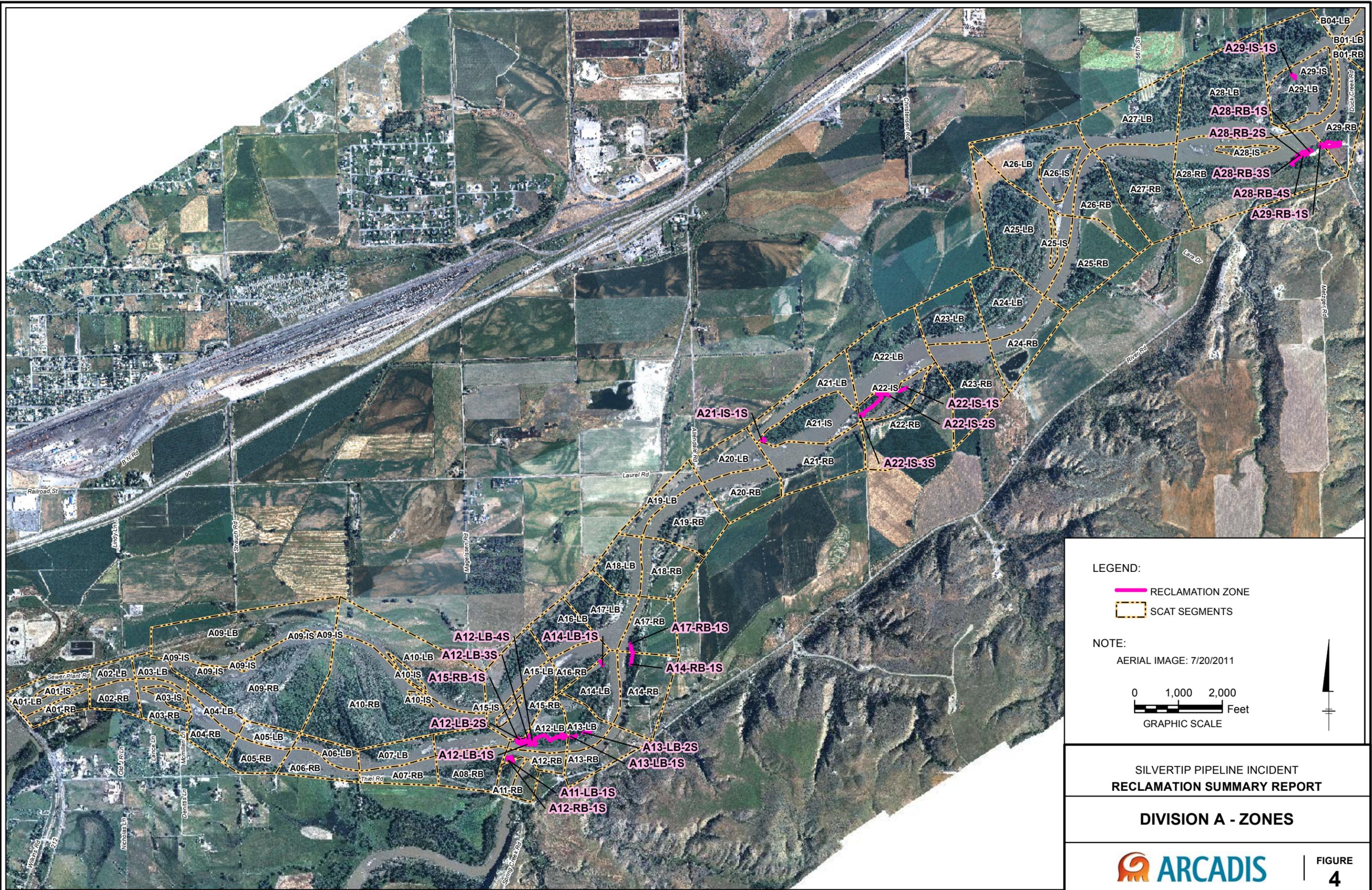
- NOTES:**
1. BASEMAPPING TOPOGRAPHIC MAP PROVIDED BY ESRI ARCGIS ONLINE MAP SERVICE.
 2. YELLOWSTONE RIVER CENTERLINE APPROXIMATED FROM 2009 AERIAL IMAGERY.

SILVERTIP PIPELINE INCIDENT
 RECLAMATION SUMMARY REPORT
**YELLOWSTONE RIVER RECLAMATION
 CHARACTERIZATION AREA**

2



CITY: MPLS DIV: GROUP: IM DB: MG LD: EL
SILVERTIP
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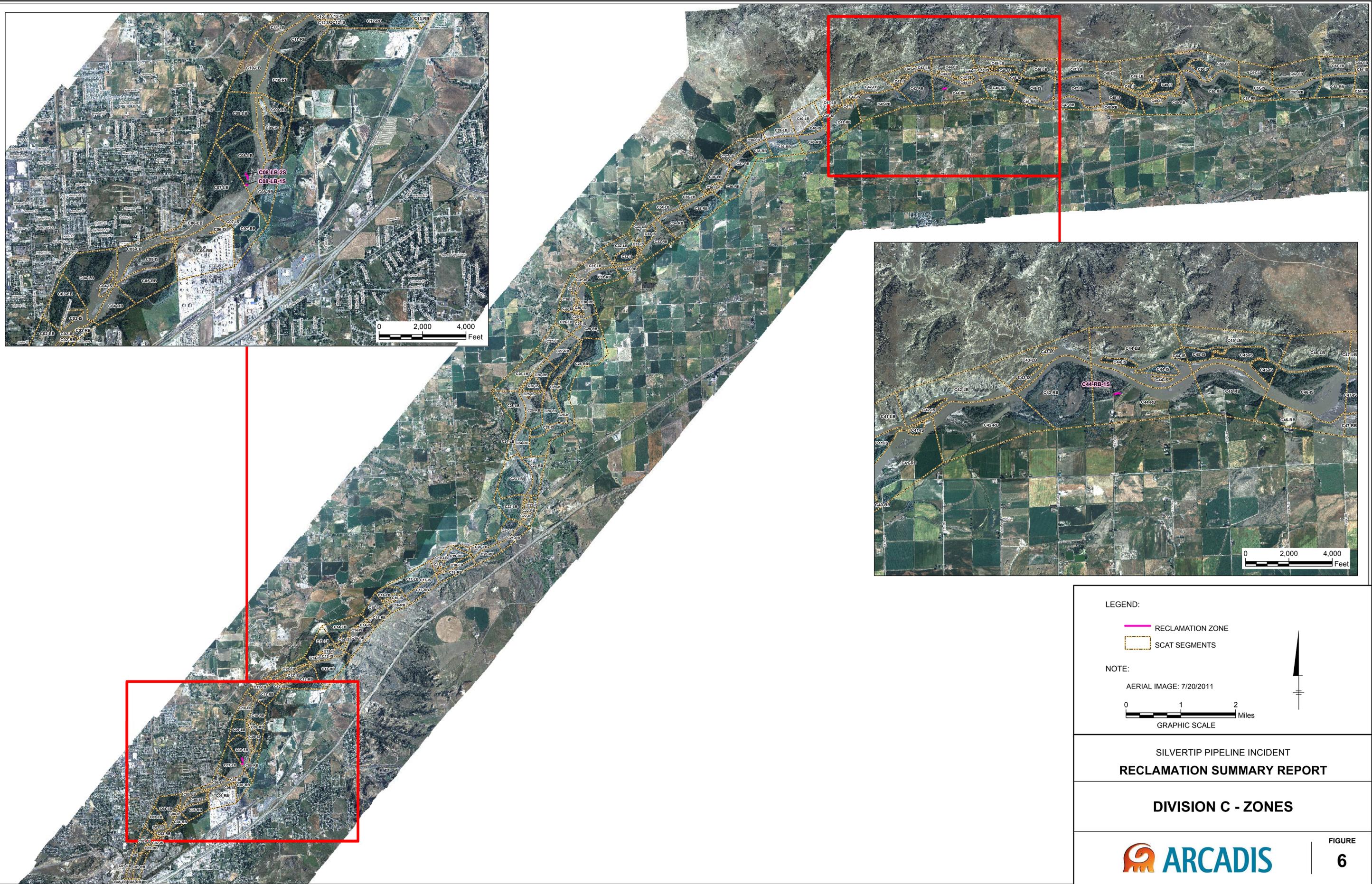
LEGEND:
RECLAMATION ZONE
SCAT SEGMENTS

NOTE:
AERIAL IMAGE: 7/20/2011
0 1,000 2,000 Feet
GRAPHIC SCALE

SILVERTIP PIPELINE INCIDENT
RECLAMATION SUMMARY REPORT

DIVISION A - ZONES





LEGEND:

- RECLAMATION ZONE
- SCAT SEGMENTS

NOTE:

AERIAL IMAGE: 7/20/2011



SILVERTIP PIPELINE INCIDENT
RECLAMATION SUMMARY REPORT

DIVISION C - ZONES





Appendix A

Area Specific Reclamation Plans
(included on CD)



Appendix B

Standard Operating Procedures and
Specifications

EXXONMOBIL SILVERTIP INCIDENT
RECLAMATION SPECIFICATIONS – SEEDING

PART 1 General

- 1.1 An Area Specific Reclamation Plan (ASRP) will be provided to Contractor by ARCADIS containing the name, location, and reclamation method identified for each Zone within the area. Contractor will use the location information provided in these reports and by The Response Group (TRG) to locate each Zone.
- 1.2 Submittals. The Seeding Contractor (Contractor) will provide completion data to ARCADIS and TRG documenting reclamation method completed for each Zone within 24 hours of completing all Segments within an Area.

PART 2 Seed Mixes

- 2.1 Materials. Five types of seed mix will be used on the site. These are:
 - 1. Brome Mix
 - 2. Native Riparian Mix
 - 3. Native Dry Upland Mix
 - 4. Native Wetland Mix
 - 5. Duck Creek parking area
- 2.2 Materials Acceptance. The seed mix composition is based on species availability and final input from seed provider. Preliminary seed mix recommendations and availability provided by Circle S Seeds, Billings, Montana. The Contractor shall inform ExxonMobil and ARCADIS of the composition of seed mixtures which are intended for application at each Zone before any materials are applied. Acknowledgment of acceptance of these materials shall be given by ExxonMobil or ARCADIS before seeding operations may begin. Species replacements must be approved by ExxonMobil or ARCADIS one week prior to beginning seeding operations. Contractor shall provide seed tag for each seed in the mix one week prior to beginning seeding operations. Seed tag will include purity, germination, and testing date of the seed. Labels and other material identification pertaining to the materials which are applied shall be retained by the seeding contractor for a minimum of 90 days after the completion of seeding operations.

2.3 Seed Mixes

1) Brome Mix

| Common Name | Species | Percent mix (%) | Desired seeds/square foot | Seeds/pound | PLS pounds/acre |
|--------------------|----------------------------|-----------------|---------------------------|-------------|-----------------|
| Smooth brome | <i>Bromus inermis</i> | 10 | 8 | 142,880 | 2.4 |
| Slender wheatgrass | <i>Elymus trachycaulus</i> | 45 | 36 | 135,000 | 11.6 |
| Basin wild rye | <i>Leymus cinereus</i> | 45 | 36 | 144,000 | 10.9 |
| Total | | 100 | 80 | | 24.9 |

2) Dry Meadow Mix

| Common Name | Species | Percent mix (%) | Desired seeds/square foot | Seeds/pound | PLS pounds/acre |
|--------------------------|-----------------------------|-----------------|---------------------------|-------------|-----------------|
| Thickspike wheatgrass | <i>Elymus lanceolatus</i> | 25 | 20 | 153,000 | 5.7 |
| Bluebunch wheatgrass | <i>Agropyron spicatum</i> | 25 | 20 | 117,500 | 7.4 |
| Basin wild rye | <i>Leymus cinereus</i> | 10 | 8 | 144,000 | 2.4 |
| Big bluegrass | <i>Poa ampla</i> | 25 | 20 | 1,046,960 | 0.8 |
| Rocky Mountain penstemon | <i>Penstemon strictus</i> | 5 | 4 | 489,888 | 0.4 |
| Yarrow | <i>Achillea millefolium</i> | 10 | 8 | 2,852,012 | 0.1 |
| Total | | 100 | 80 | | 16.8 |

3) Native Riparian Mix

| Common Name | Species | Percent mix (%) | Desired seeds/square foot | Seeds/pound | PLS pounds/acre |
|-----------------------|----------------------------|-----------------|---------------------------|-------------|-----------------|
| Tall mannagrass | <i>Glyceria grandis</i> | 25 | 20 | 200,000 | 4.4 |
| Slender wheatgrass | <i>Elymus trachycaulus</i> | 25 | 20 | 135,000 | 6.5 |
| Western wheatgrass | <i>Pascopyrum smithii</i> | 15 | 12 | 113,840 | 4.6 |
| Streambank wheatgrass | <i>Agropyron riparium</i> | 15 | 12 | 153,000 | 3.4 |
| Basin wild rye | <i>Leymus cinereus</i> | 15 | 12 | 144,000 | 3.6 |
| Annual ryegrass | <i>Lolium multiflorum</i> | 5 | 4 | 247,000 | 0.7 |
| Total | | 100 | 80 | | 23.2 |

4) Wetland Mix

| Common Name | Species | Percent mix (%) | Desired seeds/square foot | Seeds/pound | PLS pounds/acre |
|---------------------|-------------------------------|-----------------|---------------------------|-------------|-----------------|
| Tall mannagrass | <i>Glyceria grandis</i> | 25 | 20 | 200,000 | 4.4 |
| Creeping spike rush | <i>Eleocharis palustris</i> | 25 | 20 | 900,000 | 1.0 |
| Baltic rush | <i>Juncus balticus</i> | 30 | 24 | 3,000,000 | 0.3 |
| Tufted hairgrass | <i>Deschampsia caespitosa</i> | 15 | 12 | 1,300,000 | 0.4 |
| Annual rye | <i>Lolium multiflorum</i> | 5 | 4 | 247,000 | 0.7 |
| Total | | 100 | 80 | | 6.8 |

5) Duck Creek Parking Areas

| Common Name | Species | Percent mix (%) | Desired seeds/square foot | Seeds/pound | PLS pounds/acre |
|-----------------------|----------------------------|-----------------|---------------------------|-------------|-----------------|
| Green Needle Grass | <i>Nassella viridium</i> | 25 | 20 | 181,000 | 5 |
| Slender wheatgrass | <i>Elymus trachycaulus</i> | 25 | 20 | 135,000 | 6.5 |
| Western wheatgrass | <i>Pascopyrum smithii</i> | 15 | 12 | 113,840 | 4.6 |
| Thickspike Wheatgrass | <i>Elymus lanceolatus</i> | 25 | 20 | 153,000 | 5.7 |
| Annual ryegrass | <i>Lolium multiflorum</i> | 5 | 4 | 247,000 | 0.7 |
| Total | | 100 | 80 | | 22.5 |

PART 3 Execution

- 3.1 Soil Preparation. Area soils identified for broadcast seeding methods shall be tilled and loosened with rototillers, disk harrows, or other soil preparation equipment which shall leave the soil with an irregular open surface. The soil surface shall be loosened to a depth of at least 1 inch (6 inches at Duck Creek parking area). The soil at the time of seeding shall be firm but not compact. The surface shall be loose and open, so that dry seeds may readily fall into soil spaces, and shall be reasonable free of large rocks, roots, and other material. Maintain appropriate distance from trees and shrubs while loosening soil to prevent damage to existing plants whenever possible.

- 3.2 Seeding Methods. Seeds shall be broadcast using a properly calibrated reciprocating spreader or a properly calibrated rotary spreader or similar equipment which is equipped with an agitator to ensure continuous mixing. The equipment used will be dictated by the width of the reclamation area and is at the discretion of the Contractor. All of the grass and forb seed intended for the seeding shall be combined in a barrel or other suitable container and thoroughly mixed prior to loading the seeder.
- 3.3 Raking and Packing. After seeding, the seed shall be raked or dragged into the soil surface to an average depth of 0.10 to 0.25 inch. Following raking, the seedbed shall be packed with a weighted roller or similar so that the seeds are firmly pressed into the soil.
- 3.4 Site Cleanup. Grading stakes, stones, trash, and other debris which may hinder maintenance of the seeding site shall be removed when seeding operations are completed. Clean up shall be completed by the seeding contractor before acceptance is given.
- 3.5 Performance Acceptance. Acknowledgment of acceptable performance shall be given by the owner, general contractor, landscape architect, or other person(s) authorized to inspect the seeding site upon the satisfactory completion of each segment. The seeding site shall be inspected within 36 hours of the completion of each segment unless specified otherwise.
- 3.6 Schedule. Seeding will be conducted after October 15, after the beginning of the period of dormancy to reduce germination rates. Seeding shall not occur when snow has accumulated on the seeding surface. If seeding occurs before the period of dormancy, an additional 1 pound/acre of annual ryegrass (*Lolium multiflorum*) or similar, shall be included in the seed mix.
- 3.7 Maintenance: No irrigation, mulching or fertiliation is specified for this seeding.

PART 4 Final Acceptance

- 4.1 Maintenance. ExxonMobil and ARCADIS will evaluate the planted areas in the spring following seeding. ARCADIS may require reseeding of any reclamation zones where the establishment of vegetative ground cover does not meet expectations.
- 4.2 Damages Disclaimer The seeding contractor shall not be held liable to repair damages incurred to the site as a result of materials not applied under the supervision of the seeding contractor, nor by vandalism, nor by acts of God.

END OF SECTION

BEZ/wp
Document4

CM/Scientist Oversight Duties

- 1) Coordinate with Contractor on seed mixture/willow acquisition and composition.
- 2) Using iphones and GPS coordinates locate and stake reclamation areas with seed mix types, willow planting areas.
- 3) Track Contractor procedures to ensure that sites are in fact harrowed, seeded at the proper rates, raked and rolled. Track seed application rates by lbs/linear feet of seed applied, noting any variances. Take photos of completed areas.
- 4) Inspect seeding areas and fill out RFF noting seed mixture actually applied, rates, and any variances.
- 5) Prepare any other documentation to approve contractors work as necessary for subcontract agreements.

Needs – 1 Full time scientist/landscape specialist for each reclamation seeding crew. Supervision – 1 Tech lead ½ time.

Needs – Data/GIS assistance to help with iphones, GPS location, track progress, photo-documentation.

Some admin assistance.



Appendix C

Photograph Log of Reclamation
Equipment

Project Name: ExxonMobil - Silvertip
City/State: Laurel, Montana



Photo No.: 1

Date: October 15, 2011

Description:
Harrowing.



Photo No.: 2

Date: October 15, 2011

Description:
Rake harrowing.

Project Name: ExxonMobil - Silvertip
City/State: Laurel, Montana



Photo No.: 3

Date: October 15, 2011

Description:
Seeding.



Photo No.: 4

Date: October 15, 2011

Description:
Broadcast seeder.

Project Name: ExxonMobil - Silvertip
City/State: Laurel, Montana



Photo No.: 5

Date: October 17, 2011

Description:
Disk.



Photo No.: 6

Date: October 17, 2011

Description:
Disk behind tractor.

Project Name: ExxonMobil - Silvertip
City/State: Laurel, Montana



Photo No.: 7

Date: October 17, 2011

Description:
Compacting soil and roller.