TINTINA RESOURCES BLACK BUTTE COPPER PROJECT

WETLAND SURVEY

SEPTEMBER 2011

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TINTINA RESOURCES BLACK BUTTE COPPER PROJECT
WETLAND SURVEY
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1.0 INTRODUCTION

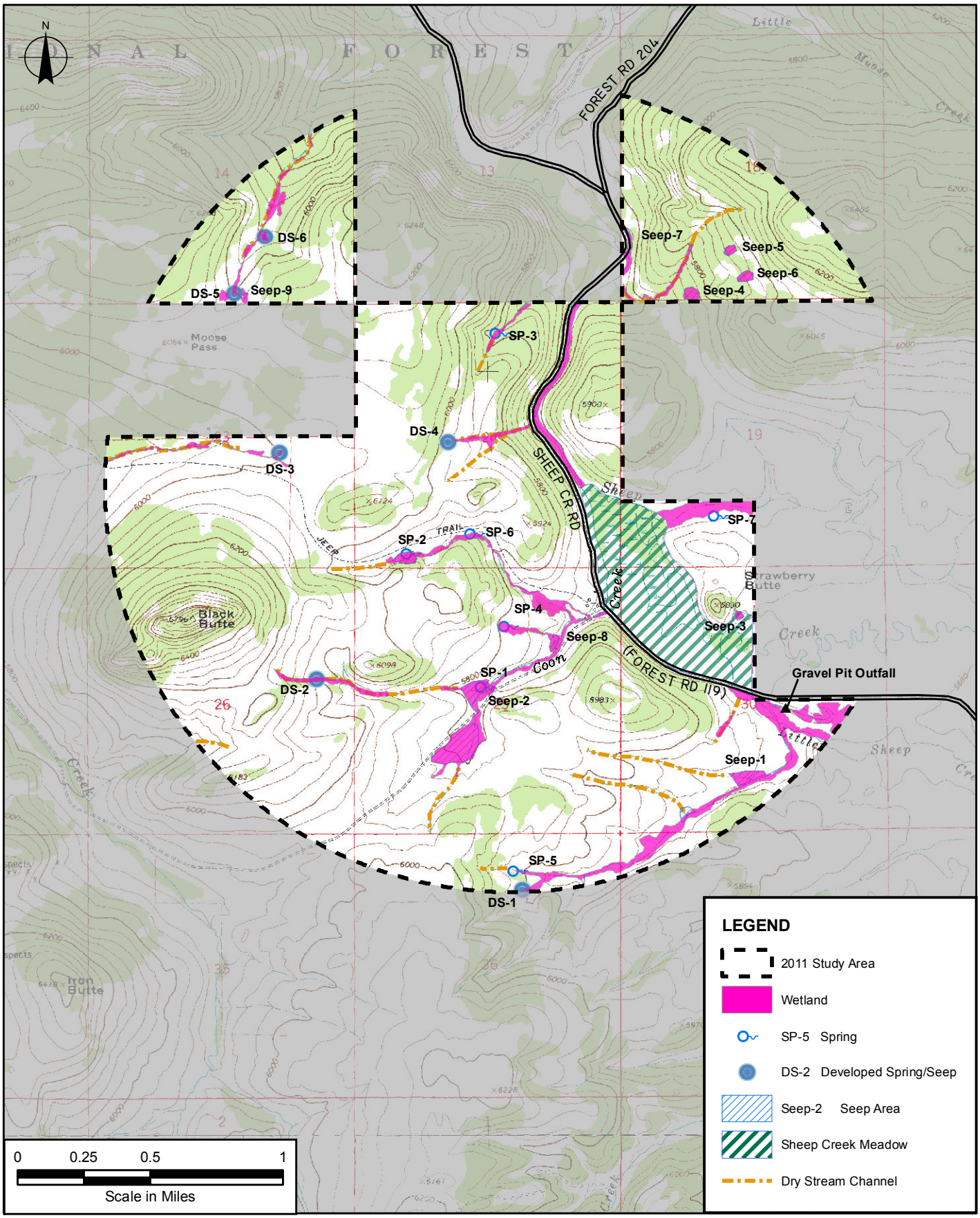
This report describes the results of the September 2011 Wetland Survey conducted for the Tintina Resources Black Butte Copper Project. The purpose of the investigation was to identify and document all wetland sites in the Black Butte Copper Project Study Area that might be subject to wetlands regulation, based on apparent hydrophytic vegetative cover and apparent site hydrology. Hydric soils, requiring more in-depth assessment, were not evaluated in this survey. The project study area is bounded within a 1.5 mile radius of the proposed exploration adit site, encompassing approximately 3,140 acres within portions of Sections 14, 23, 24, 25, 26, 35 and 36 of Township 12 North, Range 6 East and portions of Sections 18, 19, 30 and 31 of Township 12 North, Range 7 East in Meagher County, Montana. The results provide baseline information for future permitting activities. The wetland survey documented sites under late 2011 growing season conditions. This report provides a summary of the September 2011 Wetland Survey results.

2.0 SCOPE OF WORK

The September 2011 Wetland Survey included the following tasks:

- Review of preliminary results of the 2011 Sheep Creek Project Spring and Seep Inventory (Hydrometrics, 2011) prior to conducting the field survey to identify wetland sites;
- Review of Provisional Wetland and Riparian Area National Wetland Inventory Mapping (Montana Natural Heritage Program, 2010 and 2011) prior to the field survey to identify wetland sites;
- Review of Sheep Creek Project Biological Resources Report (Elliott, 2011) summaries of project study area aquatic habitats and wetland and riparian areas evaluated in support of the wetland survey;
- Review of available aerial photos prior to the field survey to identify wetland sites;
- Inspection of each drainage and wetland site within the study area;
- Documentation of wetland sites, including photographs;
- GPS logging of wetland site locations and boundaries;
- Identification, initial documentation and GPS logging of additional springs and seeps encountered during the site survey; and
- Compilation of GPS data in a GIS database.

The Black Butte Copper Project Study Area is shown in Figure 1, extending up to 1.5 miles out from the approximate location of the proposed exploration portal on public land and private lands under lease to Tintina Resources. This area encompasses the surrounding upland buttes and ridges, their ephemeral drainages and the lower lying perennial reaches of Sheep Creek (including Sheep Creek Meadow), Little Sheep Creek, and Coon Creek where they flow through wetlands in the project study area. There are two ephemeral headwater tributary drainages on the western edge of the study area within the Black Butte Creek watershed to the west. Wetlands on properties not leased by Tintina and other minor private parcels within or adjacent to the project study area were not surveyed.



Topographic map obtained from Montana NRIS (http://nris.mt.gov/nsdi/drgpages/tifstate.asp)

Hydrometrics, Inc. Consulting Scientists and Engineers Date Saved: 12/5/2011 1:39:21 PM	TINTINA RESOURCES BLACK BUTTE COPPER PROJECT	**SEPTEMBER 2011 WETLAND SURVEY**	**FIGURE** **1**

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3.0 SURVEY RESULTS

The Black Butte Copper Project Wetland Survey was completed September 5-8, 2011. The survey identified 28 wetland sites comprising approximately 268 acres associated with perennial streams (including Coon Creek, Little Sheep Creek and Sheep Creek), Sheep Creek Meadow, ephemeral drainages, and springs and seeps in the Black Butte Copper Project Study Area. The Black Butte Project Wetland Survey identified additional springs and seeps for assessment during October 2011 spring and seep inventory field activities. Wetland locations identified in the project study area are shown in Figure 1. Mapping of wetland locations and associated seeps/springs at a more interpretable scale is presented in a series of figures in Appendix A. Summary descriptions and areal estimates, cross-referenced with Appendix A wetland figures and 2011 spring and seep inventory data (Hydrometrics, 2011) are presented in Table 1.

Vegetation strata observed in the wetland sites included hydrophytic grasses, grasslikes (e.g., sedge), shrubs, and trees. Hydrologic indicators observed at these sites included perennial streamflow, evidence of ephemeral streamflow, standing water, saturated soils and evidence of early-growing season saturation. The most typical character of Black Butte Copper Project Area wetlands is hydrophytic vegetation (grass, grasslike and shrub) growing in linear riparian corridors on saturated soils along perennial and ephemeral drainages. These wetlands generally transition to wider, dry channels and swales in upper drainage reaches where wetland features (hydrophytic vegetation and supporting hydrology) become isolated and absent. This typical wetland (including W-1, -6, -11, -12, -13, -15, -21, -26), providing high quality habitat and site stability buffer, was observed in most project study area sections (except Sections 19 and 35) as detailed in Table 1 and corresponding Appendix A Figures 2 to 5 and 7.

Localized wetland enhancements were noted in the immediate area of all upper drainage springs, seeps, and springs/seeps developed to support livestock watering in most sections (except Sections 31 and 35). Wetlands identified in direct association with these features

TABLE 1. SUMMARY OF POTENTIAL WETLAND SITES

Wetland Site	Site Description	Wetland Area (acres)	Spring & Seep Site	Flow Rate (gpm)
Section 14, Township 12 North, Range 6 East (*see* Appendix A, Figure 2)				
W-1	Ephemeral drainage channel below DS-5/Seep-9, headwater tributary to Sheep Creek. Upper channel reaches wide, vegetated with upland grasses and hydrophytic grasses/grasslikes/trees at isolated hydric (surface water and saturated soils) segments. Lower channel reaches are dry, incised, defined bed, conifer forest and upland grasses/shrubs.	4.9	-----	-----
W-2	Isolated hillside seep upslope (west) of DS-5. Saturated soils vegetated with upland and hydrophytic grasses/grasslikes.	0.7	-----	-----
W-3	Hillside seep/spring complex upslope (east) of DS-5. Saturated soils and some surface water, vegetated with upland and hydrophytic grasses/grasslikes. Upper portion developed to supply DS-5 stock tank	0.7	DS-5 Seep 9	4.8 No flow
W-4	Hillside seep/spring complex upslope (east) of DS-6. Saturated soils vegetated with upland and hydrophytic grasses/grasslikes. Developed to supply DS-6 stock tank (abandoned, piped flow to ground discharge next to tank).	0.5	DS-6	1 (est.)
W-5	Hillside seep upslope (east) of W-1 channel. Saturated soils vegetated with upland and hydrophytic grasses, grasslikes, shrubs and trees.	1.1	-----	-----
	TOTAL	8.0		
Section 18, Township 12 North, Range 7 East (*see Appendix A,* Figure 3)				
W-6	Dry ephemeral drainage channel, no sign of flow, tributary to Sheep Creek. Upper/lower channel reaches are narrow; mid-drainage channel wider. Drainage vegetated with upland grasses and isolated hydrophytic grasses and trees.	0.2	-----	-----
W-7	Isolated hillside seep upslope (east) of drainage channel. Saturated soil vegetated with upland grasses/shrubs and hydrophytic grasses/trees.	0.9	Seep-5	0.5 (est.)
W-8	Isolated hillside seep upslope (east) of drainage channel. Saturated soil and some surface water, vegetated with upland grasses/shrubs and hydrophytic grasses/grasslikes/trees.	1.2	Seep-6	2-3 (est.)
W-9	Isolated hillside seep upslope (east) of drainage channel. Saturated soil vegetated with upland grasses/shrubs and hydrophytic grasses/grasslikes/trees.	1.4	Seep-4	No flow
W-10	Isolated hillside seep upslope (east) of drainage channel. Formerly saturated soil (dry now) vegetated with upland grasses/shrubs and hydrophytic grasses/grasslikes/trees.	0.2	-----	-----
W-11	Hillside seep on eastern side of County Rd 119 approx. 200 feet north of Sheep Creek bridge, feeds ditch drainage to Sheep Creek. Saturated soils vegetated with upland grasses and hydrophytic grasses, grasslikes and shrubs.	0.8	Seep-7	2-4 (est.)
	TOTAL	4.6		
Section 23, Township 12 North, Range 6 East (*see* Appendix A, Figure 4)				
W-12	Dry ephemeral drainage channel, headwater tributary to Black Butte Creek. Upper channel reaches wide, vegetated with upland grasses and hydrophytic grasses/grasslikes/trees at isolated hydric (surface water and saturated soils) segments. Lower channel reaches are dry, incised, defined bed/signs of flow, forest and upland grasses/shrubs.	3.3	-----	-----
W-13	Seep at headwater of W-12 channel. Formerly saturated soils vegetated with upland and hydrophytic grasses/grasslikes.	0.1	-----	-----
W-14	Dry seep complex developed to supply downslope stocktank. Vegetated with upland and hydrophytic grasses/grasslikes.	0.1	DS-3	2 (est.)
	TOTAL	3.6		
Section 24, Township 12 North, Range 6 East (*see* Appendix A, Figure 5)				
W-15	Isolated perennial drainage channel (to subsurface flow) below SP-3, incised flow channel in wider riparian corridor completely vegetated with upland grasses/shrubs/trees and hydrophytic grasses/grasslikes/shrubs/trees. Dry upper ephemeral channel reaches (above SP-3), no sign of flow, wide, vegetated with upland grasses/shrubs and hydrophytic grasses/grasslikes/trees at isolated hydric (saturated soil) segments.	2.0	SP-3	5.4
W-16	Ephemeral drainage channel from DS-4, tributary to Sheep Creek. Upper channel reaches wide, vegetated with upland grasses and hydrophytic grasses/grasslikes/shrubs/trees at isolated hydric segments (surface water and saturated soils). Lower channel reaches are dry, incised, defined bed/sign of flow, conifer forest and upland shrubs.	3.2	DS-4	<1 gpm (est.)
	TOTAL	5.2		
Section 19, Township 12 North, Range 7 East (*see* Appendix A, Figure 6)				
W-17	Ephemeral drainage channel below SP-7, tributary to Sheep Creek Meadow/Sheep Creek. Riparian corridor drainage, saturated soils vegetated with upland grasses and hydrophytic grasses, grasslikes and shrubs.	11.1	SP-7	2 (est.)
Sections 24, 25 and 26, Township 12 North, Range 6 East (*see Appendix A,* Figure 5)				
W-18	Coon Creek perennial drainage channel, tributary to Sheep Creek Meadow/Sheep Creek, fed by upgradient channel springs and seeps (including SP-1, Seep 2, Seep 8) and tributary drainages to the west and south. Coon Creek flows through an incised channel in a wider riparian corridor, saturated soils vegetated with upland grasses and hydrophytic grasses/grasslikes/shrubs/trees.	5.7	SP-1 Seep-2 Seep-8	37-47 (est.) 5 (est.) No flow
W-19	Perennial drainage channel below SP-2 and SP-6, tributary to Coon Creek. Incised flow channel in wider riparian corridor, saturated soils vegetated with upland grasses/trees and hydrophytic grasses/grasslikes/shrubs/trees.	11.8	SP-2 SP-6	9.4 1
W-20	Perennial drainage channel below SP-4 and seeps, tributary to Coon Creek. Incised flow channel in wider riparian corridor, saturated soils vegetated with hydrophytic grasses, grasslikes and shrubs.	3.8	SP-4	25
W-21	Ephemeral drainage channel below lower drainage seeps and upper drainage DS-2, tributary to Coon Creek. Lower drainage is a wider riparian corridor, saturated soils vegetated with hydrophytic grasses, grasslikes and shrubs transitioning to dry ephemeral drainage, wider, upland grass and shrub vegetation. Upper drainage reaches are more incised, vegetated with upland grasses/weeds/shrubs/trees and hydrophytic grasses/grasslikes/shrubs at isolated hydric segments (surface water and saturated soils), including DS-2 and seeps.	10.7	DS-2	-----
W-22	Coon Creek headwater complex of springs and seeps. Surface water and saturated soils vegetated with hydrophytic grasses, grasslikes and shrubs.	13.3	-----	-----
	TOTAL	45.3		
Sections 30, 31 and 36, Township 12 North, Range 6 East (*see* Appendix A, Figure 7)				
W-23	Seep at bottom of Strawberry Butte (east side) slope on northeast corner of Sheep Creek Meadow. Saturated soils vegetated with upland grasses and hydrophytic grasses, grasslikes and shrubs.	0.4	Seep-3	-----
W-24	Little Sheep Creek perennial drainage channels (including former gravel pit, GP-Outfall), tributary to Sheep Creek Meadow/Sheep Creek. Saturated soils vegetated with upland grasses and hydrophytic grasses, grasslikes and shrubs.	18.1	GP-Outfall	2105
W-25	Isolated dry hillside seep/drainage upslope (south) of Little Sheep Creek.Vegetated with upland and hydrophytic grasses.	1.1	-----	-----
W-26	Perennial drainage channel below SP-5, DS-1 and Seep-1 tributary to Little Sheep Creek. Diffuse flow channel in wider riparian corridor, saturated soils vegetated with upland grasses, grasslikes and hydrophytic grasses and shrubs.	22.7	SP-5 DS-1 Seep-1	17 No flow No flow
	TOTAL	42.3		
Sheep Creek Meadow (*see Appendix A,* Figures 5, 6, and 7)				
W-27	Sheep Creek Meadow is a complex of subirrigated hay fields and hydrophytic grass, grasslikes and shrub vegetation along the Sheep Creek drainage between the mine site (to the west) and Strawberry Butte (to the east).	146.9	-----	-----
Sheep Creek (*see* Appendix A, Figures 3 and 5)				
W-28	Sheep Creek perennial drainage downstream of Sheep Creek Meadow. Sheep Creek flows through an incised channel in a narrow shoreline riparian corridor of variable width, saturated soils vegetated with upland grasses/shrubs/trees and hydrophytic grasses/grasslikes/shrubs/trees.	1.1	-----	-----
	TOTAL	**268.1**		

include W-3, -4, -5, -14, -16, -17, -20, and -25 as detailed in Table 1 and corresponding Appendix A Figures 2, 4, 5, and 6. These wetlands are characterized by hydrophytic vegetation (grass and grasslike) stabilizing lower-gradient riparian sites on saturated soils that are subject to trampling by livestock.

Larger wetland complexes are present at upper Coon Creek (W-22) and lower perennial drainage locations on Coon Creek (W-18), Little Sheep Creek (W-24) and Sheep Creek Meadow (W-23 and W-27) in project study area Sections 24, 25, 19, and 30 as detailed in Table 1 and corresponding Appendix A Figures 5 to 7. These wetland complexes are characterized by hydrophytic vegetation (grass, grasslike and shrub) growing in broader, less-incised riparian sites on saturated soils in perennial drainages. These sites generally provide high quality habitat and buffer site stability.

Fringe forested wetland complexes comprising W-28 are present along Sheep Creek perennial streamflow through Sections 24 and 18 in the project study area as detailed in Table 1 and corresponding Appendix A Figures 3 and 5. These wetland complexes are characterized by hydrophytic vegetation (grass, grasslike, and shrub) dominated by coniferous forest in incised riparian sites on saturated soils. These sites generally provide high quality habitat and stream protection.

Wetlands located in the approximately 273 acre mine area include two spring-fed perennial drainages (W-19 and W-20) comprising approximately 16 total acres tributary to Coon Creek as detailed in Table 1 and corresponding Appendix A Figure 5. These sites include three springs supporting forested wetlands and grass/grasslike/shrub wetlands that provide high quality habitat and buffer site stability along narrow riparian corridors.

Fewer wetlands in the project area are isolated without a direct connection to perennial drainages. These wetlands (W-2 and W-7 through W-10) are associated with isolated hillside seeps located in Sections 14 and 18 as detailed in Table 1 and corresponding Appendix A Figures 2 and 3. These sites support grass and forested wetlands that provide high quality habitat.

Extensive upper drainage reaches that have no observed wetland characteristics (noted as Dry Stream Channel with no wetland coverage on Figures 3, 5, and 7) are found in Section 18, 24, 25, 26, and 30. These sites are typically broad swales composed of upland grasses and shrubs.

The Sheep Creek Biological Resources Report (Elliott, 2011) includes summaries of project study area aquatic habitats and wetland and riparian areas evaluated in August 2011 during a project wildlife study. The report describes the project area, project area habitats (including a list of dominant plants), and plant species of conservation concern.

4.0 REFERENCES

Elliott, J., 2011. Biological Resources Report, Sheep Creek Project, Meagher County Montana. August 2011.

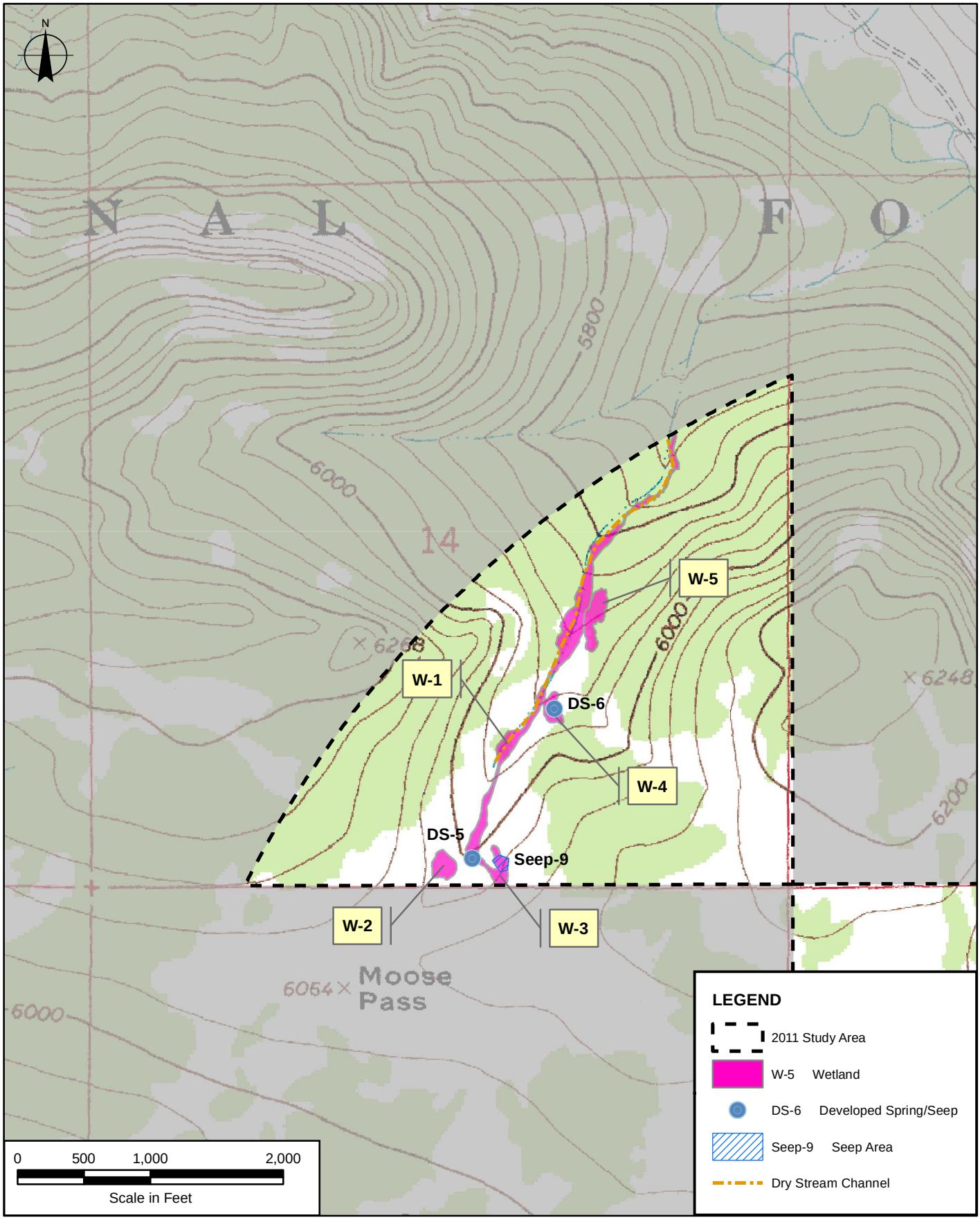
Hydrometrics, Inc., 2011. Tintina Resources Sheep Creek Project Spring and Seep Inventory. July 2011.

Montana Natural Heritage Program, 2010. Provisional Wetland and Riparian Area National Wetland Inventory Mapping, Strawberry Butte Quad, Quad Code 4611078. December 27, 2010. http://mtnhp.org/nwi/maps/29/4611078.pdf

Montana Natural Heritage Program, 2011. Provisional Wetland and Riparian Area National Wetland Inventory Mapping, Moose Mountain Quad, Quad Code 4611077. February 1, 2011. http://mtnhp.org/nwi/maps/29/4611077.pdf

APPENDIX A

WETLAND MAPPING
BLACK BUTTE COPPER PROJECT WETLAND SURVEY



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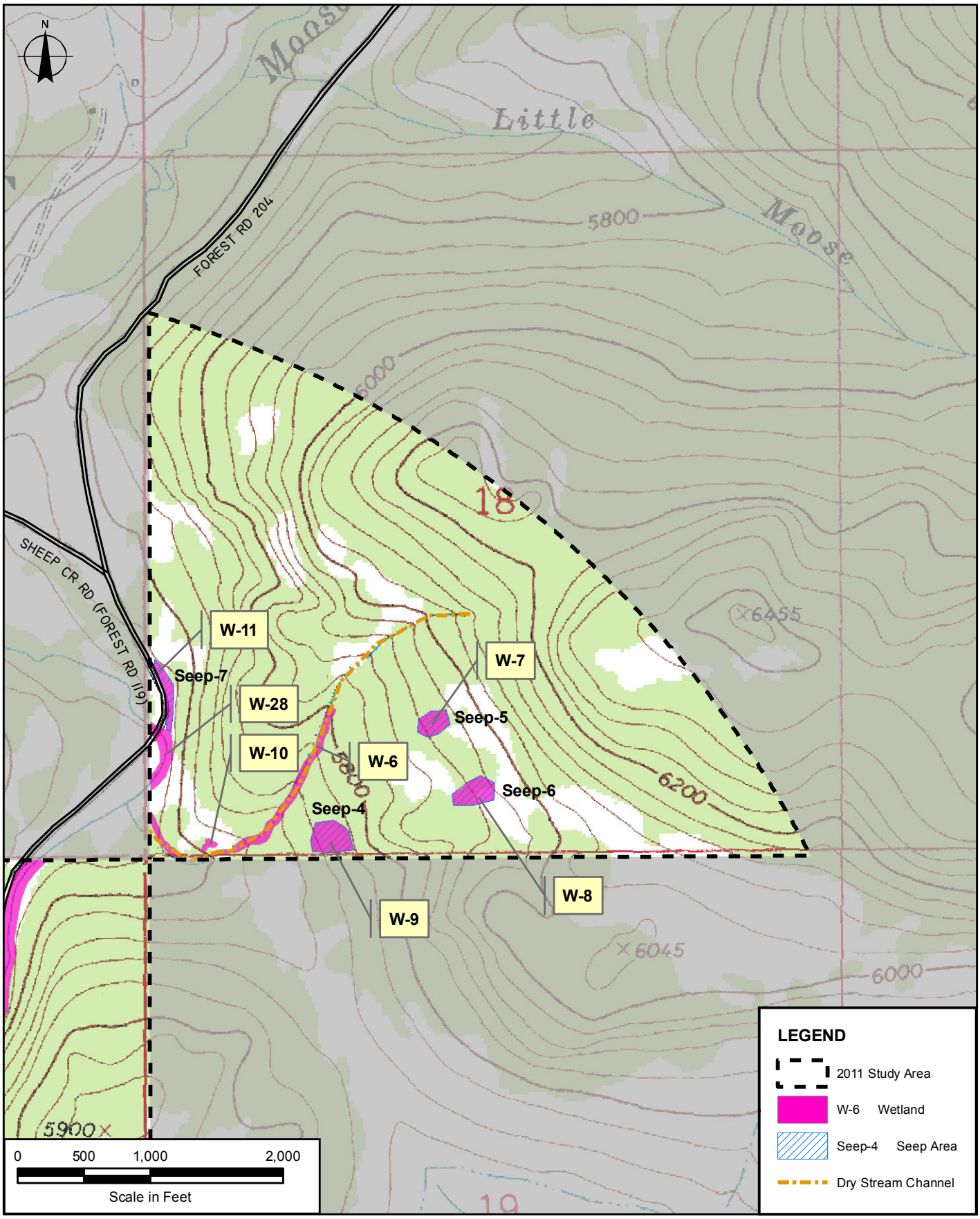

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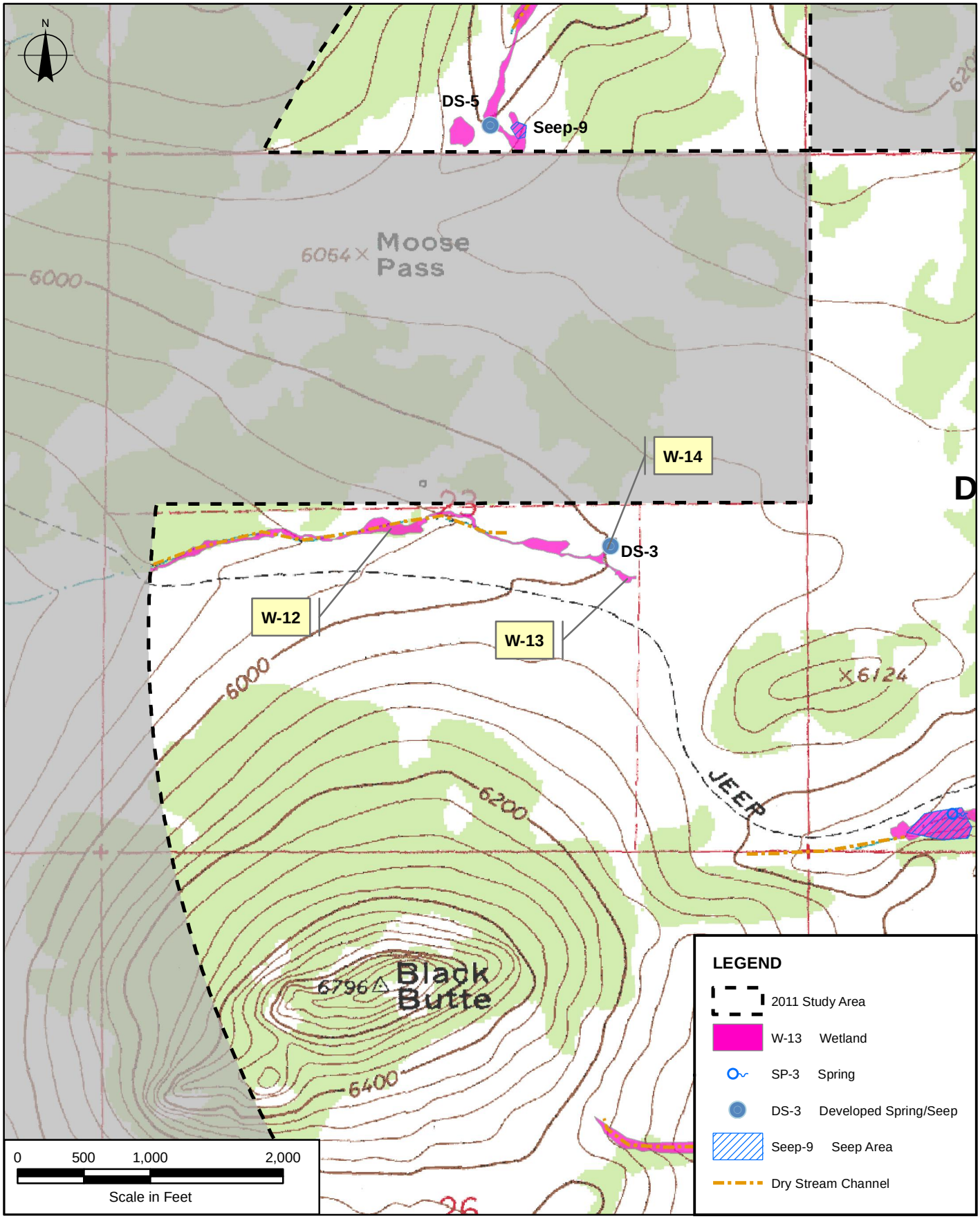

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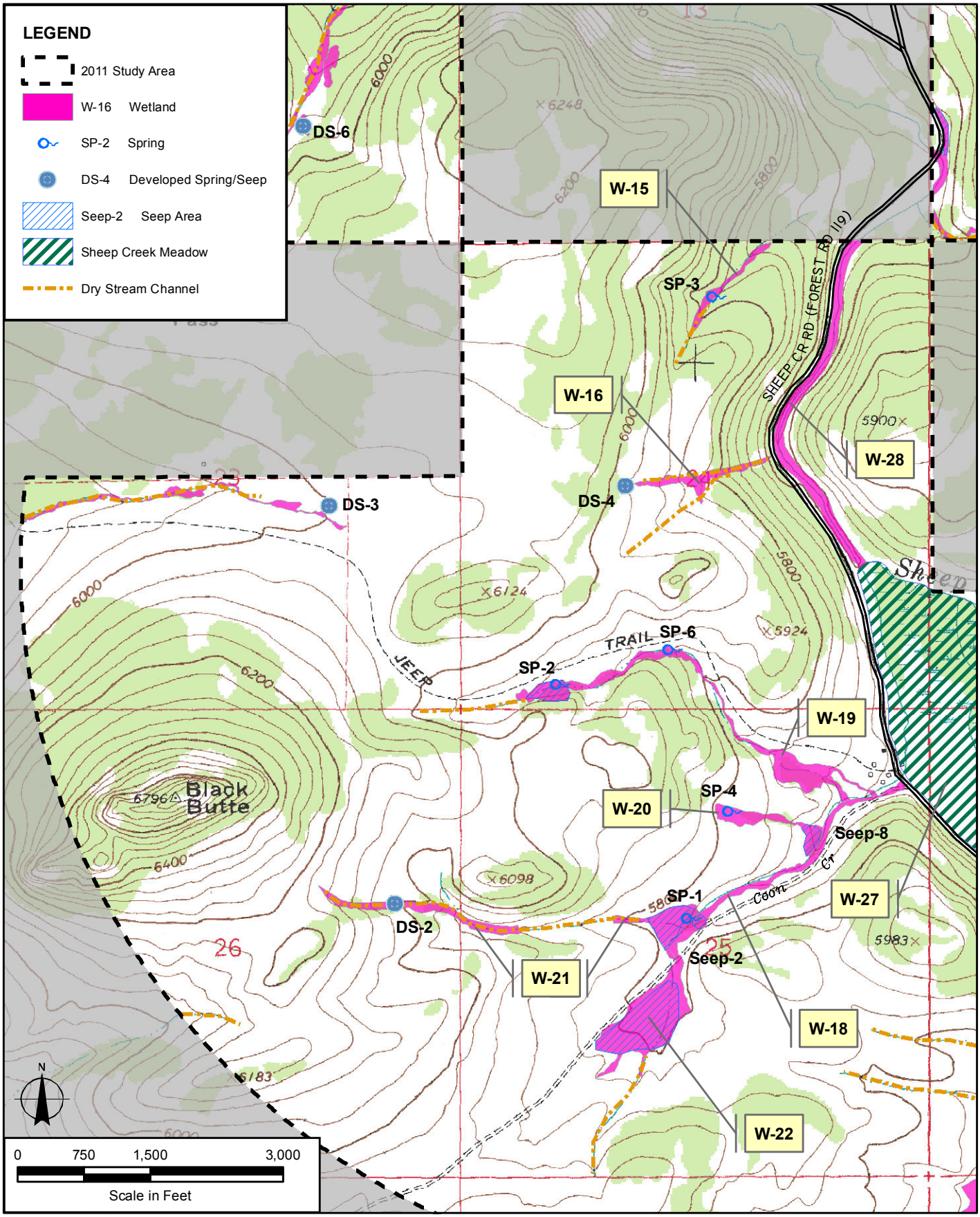

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FIGURE

5

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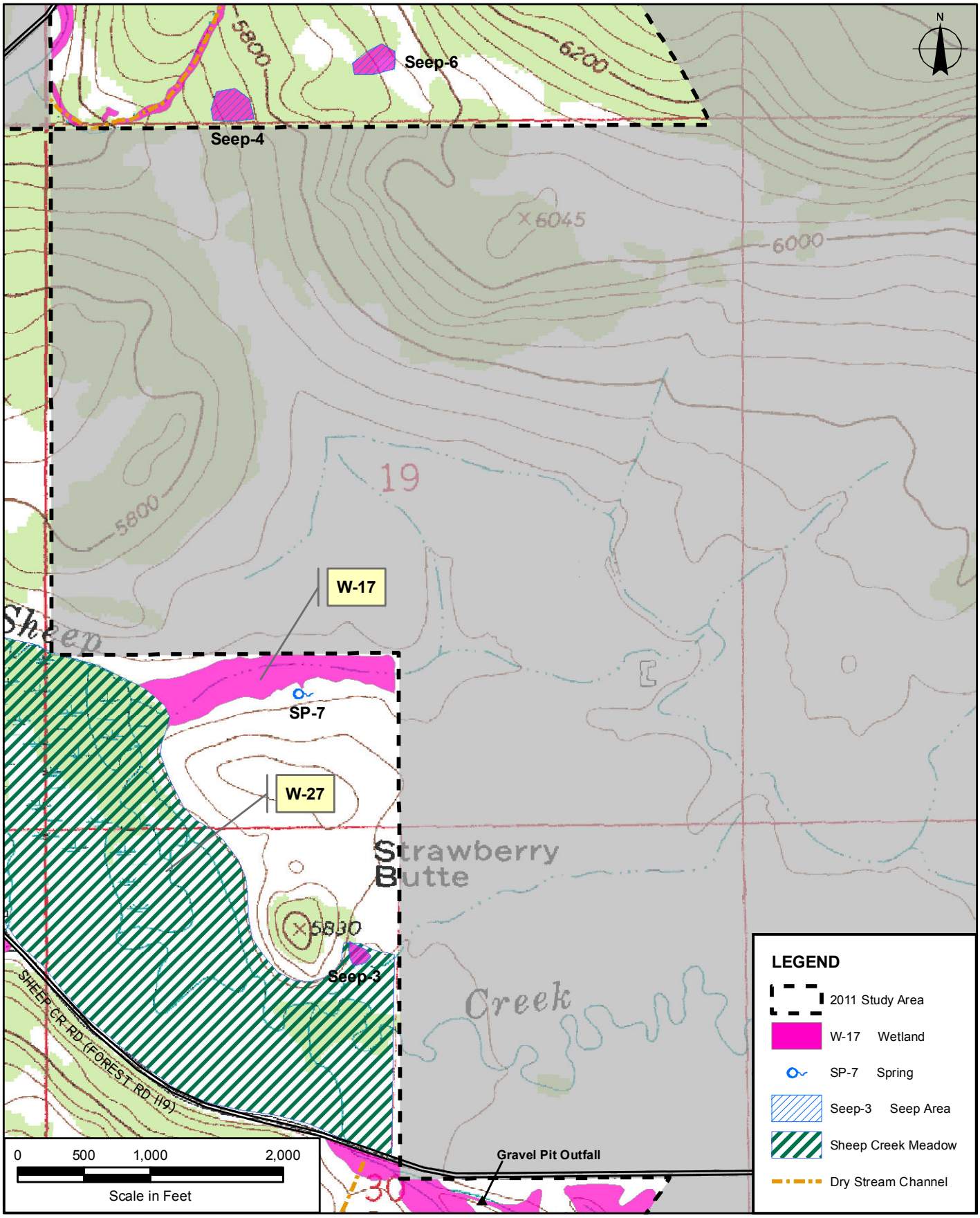

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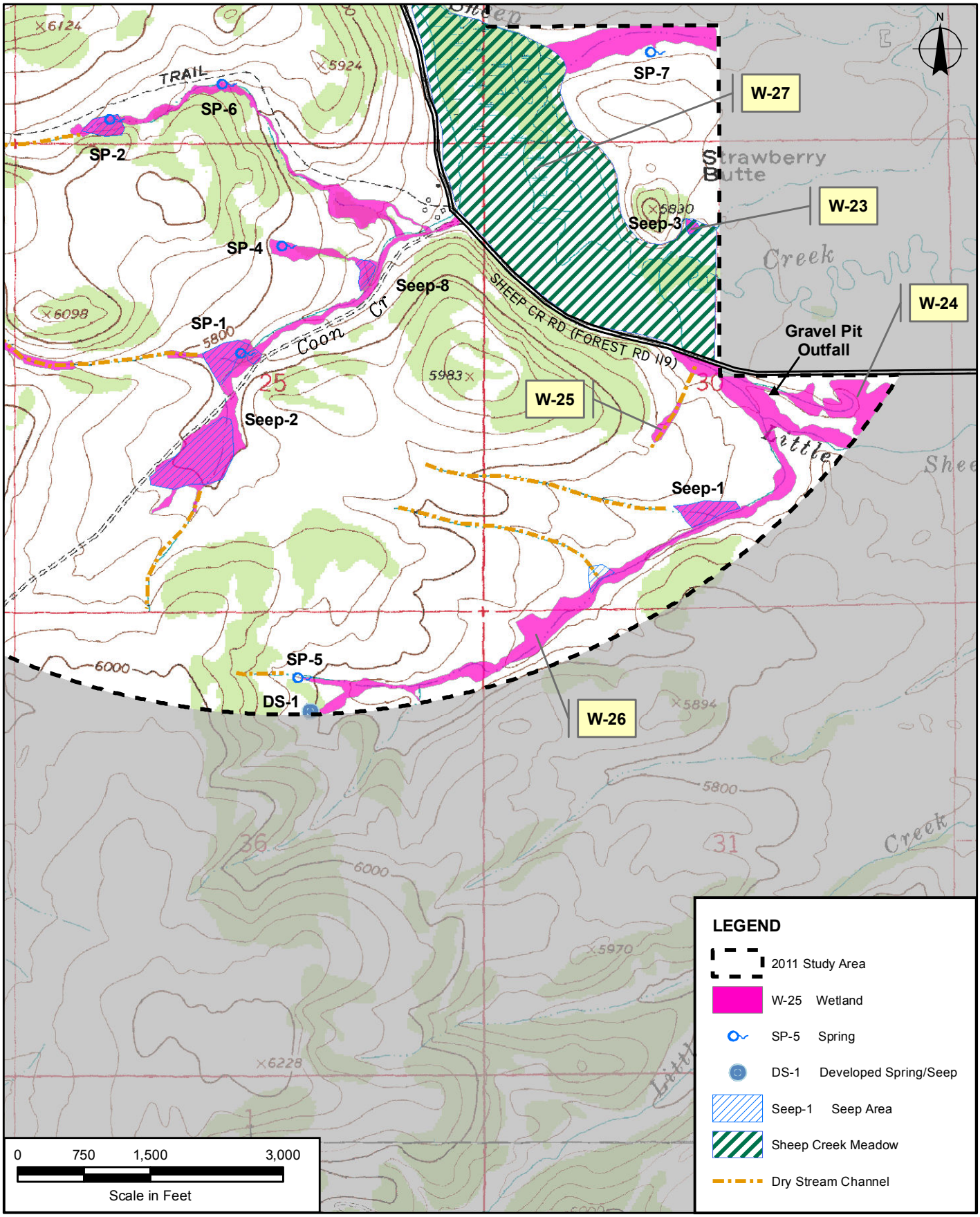

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