



Conservation Credit System

USER'S GUIDE

January ~~2024~~2025

Version 1.~~8~~9

Table of Contents

INTRODUCTION	5
USER REQUIREMENTS.....	5
HOW TO USE THE USER'S GUIDE.....	5
Desktop Analysis.....	6
DESKTOP ANALYSIS.....	7
TOOLS REQUIRED.....	7
DATA REQUIRED.....	7
ANTHROPOGENIC FEATURES EVALUATED DURING THE DESKTOP ANALYSIS	10
DEBIT PROJECTS: GUIDANCE FOR COMPLETING THE DESKTOP ANALYSIS	13
D1. Open the map template save as a new project.....	13
D2. Run Debit Tool 1.....	14
D3. Categorize the Type and Subtype of the Proposed_Surface_Disturbance_Debits layer	16
D4. OPTIONAL - Identify and delineate anthropogenic features proposed for modification or removal.....	17
D5. Run Debit Tool 2.....	17
D6. Acquire the ASUI layer from the Nevada Department of Wildlife (NDOW)	18
D7. Identify and delineate anthropogenic features.....	18
D8. Run Debit Tool 3.....	20
D9. Categorize existing features that overlap with proposed disturbance.....	21
D10. Run Debit Tool 4.....	22
D11. Divide Map_Units layer into discrete map units & populate attribute table	23
D12. Run Debit Tool 5.....	26
D13. Specify number of transects for each map unit.....	27
D14. Acquire an approved Transects layer from the SETT	27
D15. Run Debit Tool 6.....	28
D16. Add the exported data to the Debit Project Calculator	28
CREDIT PROJECTS: GUIDANCE FOR COMPLETING THE DESKTOP ANALYSIS.....	31
C1. Open the map template and save as a new project.....	31
C2. Run Credit Tool 1.....	32
C3. Divide Map_Units layer into discrete map units & populate attribute table	33
C4. OPTIONAL - Identify and delineate anthropogenic features proposed for modification	36
C5. Run Credit Tool 2.....	36
C6. Acquire the ASUI layer from the Nevada Department of Wildlife (NDOW).....	37
C7. Identify and delineate anthropogenic features.....	37
C8. Run Credit Tool 3.....	38
C9. Specify number of transects for each map unit.....	39
C10. Acquire an approved Transects layer from the SETT	40
C11. Run Credit Tool 4.....	41
C12. Add the exported data to the Credit Project Calculator	41
Field Data Collection Method	43

FIELD DATA COLLECTIONS METHODS	44
TIMING OF FIELD DATA COLLECTION	44
FIELD MATERIALS REQUIRED	44
DETAILED INSTRUCTIONS	47
F1. Conduct Site Reconnaissance	47
F2. Document Anthropogenic Features	47
F3. [Repeat Steps F4 - F12 for each Map Unit].....	48
F4. Complete Map Unit Datasheet	48
F5. Complete Resistance & Resilience Scorecard	48
F6. Complete Ability to Control Wildfire Scorecard	48
F7. Complete Lentic or Lotic PFC Checklist (if applicable).....	48
F8. [Repeat Steps F9 - F12 for each Transect]	49
F9. Navigate to Transect and Begin Data Collection	49
F10. Distance to Sagebrush Cover.....	53
F11. Line Intercept.....	53
F12. Daubenmire Plots.....	55
F13. Input Data into Credit or Debit Project Calculator	56
F14. Scan Datasheets.....	57
POST-FIELD SUBMITTAL.....	57
CREDIT/CREDIT OBLIGATION CALCULATION.....	60
TOOL PREREQUISITES	60
DETAILED STEPS TO CALCULATE CREDITS.....	60
APPENDICES.....	65
APPENDIX 1. GUIDANCE FOR DELINEATING ANTHROPOGENIC FEATURES	66
APPENDIX 2. GUIDANCE ON CLASSIFYING OVERLAPPING AND EXISTING ANTHROPOGENIC FEATURES.....	76
APPENDIX 3. GUIDANCE FOR DELINEATING MAP UNITS	82
APPENDIX 4. MINIMUM TRANSECTS PER MAP UNIT	87
APPENDIX 5. DEBIT TOOL OVERVIEW.....	92
APPENDIX 6. CREDIT TOOL OVERVIEW	96
APPENDIX 7. DATA DESCRIPTIONS.....	98

Figures

Figure 1: Name of the project folder	13
Figure 2: Project and File Geodatabase Structure	14
Figure 3: Debit Tool 1 interface	15
Figure 4: Example Attribute Table for 'Proposed_Surface_Disturbance_Debits' Layer	17
Figure 5: Debit Tool 2 interface	18
Figure 6: Debit Tool 3 interface	21
Figure 7: Debit Tool 4 interface	22
Figure 8: Example completed map unit attribute table.....	26
Figure 9: Debit Tool 5 interface	27
Figure 10: Debit Tool 6 interface.....	28
Figure 11: Export Tables generated and corresponding Calculator worksheet.....	29
Figure 12: Name of the project folder.....	31
Figure 13: Project and File Geodatabase Structure	32
Figure 14: Credit Tool 1 interface.....	33
Figure 15: Example completed Map_Unit attribute table	36
Figure 16: Credit Tool 2 interface.....	37
Figure 17: Credit Tool 3 interface.....	39
Figure 18: Credit Tool 4 interface.....	41
Figure 19: Export Tables generated and corresponding Calculator worksheet.....	42
Figure 20: Transect reflection examples (a. map unit boundary, b. stream, c. moving the transect 3 meters out of dense shrubs, reflecting other dense shrubs, and sampling through less-dense shrubs).....	50
Figure 21: Transect photo example	52
Figure 22: Diagram of transect and plots.....	55
Figure 23: Overview of the process steps to generate credits	61
Figure 24: Overview of the process to calculate credit obligation and acquire credits	61
Figure 25: The minimum transects required for sampling various map unit types on a power trend.	89

Tables

Table 1. Anthropogenic Features Considered in the Nevada Conservation Credit System with assigned weights and distances ^{t,t2}	10
Table 2. Attributes measured and summary of data collection methods	45
Table 3. Cover classes for use when estimating cover in Daubenmire frames	56
Table 4. Field Datasheets completed during the Field Data Collection and corresponding Calculator Worksheet	57
Table 5. Competing Land Uses reserve account categories and contribution percentages for credits on privately-owned land	63
Table 6. Ranking of all Anthropogenic Features by degree of impact	80

INTRODUCTION

The User's Guide describes the detailed steps necessary to calculate credits and credit obligations for ~~e~~Credit and ~~D~~ebit ~~s~~ites ~~p~~rojects, respectively. ~~Debit P~~rojects must use the Conservation Credit System if they are located in or within 6km of Greater Sage-grouse (*Centrocercus urophasianus*; hereafter GRSG) habitat for ~~the~~in Nevada ~~Conservation Credit System~~.

USER REQUIREMENTS

The User's Guide is intended for use by the Credit System Administrator, Technical Support Providers, and Verifiers to calculate credits and credit obligations. Evaluating credit or debit projects requires moderate GIS capabilities. Completing field data collection requires substantial knowledge of sage-grouse biology and extensive experience with field data collection methods, including identification of Great Basin plant species. ~~Additionally, In addition, there are~~ specific software requirements must be met (as defined at the beginning of each section), including an ESRI ArcGIS Pro license with the Spatial Analyst extension and Microsoft Excel 2007 or later.

HOW TO USE THE USER'S GUIDE

The User's Guide is organized into three major steps summarized below. All steps should be executed in the sequence listed—unless the user has extensive experience and a deep understanding of the process steps—~~in order~~ to ensure accurate calculation of credits and credit obligations and take advantage of efficiencies built into the design of the User's Guide.

1. **Desktop Analysis:** The pre-field Desktop Analysis should be completed first, because (a) the Desktop Analysis informs the sampling protocol used in the field analysis, and (b) ~~the Desktop Analysis~~ it pre-screens credit project sites to ensure that they meet the credit site eligibility requirements (see the Credit System Manual for more on credit site eligibility) before investing significantly more resources to collect field data. The Desktop Analysis should be re-run after field data have been collected and all aspects of the analysis, ~~have been finalized and verified,~~ such as the map units and the anthropogenic features, have been finalized and verified. Useful information related to the Desktop Analysis is included in appendices ~~of~~to this User's Guide—please review ~~these~~ appendices carefully if ~~you are~~ unfamiliar with the Desktop Analysis.
2. **Field Data Collections Method:** The Field Data Collection Method can be conducted after the Desktop Analysis. Map units and transect locations may need to be revised during the field visit, which ~~may would~~ require portions of the Desktop Analysis to be rerun.
3. **Credit/Credit Obligation Calculation:** The complete Credit/Credit Obligation calculation can only be performed after ~~completing~~ both the Desktop Analysis and Field Data Collection Methods have been completed. ~~However,~~ it is possible to generate ~~some~~ partial estimates of the credit/credit obligation calculation for specific situations that may be of interest in particular situations (e.g., projected local-scale function, site- scale ~~habitat~~ function) once required data for those elements are available.

Desktop Analysis

DESKTOP ANALYSIS

TOOLS REQUIRED

~~In order to~~To complete the Desktop Analysis, the following tools are required:

- ESRI ArcGIS Pro version 3.1 or later
- Spatial Analyst extension license
- Python 3.9 or later (automatically installed with ArcGIS Pro)
- Microsoft Excel (2007 or higher)
- Credit or Debit Project Calculator Version 1.98
- Management Plan and Validation Checklist (~~C~~redit ~~P~~rojects only)
- *Recommended:* Nevada Conservation Credit System Manual and HQT Scientific Methods Document for reference

DATA REQUIRED

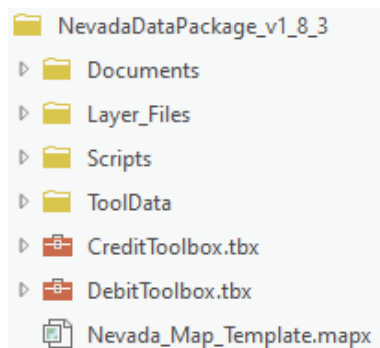
The following data should be acquired before beginning the Desktop Analysis:

1. Download and extract the compressed file **NevadaDataPackage_v1_98.zip** to a location on the computer's hard drive. ~~We recommend saving~~Save the Nevada Data Package locally, ~~as~~ opposed to an external server, ~~for to improved~~ processing time. The Nevada Data Package is available at: <https://dcrftp.ndep.nv.gov>.

Username: SET_public

Password: SET@1234

The contents should appear as shown below.



- ~~A helpful starting point in delineating wet meadows for identifying stringer and riparian areas at smaller scales is the MVRN1e shapefile (Saito 2020, available at <https://www.dri.edu/project/wetland-mapnvnew/>) called NV_Wet_Meadows in the Nevada_Map_Template, though meadow delineations should ultimately be confirmed with aerial imagery and later in the field.~~

- ~~A product description as well as the original shapefiles are also available at: <https://www.dri.edu/project/mrvn/>~~

2. Download supplemental data sources:
 - ~~A helpful starting point in delineating wet meadows for identifying stringer and riparian areas at smaller scales is the MVRN1e shapefile (Saito 2020, available at <https://www.dri.edu/project/wetland-mapnvnew/>) called NV_Wet_Meadows in the Nevada_Map_Template, though meadow delineations should ultimately be confirmed~~

with aerial imagery and later in the field.

- o A product description as well as the original shapefiles are also available at: <https://www.dri.edu/project/mrvn/>

- Synth Map 2008 (or most recent version):** Use as a supplemental data source for delineating map units. Available at <https://heritage.nv.gov/documents/a-synthesis-of-vegetation-maps-for-nevada-initiating-a-living-vegetation-map>. Download the 'Vegetation Index GIS data' and unzip the folder to the desired location. Add the layer file (.lyr) and set the data source as the shapefile (.shp).
- o **Sage-grouse Initiative (SGI) Mesic Resources Maps:** Use the SGI mesic resources maps to assist in delineating meadows. To access the Mesic Resources Layer in ArcGIS:
 - Install ~~this the following~~ ArcGIS Server: Select the Insert tab > click the Connections button > Server > from the Insert menu, navigate to Server > New WMTS Server. Enter <http://map.sagegrouseinitiative.com/wmts.xml> into the internet server box then click Ok.
 - Use the data from the above server: In the Catalog pane, navigate to Servers > WMTSGate on map.sagegrouseinitiative.com > WMTSGate > Mesic Resources – Persistence.
 - Further information can be found at <https://map.sagegrouseinitiative.com>.
 - o **SSURGO (Soil Survey Geographic Database):** Use the web soil survey data to assist with delineating map units based on ecological site descriptions. Available at <http://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx>. Download soils data either by navigating to appropriate county and select the most appropriate soils survey based on description or by defining ~~area~~ Area of interest (AOI) and downloading data for the AOI ~~(Area of Interest)~~.
 - o **USGS Topographic Maps:** Use to assist with delineating map units ~~for assistance in delineating map units~~. In ArcGIS, go to Map > Layer > Add Data > Data > Portal > 'ArcGIS Online'. Search for USA Topo. Click "Add" for the most recent version. Also available at <http://nationalmap.gov/ustopo/>.
3. Acquire field data sheets and guidance for the scorecards, located in the Appendices.
 4. Acquire the **'Proposed Surface Disturbance'** or **'Credit/Project Boundary'** shapefile or feature class. This is ~~the the geographic area that is~~ being proposed as the debit or credit project and should be provided by the project proponent. If the proposed surface disturbance or ~~credit~~ project boundary shapefile or feature class is not provided, follow the steps below to create it. Ensure ~~you have~~ sufficient information is acquired to accurately digitize this layer.
 - a. For eCredit Projects:
 - i. Create a new feature class, type— "Polygon Features". Name this file **'Credit_Project_Boundary'**.
 - ii. Start an editing session by right-clicking on the layer in the Table of Contents, clicking 'Edit Features', then 'Start Editing'.
 - iii. Digitize the area of land on which credits can be generated. For example, areas not designated within management categories are to be excluded as well as lands not eligible to be included in the project. Be sure to save edits ~~and stop editing~~ when done.
 - b. For Ddebit Projects:
 - i. Proceed with the Desktop Analysis, a template feature class will be created ~~for~~

- ~~you.~~
5. ~~You will need to acquire~~ Acquire the '**Abundance and Space Use Index**' (ASUI) layer from the Nevada Department of Wildlife (NDOW) by submitting a Data Request Form, available from the NDOW website at <https://www.ndow.org/blog/gis-data/>. ~~You will be prompted to request this information and~~ During the Desktop Analysis a prompt to request this information will appear and a required shapefile will be generated ~~for you~~. For Debit ~~projects~~ Projects, see step D6 for more information. For Credit ~~projects~~ Projects, see step C6.
 6. Transect locations will be provided by the SETT for ~~er~~ Cedit and ~~d~~ Debit ~~p~~ Projects. For Debit ~~projects~~ Projects, see step D13 for more information. For Credit ~~projects~~ Projects, see step C10.

ANTHROPOGENIC FEATURES EVALUATED DURING THE DESKTOP ANALYSIS

Table 1 contains the codes and indirect effect weights and distances of anthropogenic features. This table is referenced throughout the Desktop Analysis to evaluate impacts from existing and proposed anthropogenic features. It is provided here for quick reference.

Table 1. Anthropogenic Features Considered in the Nevada Conservation Credit System with assigned weights and distances^{t,t2}

TYPE	SUBTYPE	TYPE CODE ^t	SUBTYPE CODE ^t	WEIGHT (%)	DISTANCE (Meters)
Towers	Communications ¹	Towers	Communications	75%	6,000 m
	Meteorological	Towers	Meteorological	75%	6,000 m
Powerlines ^{2,4}	Nest Facilitating	Powerlines	Nest_Facilitating	75%	6,000 m
	Non-Nest Facilitating	Powerlines	Non_Nest_Facilitating	25%	6,000 m
Mines	Active – Large	Mines	Active_Large	100%	6,000 m
	Active – Med or Small	Mines	Active_Small	100%	3,000 m
	Inactive – Large	Mines	Inactive_Large	50%	1,000 m
	Inactive – Med or Small	Mines	Inactive_Small	10%	1,000 m
	Ancillary – Large	Mines	Active_Large_Ancillary	50%	3,000 m
	Ancillary – Med or Small	Mines	Active_Small_Ancillary	50%	1,500 m
Oil & Gas Wells	Producing	Oil_Gas	Producing	100%	3,000 m
	Inactive	Oil_Gas	Inactive	0%	0 m
Urban, Suburban, Ex-Urban Development ^{2,3}	Med – High	Urban	High	100%	6,000 m
	Low	Urban	Low	75%	3,000 m
Roads	Interstate	Roads	Interstate	100%	6,000 m
	High Use – Paved or Improved; Commercial	Roads	High_Use	100%	3,000 m
	Low Use – Improved; Local	Roads	Low_Use	25%	1,000 m
Railways	Railways	Railway	Railway	100%	3,000 m
Renewable	Geothermal	Renewable	Geothermal	100%	6,000 m
	Ancillary – Geothermal	Renewable	Geothermal_Ancillary	50%	3,000 m
	Solar	Renewable	Solar	25%	1,000 m
	Wind	Renewable	Wind	25%	6,000 m

Linear Rights of Way	LROW – High	LROW	LROW_High	50%	1,000 m
	LROW – Low	LROW	LROW_Low	25%	500 m
Mineral Exploration⁴	Mineral Exploration	Exploration	Exploration	100%	0 m
Other Disturbance	Other -High ^{5,4}	Other	Other_High	75%	6,000 m
	Other – Medium ^{6,5}	Other	Other_Medium	50%	3,000 m
	Other – Low ^{7,6}	Other	Other_Low	25%	1,000 m
	No Indirect Disturbance	Other	No_Indirect_Dist	100%	0 m

¹This category includes satellites, large telescopes, and other antennas for communication or broadcasting.

²The project proponent may request to review and adjust the weight and distance criteria based upon powerline height, construction, perch deterrents or other site-specific factors. Any requests must be submitted to the Administrator and approved by the Scientific Committee.

³The Urban Low classification includes landfills.

⁴Mineral exploration is a special case of impact type and includes exploration associated with CCS defined disturbance within Table 2, including mining, oil and gas, renewable, etc. Additional information is provided throughout this guide for this type of impact.

⁵ Examples include: Structures that could be used as perching and nesting by ravens; consistent or continuous noise; subsidies that would act as predator attractants; continuous activity and other attributes that suggest large-scale disturbance. The SETT intends to capture the majority of disturbances within the provided weights and distances. If warranted, the SETT may determine the 75% weight for the High category be adjusted to 100% under certain circumstances. The SETT would bring any proposed disturbances that may warrant a 100% weight to the SEC for consideration.

⁶Examples include: Disturbances that are minimized using measurable methodologies; intermittent or less continuous noise and activity.

⁷Examples include: Disturbances that do not exhibit significant indirect impacts; general presence of infrastructure, direct habitat loss, and potential for invasive weed spread from ground disturbance will be the primary impacts expected.

⁸When digitizing anthropogenic features or categorizing proposed surface disturbance, the Type and Subtype attributes must be exactly the same as the Type and Subtype codes provided in this table, including capitalization. To aid in digitization, editing templates have been provided.

¹²All above-ground facilities associated with the anthropogenic feature are classified as the type and subtype of the feature it is associated with. Substations that are associated with a LROW feature should be classified according to the height and width criteria that classifies whether a feature falls within a Low or High LROW.

¹³The project proponent may request to review and adjust the weight and distance criteria based upon powerline height, construction, perch deterrents or other site specific factors. Any requests must be submitted to the Administrator and approved by the Scientific Committee.

~~²The Urban Low classification includes landfills.~~

~~¹When digitizing anthropogenic features or categorizing proposed surface disturbance, the Type and Subtype attributes must be exactly the same as the Type and Subtype codes provided in this table, including capitalization. To aid in digitization, editing templates have been provided.~~

~~³Mineral exploration is a special case of impact type and includes exploration associated with CCS-defined disturbance within Table 2, including mining, oil and gas, renewable, etc. Additional information is provided throughout this guide for this type of impact.~~

~~⁴Examples include: Structures that could be used as perching and nesting by ravens; consistent or continuous noise; subsidies that would act as predator attractants; continuous activity and other attributes that suggest large scale disturbance. The SETT intends to capture the majority of disturbances within the provided weights and distances. If warranted, the SETT may determine the 75% weight for the High category be adjusted to 100% under certain circumstances. The SETT would bring any proposed disturbances that may warrant a 100% weight to the SEC for consideration.~~

~~⁵Examples include: Disturbances that are minimized using measurable methodologies; intermittent or less continuous noise and activity.~~

~~⁶Examples include: Disturbances that do not exhibit significant indirect impacts; general presence of infrastructure, direct habitat loss, and potential for invasive weed spread from ground disturbance will be the primary impacts expected.~~

DEBIT PROJECTS: GUIDANCE FOR COMPLETING THE DESKTOP ANALYSIS

This section describes the process required to assess a ~~debit~~ **Debit project**. Only a Desktop Certified Verifier should run these tools. The tools provided in the Debit Toolbox are intended to facilitate the assessment of Debit Projects, but user input is required. ~~User input is required.~~ **Please read each step carefully.** User tips are provided for each step, some of which may be essential for successfully completing certain tasks~~required to successfully complete the step in certain circumstances.~~ We recommend reviewing this guide in its entirety before starting.

Each tool will add one or more feature classes to the default file geodatabase. Subsequent tools require these feature classes ~~in order~~ to run. **Do not modify or rename these feature classes.** Only outputs that are added to the Table of Contents and map display should be edited.

If ~~you have already delineated~~ map units and/or current anthropogenic features are already delineated, you will be able to use those layers can be used in this process. There is no need to recreate those layers. You do not need to re-create those layers. If you have map units are already delineated map units, instructions will be the subsequent steps are provided in step If current anthropogenic features you have already been digitized ~~current anthropogenic features, instructions will be, the subsequent steps are provided in ~~s~~Step D7.D11. If ~~you have current anthropogenic features are already digitized current anthropogenic features, instructions will be~~ the subsequent steps are provided in ~~s~~Step D7.~~

For a description of the tools and the calculations performed by the automated tools ~~are completing~~, refer to [Appendix 5. Debit Tool Overview](#).

D1. Open the map template save as a new project

- D1.1** In the NevadaDataPackage_v1_89 folder, double-click the Nevada_Map_Template to open it in ArcGIS Pro.
- D1.2** Save the project using the naming convention ProjectName_YYYYMMDD (Project > Save Project As).- ArcGIS Pro will typically create a project folder and default Geodatabase to store the analysis. ~~If it does not then create a project folder and Geodatabase prior to beginning. You will submit~~ This Project Folder and the Geodatabase is submitted to as a zipped folder (.zip) to the Credit System Administrator along with the Project Calculator as zipped folder (.zip).

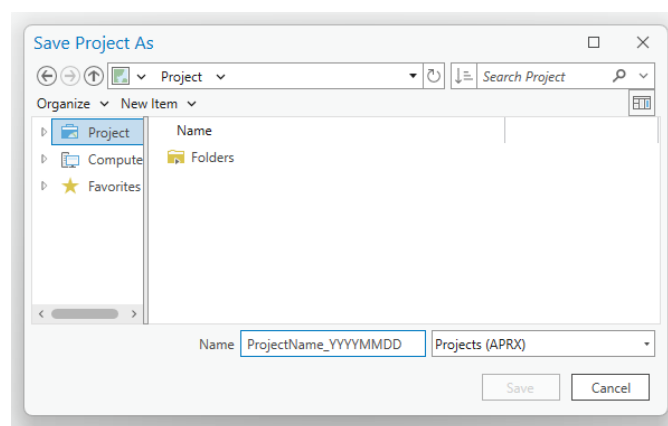


Figure 1: Name of the project folder

- D1.3** Add the Debit Toolbox to the project by right-clicking on the parent Toolboxes (📁) in the

Catalog window and selecting 'Add Toolbox'. Navigate to the Toolbox saved in the Nevada Data Package (see [Data Required](#) Section) and ~~click-select~~ 'Open'OK'. The toolbox should now be available in the list of toolboxes.

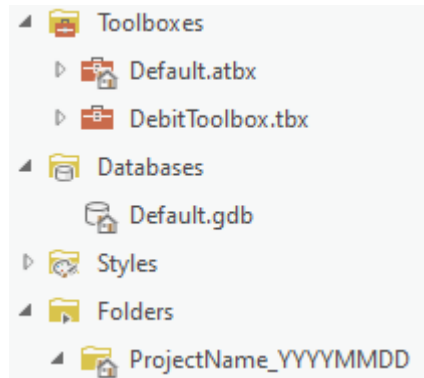


Figure 2: Project and File Geodatabase Structure

Tips

- When creating folder names and file names, use only letters, numbers, and underscores. Do not use other characters. Do not start file names with a number. Some tools will not run properly if there are periods, hyphens, or other symbols in the folder or file names. ~~Some tools may not run properly if the file name is too long. If you have issues with a the tool is not completing, your the file name may be too long.~~

D2. Run Debit Tool 1

[Toolboxes > DebitTools > Debit Tool 1]

~~Project Folder = you may need to create a new folder to store the output from the debit tools. This is where your project Geodatabase will live.~~

- Project Geodatabase** = the default project geodatabase ~~for this project~~, located in the project folder. ~~You can use the "default.gdb" in the project folder or create a new geodatabase.~~ Right click on the project folder and select 'New File Geodatabase' to create a new file geodatabase. Make sure to follow the same naming convention mentioned above in D1.2.
- Proposed Surface Disturbance** = a shapefile or feature class of ~~the area of~~ the proposed surface disturbance area. If no feature class or shapefile is provided, a template will be created ~~for you~~. Note: for exploration projects, a Plan of Operations Project Area or an appropriate pre-determined spatial area can be used, additional clarification for exploration can be found in Appendix 1.
- Debit Project will remove or modify existing anthropogenic features? (optional)** = 'check' if the ~~Debit p~~Project proposes to remove or mitigate existing anthropogenic features. **DO NOT** check this box if the project is expanding or upgrading an existing feature. ~~only check this box when the project will remove or mitigate the impact of an existing anthropogenic feature.~~
- Proposed Modified Features (optional)** = ~~Provide~~ a shapefile or feature class that outlines the specific anthropogenic features to be modified or removed. If no shapefile is provided, a template will be created ~~for you~~. If the project is expanding or upgrading an existing feature, leave this blank.

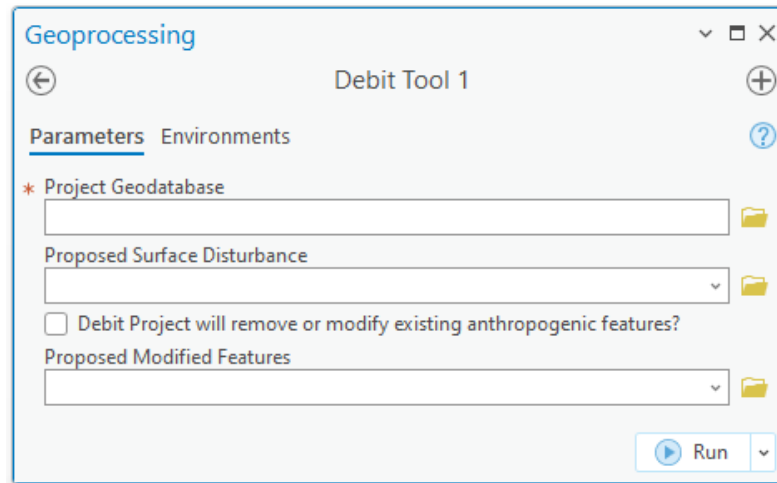


Figure 3: Debit Tool 1 interface

Debit Tool 1 Output:

- [Proposed Surface Disturbance Debits Layer](#)
- [Proposed Modified Features \(Optional Proposed Modified Features Output\)](#)

Tips

- Do NOT use a PoO, full Plan Boundary, or full construction ROW widths for disturbance. Often a construction ROW is many times greater than what the actual disturbance will be. Delineate the actual disturbance that will be put on the ground. See *Mineral Exploration in Appendix A1* for when an exception may be in order.
- If the '**Proposed_Surface_Disturbance**' provided by the project proponent is represented by multiple shapefiles, use the Merge tool to merge-combine the shapefiles into a single feature class. Ensure you are using the 'as built' shapefile of the footprints for for the proposed disturbance layers is being used. ~~Do NOT use a PoO, full Plan Boundary, or full construction ROW widths for disturbance. Often a construction ROW is many times greater than what the actual disturbance will be. Delineate the actual disturbance that will be put on the ground. what will actually be put on the ground individually. See Mineral Exploration in Appendix A for when an exception may be in order.~~


[Geoprocessing > Toolboxes > Data Management Tools > General > Merge]

- Input Datasets = All shapefiles representing the '**Proposed_Surface_Disturbance**'
- Output Dataset = '**Proposed_Surface_Disturbance**'
- Field Map = leave as default.
- Overlapping polygons must be removed from the '**Proposed_Surface_Disturbance**' layer provided by the project proponent before running Debit Tool 1. Use the Intersect tool to determine if the layer contains overlapping polygons.

[Geoprocessing > Toolboxes > Analysis > Overlay > Intersect]

- **Input Features** = '**Proposed_Surface_Disturbance**'
- **Output Feature Class** = append '_Merged' to feature class name
- **Attributes To Join** = ALL
- **Output Type** = INPUT
- If overlapping polygons are present, remove any areas of overlap. Select an overlapping polygon. Select the **Clip tool** in the Editor toolbar (Edit > Tools > Clip). A dialog box will pop up. Leave the Buffer Distance = 0.0 and select 'Discard the area that intersects', then

select 'Clip'. Any polygon portions overlapping the selected polygons will be deleted. Repeat for all overlapping polygons. Consult the project proponent if unsure about how to categorize overlapping areas.

- Ensure snapping is enabled (add the Snapping Toolbar if necessary). Also ensure 'Snap to Sketch' is enabled once in your an editing session, this will allow you to creation of map units that are fully contained within one other map unit.
- If the **'Proposed_Surface_Disturbance'** comprises multiple disturbance types and subtypes (Table 1) or different term limits (temporary or permanent), represent each as a separate polygon. To efficiently split polygons, use the Split tool () in the Edit toolbar.
- ~~If overlapping polygons are present, remove any areas of overlap: In an editing session, select an overlapping polygon. Select the Clip tool in the Editor toolbar (Editor> Clip). A dialog box will pop up. Leave the Buffer Distance = 0.0 and select 'Discard the area that intersects', then click OK. Any polygon portions overlapping the selected polygons will be deleted. Repeat for all overlapping polygons. Consult the project proponent if unsure about how to categorize overlapping areas.~~

D3. Categorize the Type and Subtype of the Proposed_Surface_Disturbance_Debits layer

- D3.1 In the Table of Contents window, right-click on the **'Proposed_Surface_Disturbance_Debits'** layer and open the ~~attribute-Attribute table~~ **Table**.
- D3.2 Double-click the cells in the ~~attribute-Attribute table~~ **Table** to edit the cells. ~~Ensure all edits are saved and editing session is over by clicking "Save" on the editing toolbar once all editing is com~~ If a shapefile or feature class was provided, review the features and edit as needed. If not, digitize the outer extent of all proposed anthropogenic features. Ensure that the outer extents of all proposed anthropogenic features are digitized correctly, and all pre-populated data is accurate. ~~Ensure you are using the 'as built' shapefiles for the proposed disturbance layers. Ensure you are using the shapefile of the footprint for the proposed disturbance is being used (-remember, Do NOT use a Plan of Operations (PoO), full Plan Boundary, or full construction ROW widths for disturbance shapefile.). Often a construction ROW is many times greater than what the actual disturbance will be. Delineate what will actually be put on the ground individually. See Mineral Exploration in Appendix A for when an exception may be in order.~~
- D3.3 Populate the 'Type' and 'Subtype' fields for each feature ~~based on the descriptions in exactly as in Table 1~~ (see *Appendix 1* for definitions). ~~If 'Type' and 'Subtype' are input incorrectly, it will drastically alter the debit estimate.~~ The **'Proposed Surface Disturbance'** file provided by the project proponent will likely contain field codes analogous to the 'Type' and 'Subtype' fields populated with information from **Table 1**. Work with the project proponent to re-categorize the layer using those field codes if necessary.
- D3.4 Populate the **'Surface_Disturbance'** field for each feature based on the type of surface disturbance permitted for that feature. Refer to field code definitions below.
- i. **Term_Reclaimed:** a feature permitted for a limited term disturbance (i.e., not perpetual) that will be reclaimed at the end of the project permit (e.g., a new Low Use road).
 - ii. **Term_Retired:** a feature permitted for a limited term disturbance that will NOT be reclaimed at the end of the project permit (e.g., a mine pit).
 - iii. **Term_Reclassified:** a feature permitted for a limited term disturbance that will be

reclassified to another disturbance type at the end of the permit term (e.g., a High Use haul road or ingress/egress route to a facility that will remain for local traffic following disturbance as a Low Use road).

- iv. **Permanent:** a feature permitted for disturbance in perpetuity (e.g., a new High Use road).

D3.5 ~~For~~ If a surface disturbance classified as 'Term_Reclassified', populate the 'Reclassified_Subtype' field with the Subtype of the feature planned after the permit expires (see *Table 1*). For all other features, leave this field blank.

D3.6 Ensure all edits are saved by clicking 'Save' on the editing toolbar once all editing is complete. ~~Save the edits and stop editing when done.~~

OBJECTID *	Shape *	Layer	Descrip...	Type	Subtype	Surface_Disturbance	Reclassified_Subtype	Acres	FSMap	T
1	Polygon ZM	Dark S...	WRDF	Mines	Active_Large	Term_Reclaimed	<Null>	130.714725		M
2	Polygon ZM	Dark S...	Pit	Mines	Active_Large	Term_Retired	<Null>	126.422232		M

Figure 4: Example Attribute Table for 'Proposed_Surface_Disturbance_Debits' Layer

Tips

- For Debit projects with multiple debit terms, consult with the Credit System Administrator to estimate the credit obligation at each phase of the project.

D4. OPTIONAL - Identify and delineate anthropogenic features proposed for modification or removal

For debit projects that will remove or reduce the impact of existing anthropogenic features, digitize and/or populate the attribute-Attribute table-Table with the 'Type' and 'Subtype' of the anthropogenic features to be removed or modified.

- D4.1** In the Table of Contents window, right-click on the '**Proposed_Modified_Features**' layer and open the attribute-Attribute table-Table.
- D4.2** Review ~~any features that are already previously~~ delineated features and edit as needed. Ensure that the outer extents of all anthropogenic features proposed for modification are digitized correctly. Delineate additional features as needed.
- D4.3** Populate the 'Type' and 'Subtype' fields for each entry. Be sure to save edits and stop editing when done. The 'Type' and 'Subtype' provided here should reflect the current 'Type' and 'Subtype' of the feature, NOT the 'Type' and 'Subtype' after modification.

D5. Run Debit Tool 2

[Catalog> Toolboxes > DebitTools > Debit Tool 2]

- **Proposed_Surface_Disturbance_Debits** = the '**Proposed_Surface_Disturbance_Debits**' layer edited in step D3. Ensure the attribute-Attribute table-Table has been populated appropriately.
- **Proposed Modified Features (optional)** = the feature class containing the anthropogenic features proposed for modification or removal, if applicable. Ensure the 'Type' and 'Subtype' fields in the attribute table have been populated with the current (not proposed/modified) anthropogenic type and subtype.
- **Project Folder** = the unique folder for this project. A copy of the Debit Tool 2 output, 'Debit_Project_Area', will be saved as a shapefile to this folder. Provide this layer as the

'Project Extent' to NDOW to request the 'ASUI' layer.

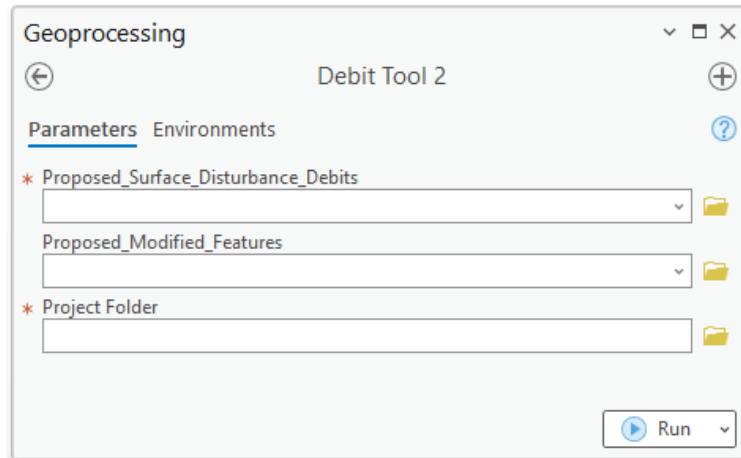


Figure 5: Debit Tool 2 interface

Debit Tool 2 Output:

- Proposed Surface Disturbance Eligible Layer
- Analysis Area Layer

D6. Acquire the ASUI layer from the Nevada Department of Wildlife (NDOW)

- D6.1 Submit a Data Request Form, available from the NDOW website at <https://www.ndow.org/blog/gis-data/>.
- D6.2 Provide the 'Debit_Project_Area' shapefile as the 'Project Extent'. The 'Debit_Project_Area' shapefile is saved in the project folder. Clarify that you are the requesting the 'ASUI' layer is being requested for the purpose of assessing a Debit ~~p~~Project site for the Conservation Credit System.

Tips

- The Data Request Process takes time. We anticipate approximately 1 month turn around due to the volume of projects NDOW receives and processes on a weekly basis. Larger projects take additional processing time. Plan accordingly.
- The ASUI layer is not necessary until the final stages of estimating debits. If wanting to proceed to the next steps of delineating Anthro Features or Map Units, ~~Use a blank raster as a place holder while waiting for the Data Request to be fulfilled when delineating Anthro Features or Map Units.~~


D7. Identify and delineate anthropogenic features

Review each layer in the 'Anthro_Feature.gdb' feature group within the Nevada Data Package as a starting point to help identify and delineate anthropogenic features that exist within the extent of the 'Analysis_Area'. A combination of these layers, aerial imagery, and knowledge of the site should be used to identify existing anthropogenic features within the extent of the 'Analysis_Area' layer. ~~Also see the additional~~ Additional guidance is provided in Appendix 1. If historical or recent mineral exploration is within the analysis area, please refer to ~~the related section of~~ Appendix 1.





If anthropogenic features are you have already digitized, ~~anthropogenic features~~ and all features have been merged into a single feature class, skip this step and provide that feature class or shapefile as the 'Current_Anthro_Features' parameter in Debit Tool 4. Ensure the 'Type' and 'Subtype' fields in the attribute table are populated with the correct codes found in Table 1. Note that the fields 'Overlap_Status', and 'Returned' ~~are new in version 1.6 of the HQT and~~ must be included in the

Current_Anthro_Features feature class. See step D9 ~~and Appendix 16~~ for additional guidance.

~~For each anthropogenic feature layer in the Anthro_Feature feature group of the map document that requires modification or digitization, edit as follows: To modify or digitize an anthropogenic feature within the Anthro_Feature groups:~~

- D7.1 Left click on the layer in the Table of Contents, navigate to Edit > Features. Using editing tools, modify and/or create features as needed. Use the Create Features window () to access templates for easier editing.
- D7.2 Open the attribute table and populate the 'Type' and 'Subtype' fields for each entry. Use the 'Type Code' and 'Subtype Code' for each attribute as provided in Table 1. Be sure to save edits and stop editing when done.
- D7.3 If the project proposes to remove or modify anthropogenic features, ensure that feature is delineated within the correct layer in the 'Anthro_Feature.gdb'.

Tips

- When editing existing anthropogenic feature layers, use the templates available in the Create Feature toolbar (). This will automatically pre-populate the required fields with the specified defaults, saving time and reducing data entry errors.
- Do not add new anthro features to an existing 'Current Anthro Features'. Add them to the base 'Anthro_*feature type*' layers and create a new 'Current_Anthro_Features' layer. Not starting from scratch can significantly affect the final calculation.
- Do not change the names of the 'Anthro_*feature type*' feature classes in the project's geodatabase. If existing anthropogenic features of a specific type are digitized in a layer other than the 'Anthro_*feature type*' layer created by Debit Tool 3, copy and paste those features into the appropriate 'Anthro_*feature type*' layer.
 - Click Select the Select tool () in the Selection section on the Map toolbar
 - Click Select the feature ~~you want~~ to copy. To select multiple features at once, hHold down the SHIFT key while clicking-selecting the additional features.~~to select additional features.~~
 - Click Select the Copy button () in the Clipboard section on the Map or Edit toolbar.
 - Click Select the down arrow below the Paste button () in the Clipboard section on the Map toolbar, and click Paste Special.
 - Click Select the 'Anthro_*feature type*' layer in which to store the pasted feature.
 - Click Select 'OK'. The feature is pasted into the appropriate layer.
- Ensure that all features have been captured. It is recommended to set the map scale, located in the bottom-left corner of the map, to 1:3,000 and scan the imagery systematically to ensure that all features have been digitized properly. To increase accuracy and efficiency in identifying new Anthro features create a grid across the 'Analysis Area' for systematic searching.

[Geoprocessing > Toolboxes > Cartography Tools > Map Series > Grid Index Features]

- Output Feature Class = a new layer named 'GridIndexFeatures'
- Input Features = 'Analysis_Area'
- Generate Polygon Grid that intersects input feature layers or datasets = 'checked'
- Use Page Unit and Scale = unchecked

- Polygon Width = 1000 (in meters)
- Polygon Height = 1000 (in meters)
- All other fields = blank

D8. Run Debit Tool 3

[Catalog > Toolboxes > DebitTools > Debit Tool 3]

- **Proposed_Surface_Disturbance_Eligible** = the **Proposed_Surface_Disturbance_Eligible** layer created by Debit Tool 2. This layer MUST be located within the project's geodatabase.

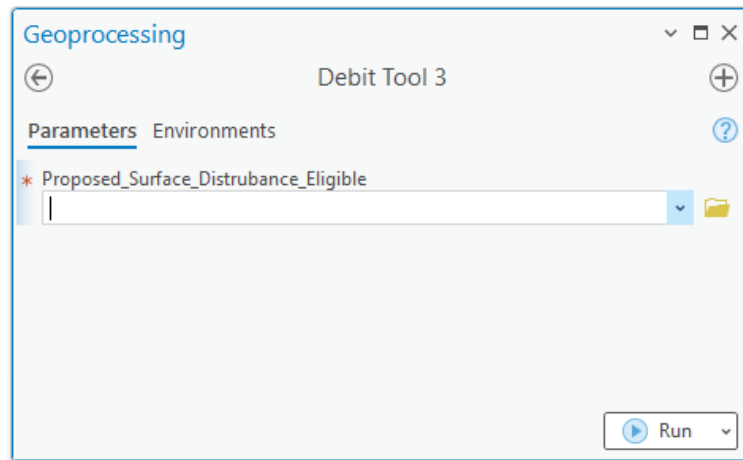


Figure 6: Debit Tool 3 interface

Debit Tool 3 Output:

- Anthro *feature type* Clip Layer

D9. Categorize existing features that overlap with proposed disturbance

Debit Tool 3 will identify and isolate existing anthropogenic features that overlap with eligible (i.e., located on public land) proposed surface disturbance. These overlapping features require additional categorization in order to be represented properly in the Projected and Permanent Anthro Feature layers. For each anthropogenic feature where overlap was identified, edit the 'Overlap_Status' and 'Returned' attributes within the Attribute Table, as follows. Anthropogenic feature layers will now be named 'Anthro_*feature type*_Clip', where *feature type* refers to a specific anthropogenic Subtype (e.g. Mines – Large, ActiveActive Large).

D9.1 Update the 'Overlap Status' field for existing features that overlap with the ~~d~~Debit ~~p~~Project. This is important and usually often overlooked, especially when rerunning analyses. Existing features are classified as 'Retained' by default, unless they overlap the proposed surface disturbance, in which case they are classified as 'Removed'. Powerlines are a special case that are classified as 'Retained' by default. Refer to field code definitions below.

- Retained:** features that will not be removed during the permitted term of the ~~d~~Debit ~~p~~Project. For example, an existing powerline co-located with a new roadway or mine.
- Removed:** features that will be removed during the permitted term of the ~~D~~debit ~~p~~Project, or features that will be upgraded from one subtype to another. For example, a low use road upgraded to a high-high-use road or overlapping low-low-use road upgraded to a mine.

D9.2 Update the 'Returned' field for existing features that overlap the ~~d~~Debit ~~p~~Project or are permanently modified (only for ~~d~~Debit ~~p~~Projects that propose to remove or mitigate existing anthropogenic features, note this is only available to ~~d~~Debit ~~p~~Projects with permanent impact terms). Existing features are classified as 'Returned' equals = True by default. Refer to field code definitions below.

- True:** features that will be returned to their current subtype classification after the permitted term of the ~~D~~debit ~~p~~Project.

- ii. **False:** features that will not be returned to their current subtype classification after the permitted term of the **dDebit pProject**. Note, only overlapping features permitted for disturbance in perpetuity (i.e., a permanent term) **are allowed to may** use this code.

D9.3 Update the 'Subtype_As_Modified' field for existing features that are modified by the **Ddebit Pproject**. Populate this field with the subtype that the existing feature will be downgraded to after the permitted term of the **Ddebit pProject**. If the existing feature will be removed, input 'N/A'. For features that will be permanently modified or removed, **make ensure** to populate the 'Returned' field with 'False'.

Tips

The 'Overlap_Type' and 'Overlap_Subtype' are additional fields that identify which existing '**Anthro_*feature type***' features overlap with the '**Proposed_Surface_Disturbance_Eligible**' layer to assist in updating the 'Overlap_Status' and 'Returned' fields.

D10. Run Debit Tool 4

[Catalog > Toolboxes > DebitTools > Debit Tool 4]

- **Analysis_Area** = the '**Analysis_Area**' layer created by Debit Tool 2. This layer MUST be located within the project's geodatabase
- **Current Anthro Features (optional)** = leave blank, unless existing anthropogenic features were not delineated within each '**Anthro_*feature type*_Clip**' layer in step D7, then provide the feature class or shapefile with delineated anthropogenic features. Ensure that the provided layer has a 'Type' and 'Subtype' field in the attribute table, and that the Type and Subtype are categorized according to the 'Type Code' and 'Subtype Code' provided in Table 1.~~**Abundance and ASUI**~~
- **Space Use Index** = the '**Abundance and Space Use Index**' ~~layer~~ **raster** provided by NDOW. This layer should be scaled from 0 - 1 (or within that range) and have the same extent as the '**Analysis_Area**'. See step D6.
- ~~**Current Anthro Features (optional)** = leave blank, unless existing anthropogenic features were not delineated within each '**Anthro_*feature type*_Clip**' layer in step D7, in which provide the feature class or shapefile in which anthropogenic features were delineated. Ensure that the provided layer has a 'Type' and 'Subtype' field in the attribute table, and that the Type and Subtype are categorized according to the 'Type Code' and 'Subtype Code' provided in Table 1.~~

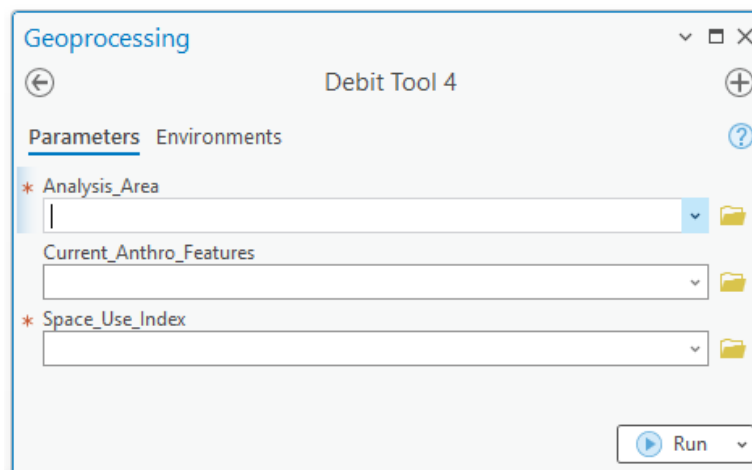


Figure 7: Debit Tool 4 interface

Debit Tool 4 Output:

- [Map Units Layer](#)
- [Current Anthro Features Layer](#)
- [Current Anthro Disturbance Layer](#)
- [Projected Anthro Features Layer](#)
- [Projected Anthro Disturbance Layer](#)
- [Permanent Anthro Features Layer](#)
- [Permanent Anthro Disturbance Layer](#)


Tips

- After running Debit Tool 4, a raster layer named '**Debit_Project_Impact**' has been added to the map document illustrating where the **Debit P**project has the most impact on **greater sage-grouse** habitat. To reduce debits, consider modifying the **dDebit p**Project design to avoid areas of high impact. Re-run the Desktop Analysis to evaluate changes to the project design. **You may want to C**reate a new geodatabase so **as not to have the** original results **and files are not** overwritten.

D11. Divide Map_Units layer into discrete map units & populate attribute table

~~If you have already Previously~~ digitized map units ~~can be~~ combined with the '**Map_Units**' layer created by Debit Tool ~~34 and your previously created layer~~. Under Table Options (☰), uncheck 'Show Field Aliases'. Review the instructions below to ensure the attribute table is populated correctly (~~ensure you Be sure to are~~ editing the correct field based on its field name, not alias). In step D12, provide ~~ed~~ the feature layer created as the '**Map_Units**' parameter. Note this layer MUST be located within the project's geodatabase.

D11.1 Left click the '**Map_Units**' layer in the Contents window.

D11.2 Using the Split tool () in the Edit Toolbar, delineate map units in the '**Map_Units**' layer. See [Appendix 32](#). Guidance for Delineating Map Units for detailed information. ~~You may also use~~ Use any other geoprocessing tools ~~you~~ desired to create map units. When running Debit Tool 4, provide the final feature class as the '**Map_Units**' layer. This layer does not need to be named '**Map_Units**'.

- ~~The **Minimum**~~ minimum map unit size should ~~generally~~ be ≥ 0.5 acres, unless there are features such as stringer meadows that are appropriate to delineate at a smaller scale. Map units less than 5 meters in width may be excluded from the credit or debit calculation.
- Clusters of willow or other dense patches of woody riparian vegetation within meadows should not be delineated as separate map units. **However, transects should not be run through long stretches (>5m) of dense (closed shrub, 70-100% canopy cover) impassible willow patches.**
- ~~For Debit Projects, delineate map units should first be delineated by~~ based on the indirect disturbance area, proposed surface disturbance, and already existing disturbance areas respectively. ~~Subdivide the indirect indirect and proposed disturbance areas should then be further subdivided according to the standards guidelines. Existing disturbance areas do not require further subdivision, as no sampling will occur in these areas. These map units will be assigned a site scale score of zero, and no transects will be generated within them. No sampling will occur in existing disturbance areas, so no further subdivision is needed. This map unit will be assigned a site scale score of zero and no transects will be generated in this map unit.~~
- ~~For Debit Projects, term features should be separate map units from permanent features.~~
- ~~For debit projects, reclaimed mine (or other disturbance type) areas should be delineated as separate map units~~
- ~~Run the Intersect tool to ensure there are no overlapping polygons.~~
- Meadows should be digitized as distinct map units. Meadows are important resources for GRSG and so take care in identifying and delineating all meadows within the project area.

D11.3 Map units that have been automatically delineated as meadows due to their presence in the '**NV_Wet_Meadows**' layer should be confirmed as such using aerial imagery and other sources and refined as appropriate. The '**NV_Wet_Meadows**' layer is also present in the mxd, which has further detail in the attribute table that might aid in refining delineations. It should be noted that this layer is a ~~rough~~ coarse delineation and irrigated areas that meet the program definitions of meadow ~~system habitat in the program~~ have often been excluded. These will often need to be delineated as well, with the exception of center pivot agriculture, which should be excluded. 'Unaltered' meadows ~~are now~~ is the default description ~~and so~~ 'Altered' meadows should be recategorized appropriately such as. For ~~all other non-meadow~~ map units, populate the 'Meadow' attribute with 'No_Meadow'.

- Unaltered meadows are defined at naturally occurring wetland complexes, dominated by wetland vegetation and soils (e.g., stringer meadows, springs, seeps) where the hydrology has not been minimally altered or is currently not being managed.
- Altered meadows are defined as receiving either controlled irrigation, where the hydrology is currently being altered or managed (e.g., diversions, spreaders), or where the landscape is being functionally altered.

- D11.4** ~~Any proposed direct disturbance area will be sampled in the field to verify habitat function.~~ Map units automatically labeled as 'Phase III' due to greater canopy cover in the 'Conifer_Phase' column that overlap with the proposed direct disturbance should are not to be removed as non-habitat (this includes exploration projects). Any proposed direct disturbance area will be sampled in the field to verify GRSG habitat function. Instead, running field transects will indicate whether or not a depauperate understory does indeed occur or whether GRSG habitat function is apparent due to the presence of a healthier understory. If this occurs, replace 'Phase_III' with 'N/A' in the Conifer_Phase column. However, in the indirect disturbance area, areas labeled 'Phase III', however, can be removed as non-habitat (Selecting Yes for "was field data collected"). Due to being indirect to and often more distant from the disturbance, it is simply not as critical to ground-truth whether it indeed has a depauperate understory and is thus, non-habitat.
- D11.5** Numerically Name_ID each map units numerically and record the name in the 'Map_Unit_ID' field. Ecologically similar map units that are not geographically adjacent ~~Map units that appear to be very similar, but not adjacent to each other,~~ can receive the same numerical name-ID and be considered a single map unit. In the field, a visual walk-through should confirm this is the case.
- D11.6** Name each map unit by providing a short description, typically associated with the major vegetation type, in the 'Map_Unit_Name' field. *Important: Ensure that each map unit name associated with a unique map unit is identical, but separate map units must have a unique name.*
- D11.7** Optional – Capture additional information related to each map unit in the 'Notes' field. The Notes field does not need to be identical for each unique map unit ID. The 'Notes' field for each map unit will be concatenated when dissolving the Map_Units features by Map_Unit_ID. The concatenated notes will be truncated if greater than 255 characters in length.
- D11.8** Run the Intersect tool (Geoprocessing > Toolboxes > Analysis Tools > Overlay > Intersect) to ensure there are no intersects or overlap throughout the map units. Intersects can skew the final calculations. If intersects are found, they must be removed. Use the prior instructions or the Union tool to union the intersect tool results and map units, and for each sliver of overlap, determine only one map unit to assign it to, and delete any duplicates.
- D11.9** Save the edits and stop editing when done.

OBJECTID	Shape	Meadow	Conifer_Phase	Disturbance_Type	Map_Unit_ID	Map_Unit_Name	Notes	Shape_Length	Shape_Area
1	Polygon	No Meadow	N/A	Indirect	1	Big Sagebrush	<Null>	829889.532303	578415588.523078
2	Polygon	No Meadow	N/A	Direct_Term_Recl...	2	Low Sagebrush	<Null>	40592.603171	3139271.787798
3	Polygon	No Meadow	N/A	Direct_Term_Recl...	3	Mountain Maho...	<Null>	54757.776684	319926.728851
4	Polygon	No Meadow	N/A	Direct_Term_Retir...	4	Broomfield Downs	<Null>	30259.867643	1381984.055403
5	Polygon	No Meadow	Phase III	Indirect	5	Phase III PJ	<Null>	171203.5136	12953308.671539

Figure 8: Example completed map unit attribute table

Tips

- Before beginning to delineate map units, we recommend referencing the DRG layer and grouping the ecological sites into the identified DRG groups that are listed in the attribute table. Use supplemental data sources identified in the [Data Required](#) section for assistance in meadow delineation and other unique features.
- Useful information about stratification has been developed by the US Department of Agriculture (Herrick et al., 2009, Monitoring Manual for Grassland, Shrubland and Savanna Ecosystems, Chapter 2 – “Stratify Land into Monitoring Units”, page 131).
- Map units should always be confirmed in the field.
- Ensure snapping is enabled (add the Snapping Toolbar if necessary). Also ensure ‘Snap to Sketch’ is enabled once in your-an editing session, this will allow you-to creation-of map units that are fully contained within one other map unit.
- ~~Meadows should be digitized as distinct map units. Meadows are important resources for sage-grouse GRSG and so take care in identifying and delineating all meadows within the project area.~~

D12. Run Debit Tool 5

[Catalog> Toolboxes > DebitTools > Debit Tool 5]

- Map Units** = the feature class or shapefile containing the delineated map units, most often the **Map_Units** layer. The provided feature class MUST be located within the project's geodatabase.
- Project Folder** = the unique folder for this project. Excel files containing the outputs from this process will be saved to this folder.
- Project Name (optional)** = a unique name which will be included in the output file name, ~~if desired.~~

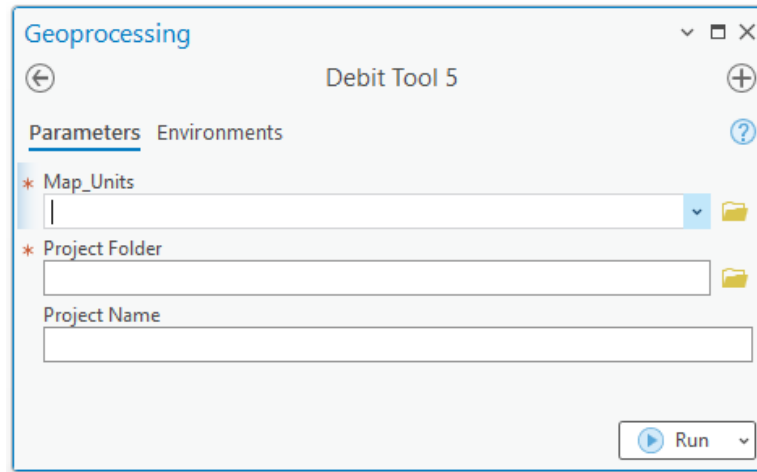


Figure 9: Debit Tool 5 interface

Debit Tool 5 Output:

- [Map_Units Dissolve Layer](#)
- [Five Excel Files for Calculator Entry](#)

Tips

- If a feature class named '**Map_Units_Dissolve**' already exists in the project geodatabase (which may be the case if ~~you did not follow these steps but delineated map units were delineated~~ ~~units~~ through a separate process), that feature class will be overwritten by Debit Tool 4. ~~You may To prevent overwriting either~~ change the ~~at~~ layer's name (~~we recommend e.g.,~~ '**Map_Units_Copy**') or save a copy outside of the project geodatabase ~~if overwriting that layer is not desired.~~
- ~~Tool %5 may not run properly complete if the file name is too long. If you have issues with a tool not completing, your file name maybe too long. A good hint that this is the issue, is if it creates a 'Map Unit Dissolved' layer, but cannot output into the project folder.~~

D13. Specify number of transects for each map unit

D13.1 Open the attribute table of the '**Map_Units_Dissolve**' layer.

D13.2 Populate the 'Transects' field for each map unit with the number of transects to be sampled within each map unit according to the necessary sampling intensity (see [Appendix 4. Minimum Transects Per Map Unit](#)). For the map unit associated with existing surface disturbance, and any other map units where field data will not be collected, input '0'.

D13.3 Save edits ~~and stop editing~~ when done.

Tips

- ~~A-The~~ number of transects should only be specified for map units that will be sampled in the field. For map units where field data will not be collected, input '0' in the 'Transects' field.

D14. Acquire an approved Transects layer from the SETT

D14.1 Provide the '**Map_Units_Dissolve**' shapefile to the SETT with the Transect attribute populated. The SETT will generate spatially balanced transects pre-screened for hazards, including steep slopes, for each project. Additionally, they will ensure that each transect is no more than 2 miles from any road (e.g., two-

track, gravel road, or main road). If you are aware of any hazards, such as unstable slopes near a mine pit, please inform the SETT so they can coordinate transects within the hazard map units. Provide the Map_Units_Dissolve shapefile to the SETT with the Transect attribute populated. SETT will generate spatially balanced transects pre-screened for hazards including steep slopes for each project.

D15. Run Debit Tool 6

[Catalog > Toolboxes > DebitTools > Debit Tool 6]

- **Map_Units_Dissolve** = the 'Map_Units_Dissolve' layer created by Debit Tool 54. Ensure the 'Transects' field of the attribute table has been populated appropriately (if Transects have not been generated through a separate process).
 - **Transects** = A point shapefile or feature class that represents transect locations, provided by the SETT.
 - **Project Folder** = ~~The~~ the unique folder for this project. An Excel file with transect locations and bearings will be saved here.
- Project Name (optional)** = ~~Provide~~ a unique name which will be included in the output file name, ~~if desired.~~

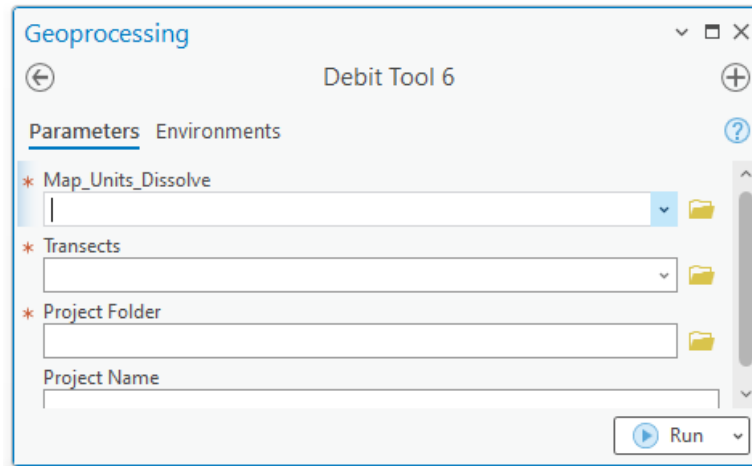


Figure 10: Debit Tool 6 interface

Debit Tool 6 Output:

- Transect SpatialJoin Excel File

D16. Add the exported data to the Debit Project Calculator

- D16.1 Open the project folder to find exported data tables as Excel files.
- D16.2 Copy the relevant columns from the tables and Paste Values into the corresponding worksheets and columns in the pProject calculator Excel file, Debit Project Calculator v1.8.0. Strict copy and paste can lead to cell formatting changes, 'paste values only' is best practice. See **Figure 11** for a list of data generated during the Desktop Analysis that must be inputted into the Project HQT Calculator.

EXPORT TABLE	CALCULATOR WORKSHEET
<input type="checkbox"/> Map_Units_Dissolve	1.1 Enter Map Unit Data
<input type="checkbox"/> Current_Mgmt_Cat	1.3 Enter Mgmt Cats Data

<input type="checkbox"/>	Current_WMZ	1.3 Enter Mgmt Cats Data
<input type="checkbox"/>	Current_PMU	1.3 Enter Mgmt Cats Data
<input type="checkbox"/>	Current_Precip	1.3 Enter Mgmt Cats Data
<input type="checkbox"/>	Transects_SpatialJoin	1.2 Enter Transects Data

Figure 11: Export Tables generated and corresponding Calculator worksheet

Exploration Special Instructions

- If an exploration project is being analyzed, replace the acreage summarized during the In the desktop analysis (Worksheet 1.1, column L-K), input the actual acreage planned for exploration within the direct disturbance map units. Since a larger spatial area may have been analyzed to allow flexibility in drill sites and roads, the correct acreage needs to replace the acreage of the Plan of Operations (PoO) Project Area or an equivalent spatial area. If multiple map units exist for the direct disturbance, apply the proportion of each map unit's acreage within the PoO Project Area to the proposed exploration acreage in order to calculate the appropriate acreage. Use the Map Unit Adjustment Calculator to determine the correct debit amount. Desktop analysis in Tab 1.1, column L for the direct disturbance map units with the actual acreage planned for exploration. Due to analyzing a larger spatial area to account for flexibility in drill sites and roads, the correct acreage needs to replace the acreage of the PoO Project Area or equivalent spatial area. If multiple map units exist for the direct disturbance, apply the proportion of each map unit acres of the Plan of Operations Project area to the proposed exploration acreage to calculate the appropriate acreage. For example, if 10 acres of proposed disturbance within a 1,000-acre Plan area consisted of 5 map units of 200 acres each, each map unit acreage of 200 would be replaced with 2 acres to reflect the total proposed disturbance of 10 acres. PoO each 200-acre map unit for each map unit the 200-acre adjustment acreage change the Exploration projects can either use 100% site-scale function or collect field data using standard HQT protocol.
- If any portion of the Proposed Area of Operation falls within mapped GRSG habitat, the entirety of the proposed exploration acreage will be used in the project analysis. Once the applied when analyzing the project. When exploration phases are more defined, the HQT will be re-run to adjust for the actual proposed or disturbed acreage.
- Phase III conifer is not removed as a map unit when analyzing exploration.**
- Meadows must be delineated as map units within the a-PoO when analyzing exploration.

Tips

- The Calculator includes more detailed instructions for how to input data from each field datasheet. See rows 1 and 2 in the relevant worksheet in the Calculator.
- After receiving Transect locations from the SETT, you are ready to complete you can complete Section 2: can be completed. Field Data Collection Method can be completed. The field crew will confirm the boundaries of map units, add or remove transect locations, and confirm the location of anthropogenic features. When Once field work is complete, make any necessary revisions to the 'Map_Units_Dissolve' layer, 'Transects' layer, and 'Current_Anthro_Features' layer.
- If the field crews recommends changes to the 'Map_Units_Dissolve' layer, 'Transects' layer, and 'Current_Anthro_Features' layer, make necessary revisions and redo steps D8, D12, D15 and D16. Specify the updated 'Map_Units_Dissolve' layer for the

'Map_Units' parameter in Debit Tool 3 and updated '**Current_Anthro_Features**' layer for the '**Current_Anthro_Features**' parameters in Debit Tool 4.

- In ~~sheet Tab~~ 2.6 of the Calculator, under "~~A~~access to ~~M~~map ~~U~~unit for ~~f~~field ~~s~~sampling", ~~put enter~~ "yes" in areas of non-habitat, ~~such as like~~ Phase III PJ that was not sampled ~~in the field~~. This will count the acreage but ~~will~~ not assign any debits to those areas.
- If the Credit Buyer has decided to use 100% site--scale function ~~in lieu~~instead of field sampling, change the "~~Current Average Seasonal HSI~~" for Spring, Summer, and Winter to 100% in ~~the Sheet~~ '1.1 Enter Map Unit Data' ~~sheet~~ in the Debit Project Calculator.

CREDIT PROJECTS: GUIDANCE FOR COMPLETING THE DESKTOP ANALYSIS

This section describes the process required to assess Credit Projects. Only a Desktop Certified Verifier should run these tools. Tools provided in the Credit Toolbox are intended to facilitate the assessment of Credit Projects. User input is required. Please read each step carefully. User tips are provided for each step, some of which may be required to successfully complete the step in certain circumstances. We recommend reviewing this guide in its entirety before starting.

Each tool will add one or more feature classes to the default file geodatabase. Subsequent tools require these feature classes in order to run. Do not modify or rename these feature classes. Only outputs that are added to the Table of Contents and map display should be edited.

If ~~you have map units and anthropogenic features are~~ already delineated ~~map units and anthropogenic features, you will be able to use~~ those layers can be used in this process. There is no~~You do not~~ need to recreate those layers. If ~~you have map units have~~ already been delineated ~~map units~~, instructions will be provided in step C7.C1. If you have already digitized existing anthropogenic features, instructions will be provided in step C7.C2. If existing anthropogenic features ~~you have already been~~ digitized ~~existing anthropogenic features~~, instructions will be provided in step C7.

For a description of the tools and the calculations the automated tools are completing, refer to [Appendix 6. Credit Tool Overview](#).

C1. Open the map template and save as a new project

- C1.1 In the NevadaDataPackage_v1_8-9 folder, double-click the 'Nevada_Map_Template' to open it in ArcGIS Pro. ~~You will s~~ubmit this Project Folder as a zipped folder (.zip) to the Credit System Administrator along with the Project Calculator.
- C1.2 Save the project using the naming convention ProjectName_YYYYMMDD (Project > Save Project As). ArcGIS Pro will typically create a project folder and default Geodatabase to store the analysis. If it does not then create a project folder and Geodatabase prior to beginning. This Project Folder and the Geodatabase is submitted to Credit System Administrator along with the Project Calculator as zipped folder (.zip).

~~Save the project using the naming convention ProjectName_YYYYMMDD.~~

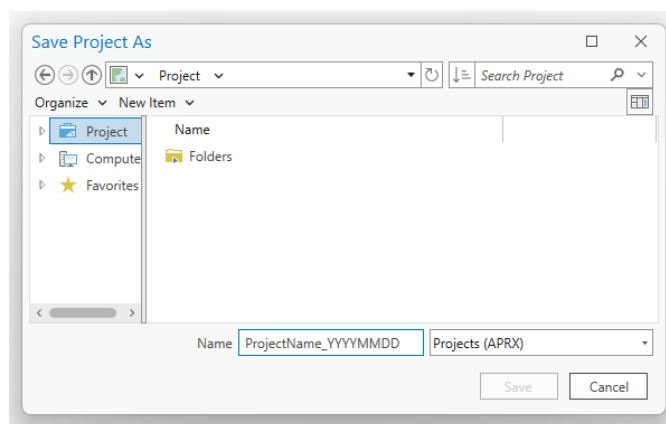


Figure 12: Name of the project folder

- C1.3 Add the Credit Toolbox to the project by right-clicking on the parent Toolboxes (🗄️) in the

Catalog window and selecting 'Add Toolbox'. Navigate to the Toolbox saved in the Nevada Data Package (see [Data Required](#) Section) and click 'Open'. The toolbox should now be available in the list of toolboxes.

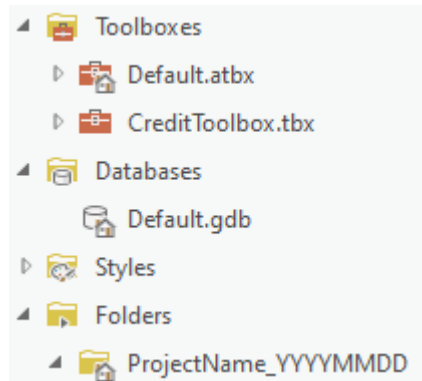


Figure 13: Project and File Geodatabase Structure

You will submit this Project Folder as a zipped folder (.zip) to the Credit System Administrator along with the Project Calculator.

Tips

- When creating folder names and file names, use only letters, numbers, and underscores. Do not use other characters. Do not start file names with a number. Some tools will not run properly if there are periods, hyphens, or other symbols in the folder or file names.

C2. Run Credit Tool 1

If ~~you have already delineated~~ map units are already delineated, review step C3. ~~That provide that~~ feature class or shapefile will be used as the 'Credit_Project_Boundary' parameter in Credit Tool 1. ~~Review step C3 to ensure map units were delineated correctly and,~~ after running Credit Tool 1, populate the attribute table appropriately.

[Catalog > Toolboxes > CreditTools > Credit Tool 1]

- Project Geodatabase** = the default project geodatabase, located in the project's folder.
- Credit_Project_Boundary (optional)** = the area that is being proposed as the credit project, provided by the project proponent. If no shapefile was provided, see step 4 in the [Data Required section-Section](#) to create this layer. If the credit project proponent does not own or control any land related to the project, leave blank. This parameter is only optional if when the credit project proposes to remove or modify existing anthropogenic features and but the project proponent does not own or control any land within the area of indirect benefits.
- Credit Project will remove or modify existing anthropogenic features? (optional)** = 'check' if the project proposes to remove or modify existing anthropogenic features.
- Proposed Modified Features (optional)** = if the project will remove or modify existing anthropogenic features, provide a shapefile or feature class that outlines the specific anthropogenic features to be modified or removed. If no shapefile is provided, a template feature class will be generated ~~for you,~~ provided the box described above is checked.

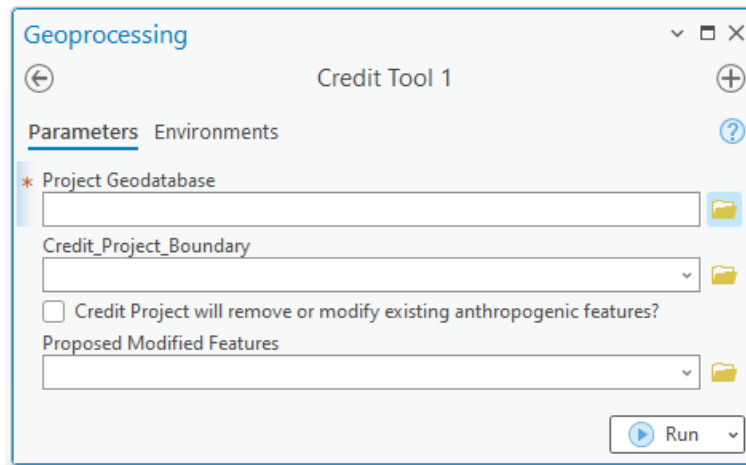


Figure 14: Credit Tool 1 interface

Credit Tool 1 Output:

- **Map Units Layer**
- **Proposed Modified Features Layer (optional proposed modified feature output)**

Tips

- If the '**Credit_Project_Boundary**' provided by the project proponent is represented by multiple shapefiles, use the Merge tool to merge the shapefiles into a single feature class.

[Geoprocessing > Toolboxes > Data Management Tools > General > Merge]


- Input Datasets = All shapefiles representing the '**Credit_Project_Boundary**'
- Output Dataset = append '**_Merged**' to feature class name
- Field Map = leave as default
- Overlapping polygons must be removed from the '**Credit_Project_Boundary**' layer provided by the project proponent before running Credit Tool 1. Use the Intersect tool to determine if the layer contains overlapping polygons.

[Geoprocessing > Toolboxes > Analysis Tools > Overlay > Intersect]

- Input Features = '**Credit_Project_Boundary**'
- Output Feature Class = append '**_Merged**' to feature class name
- Join Attributes = ALL
- XY Tolerance = blank
- Output Type = INPUT
- If overlapping polygons are present, remove any areas of overlap: In an editing session, select an overlapping polygon. Select the Clip tool in the Editor toolbar (Editor > Clip). A dialog box will pop up. Leave the Buffer Distance = 0.0 and select 'Discard the area that intersects', then click '**OK**'. Any polygon portions overlapping the selected polygons will be deleted. Repeat for all overlapping polygons. Consult the project proponent if unsure about how to categorize overlapping areas.
- The box for the *Credit Project will remove or modify existing anthropogenic features?* MUST be checked if the project proposes to modify or remove existing anthropogenic features, ~~even if a shapefile is provided for the Proposed Surface Disturbance parameter.~~

C3. Divide Map_Units layer into discrete map units & populate attribute table

- C3.1 Left click the '**Map_Units**' layer in the Contents window.

C3.2 Using the Split tool () in the Edit Toolbar, delineate map units in the 'Map_Units' layer. See [Appendix 3. Guidance for Delineating Map Units](#) for detailed information. ~~You may also use~~ Use any other geoprocessing tools ~~you desired~~ to create map units. When running Credit Tool 2, provide the final feature class as the 'Map_Units' layer. This layer does not need to be named 'Map_Units'.

- ~~The Minimum~~ minimum map unit size should generally be 0.5 acres, unless there are features such as stringer meadows that are appropriate to delineate at a smaller scale. Map units less than 5 meters in width may be excluded from the credit or debit calculation.
- Clusters of willow or other dense catches of woody riparian vegetation within meadows should not be delineated as separate map units. ~~However,~~ **Transects should not be run through long stretches (>5m) of dense (closed shrub, 70-100% canopy cover) impassible willow patches.**
- ~~For credit p~~ProjectFor Credit Projects, uplift/restoration treatment areas where a change in the site scale score is anticipated should be delineated as separate map units. (Even if currently, they are similar in vegetation to other areas, but a change is not expected in those areas.)
- Run the Intersect tool to ensure there are no overlapping polygons.
- **Meadows should be digitized as distinct map units. Meadows are important resources for GRSG and so take care in identifying and delineating all meadows within the project area.**

C3.3 Map units that have been automatically delineated as meadows due to their presence in the 'NV_Wet_Meadows' layer should be confirmed as such using aerial imagery and other sources and refined as appropriate. The 'NV_Wet_Meadows' layer is also present in the ~~mx~~data package, which has further detail in the attribute table that might aid in refining delineations. It should be noted that this layer is a ~~rough~~ coarse delineation, and irrigated areas that meet definitions of meadow ~~habitat~~ in the program have often been excluded. These will often need to be delineated as well, with the exception of center pivot agriculture, which should be excluded from ~~C~~credit ~~P~~projects in their entirety. 'Unaltered' meadows are now the default description and 'Altered' meadows should be categorized as such. For all other map units, populate the 'Meadow' attribute with 'No_Meadow'.

- Unaltered meadows are defined ~~at as~~ naturally occurring wetland complexes, dominated by wetland vegetation and soils (e.g., stringer meadows, springs, seeps) where the hydrology has not been ~~minimally~~ altered or is currently not being managed.
- Altered meadows are defined as receiving either controlled irrigation, where the hydrology is currently being altered or managed (e.g., diversions, spreaders), or where the landscape is being functionally altered.

C3.4 For projects proposing to remove conifer cover, the PJ_Phases shapefile will be used to automatically identify areas of Phase I and II conifer to delineate as separate map units.

- ~~These~~ Phase I and II layers should be ground-truthed and modified as needed. The conifer layers occasionally pick up Mountain Mahogany, and thick tree-like riparian shrubs. If a PJ layer needs to be modified, work closely with the SETT to receive an updated **PJ_Phases** and **PJ_Uplift** layers that are required to calculate uplift from conifer removal.

- Phase III PJ polygons should be left as-is

C3.5 Name map units numerically and record the name in the 'Map_Unit_ID' field. Map units that appear to be very similar, but not adjacent to each other, can receive the same numerical name and be considered a single map unit. In the field, a visual walk-through should confirm this is the case.

C3.6 Name each map unit by providing a short description, typically associated with the major vegetation type, in the 'Map_Unit_Name' field.

***Note: Important:** Ensure that each unique map unit has its own ID and name. associated with a unique map unit is identical, but separate map units must have a unique name. Ensure that each individual polygon of multi-polygon map units are ID'd and named identically to one another (they will be merged later on in the HQT).*

C3.7 Optional – Capture additional information related to each map unit in the 'Notes' field. The 'Notes' field does not need to be identical for each individual polygon of multi-polygon map unit~~each unique map unit ID~~. The 'Notes' field for each map unit will be concatenated when dissolving the Map_Units features by 'Map_Unit_ID' and name. The concatenated notes will be truncated if greater than 255 characters in length.

C3.8 Run the Intersect tool (Geoprocessing > Toolboxes > Analysis Tools > Overlay > Intersect) to ensure there are no intersects throughout the map units. Intersects can skew the final calculations. If intersects are found, they must be removed. Use the prior instructions or the Union tool to union the intersect tool results and map units, and for each sliver of overlap, determine only one map unit to assign it to, and delete any duplicates.

C3.10 Save the edits ~~and stop editing~~ when done.


NOTE If changes to the PJ layer are necessary to what has been automatically mapped, then please make changes based on the coverage of pinyon-juniper observed and delineated in the field in a clipped version in the pinyon- juniper layer. This layer should be submitted to the SETT when completed so that the necessary changes can be made at the administrative level prior to running the final Desktop Analysis. This process would be similarly necessary if there was an omission of pinyon-juniper in the layer that is present within the project area.

~~**NOTE** If changes to the PJ layer are necessary to what has been automatically mapped, then please make changes based on the coverage of pinyon-juniper observed and delineated in the field in a clipped version in the pinyon-juniper layer. This layer should be submitted to the SETT when completed so that the necessary changes can be made at the administrative level prior to running the final Desktop Analysis. This process would be similarly necessary if there was an omission of pinyon-juniper in the layer that is present within the project area.~~

OBJECTID	Shape	Meadow	Conifer_Phase	Disturbance_Type	Map_Unit_ID	Map_Unit_Name	Notes	Shape_Length	Shape_Area
1	Polygon	No Meadow	N/A	Indirect	1	Big Sagebrush	<Null>	829889.532303	578415588.523078
2	Polygon	No Meadow	N/A	Direct_Term_Recl...	2	Low Sagebrush	<Null>	40592.603171	3139271.787798
3	Polygon	No Meadow	N/A	Direct_Term_Recl...	3	Mountain Maho...	<Null>	54757.776684	319926.728851
4	Polygon	No Meadow	N/A	Direct_Term_Retir...	4	Broomfield Downs	<Null>	30259.867643	1381984.055403
5	Polygon	No Meadow	Phase III	Indirect	5	Phase III PJ	<Null>	171203.5136	12953308.671539

Figure 15: Example completed Map_Unit attribute table

Tips

- Before beginning to delineate map units, we recommend referencing the [DRG-ESD](#) layer and grouping the ecological sites into the identified [DRG-ESD](#) groups that are listed in the attribute table. Use supplemental data sources identified in the [Data Required section-Section](#) for assistance in meadow delineation and other unique features.
- Useful information about stratification has been developed by the US Department of Agriculture (Herrick, et al., 2009, Monitoring Manual for Grassland, Shrubland and Savanna Ecosystems, Chapter 2 – “Stratify Land into Monitoring Units”, page 131).
- Map units should **always** be confirmed in the field.
- Ensure snapping is enabled (add the Snapping Toolbar if necessary). Also ensure ‘Snap to Sketch’ is enabled once in **youran** editing session, this will allow **you-to-creation of** map units that are fully contained within one other map unit.
- Meadows should be digitized as distinct map units. Meadows are important resources for **sage-grouseGRSG and** so take care in **correctly** identifying and delineating all meadows within the project area.
- If very small (< 900 square meters) map units are created when the conifer map units are - automatically created, use the Edit Vertices tool () to delete the vertices that segment the small map unit from the surrounding map unit. That small map unit will be **subsumedincorporated** into the surrounding map unit.

C4. OPTIONAL - Identify and delineate anthropogenic features proposed for modification

- C4.1** In the Table of Contents window, right-click on the **Proposed_Modified_Features** layer and open the attribute table.
- C4.2** Review any features that are already delineated and edit as needed. Ensure that the outer extents of all anthropogenic features proposed for modification are digitized correctly. Delineate additional features as needed.
- C4.3** Populate the ‘Type’ and ‘Subtype’ fields for each entry. Be sure to save edits **and stop editing** when done. The ‘Type’ and ‘Subtype’ provided here should reflect the current ‘Type’ and ‘Subtype’ of the feature, NOT the ‘Type’ and ‘Subtype’ after modification.

C5. Run Credit Tool 2

[Catalog> Toolboxes> CreditTools> Credit Tool 2]

- Map_Units or Modified_Anthro_Features** = the **Map_Units** layer edited in step C3. The provided feature class MUST be located within the project's geodatabase. **Leave blank if only Modifying or Removing Anthro Features**
- Proposed_Modified_Features (optional)** = the **Proposed_Modified_Features** layer edited

in step C4. The provided feature class MUST be located within the project's geodatabase

- **Project Folder** = the unique folder for this project. A copy of the 'Credit_Project_Area' will be saved as a shapefile to this folder. Provide this layer as the 'Project Extent' to NDOW to request the 'ASUI' layer.

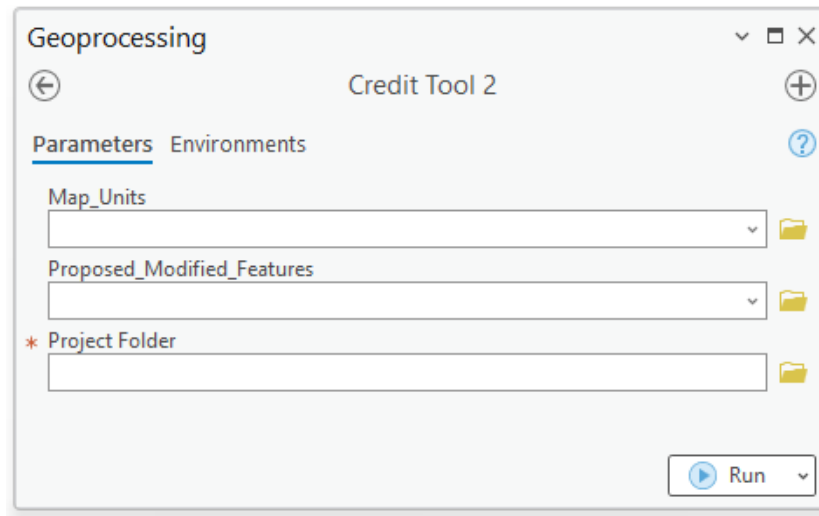


Figure 16: Credit Tool 2 interface

Credit Tool 2 Output:

- Analysis Area Layer
- Anthro *feature type* Clip Layers

C6. Acquire the ASUI layer from the Nevada Department of Wildlife (NDOW)

- C6.1 Submit a Data Request Form, available from the NDOW website at <https://www.ndow.org/blog/gis-data/>.
- C6.2 Provide the 'Credit_Project_Area' layer as the '**Project Extent**'. The 'Credit_Project_Area' layer is saved as a shapefile in the project folder. Clarify that ~~you are requesting~~ the 'ASUI' layer is being requested for the purpose of assessing a Credit ~~P~~project site for the Conservation Credit System.

C7. Identify and delineate anthropogenic features

Review each 'Anthro *feature type* Clip' layer, where **feature type** refers to a specific anthropogenic subtype (e.g. Mines), as a starting point to help identify and delineate anthropogenic features that exist within the extent of the 'Analysis Area'. 'Anthro *feature type* Clip' layers are generated by Credit Tool 2 in the 'project.gdb', where

~~**feature type** refers to a specific anthropogenic subtype (e.g. Mines) layer in the Anthro_Feature feature group that was created in Credit Tool 2, and can be used as a starting point to help identify and delineate anthropogenic features that exist within the extent of the Analysis Area. These layers are named 'Anthro_*feature type*_Clip' in the project .gdb, where~~



~~**feature type** refers to a specific anthropogenic subtype (e.g. Mines).~~ A combination of these layers, aerial imagery, and knowledge of the site should be used to identify existing anthropogenic features within the 'Analysis Area' layer. Also see the additional guidance provided in [Appendix 1](#).

If ~~you anthropogenic features~~ have already been digitized ~~anthropogenic features~~ and all features have been merged into a single feature class, skip this step and provide that feature class or shapefile as the 'Current_Anthro_Features' parameter in Credit Tool 3. Ensure the 'Type' and 'Subtype' fields in the attribute table are populated with the correct codes found in **Table 1**.

For each 'Anthro_*feature type*_Clip' anthropogenic feature layer in the Anthro_Feature feature group of the map document the 'project.gdb' that requires modification, edit as follows:

- C7.1** Use the 'Create Features' tool to add features to the appropriate 'Anthro_*feature type*_Clip' layer. Open the attribute table and populate the 'Type' and 'Subtype' fields for each entry. Use the Type Code and Subtype Code for each attribute as provided in Table 1. Be sure to save edits ~~and stop editing~~ when done.
- C7.2** For Credit P projects that propose to remove or modify existing anthropogenic features, populate the 'Subtype_As_Modified' field with the subtype that the feature will be modified to. If the feature is to be removed, select N/A. Populated 'Overlap Status' with Removed and 'Returned' with False. If the project will not remove or modify existing anthropogenic features, ~~these~~ attribute fields will not be present.
- C7.3** Save features. ~~and stop editing~~.

Tips

- Do not add new anthro features to an existing 'Current Anthro Features'. Add them to the base 'Anthro_*feature type*_Clip' layers and create a new 'Current Anthro Features' layer. Not starting from scratch can significantly affect the final calculation.
- Do not change the names of the 'Anthro_*feature type*_Clip' layers. If existing anthropogenic features of a specific type are digitized in a layer other than the 'Anthro_*feature type*_Clip' layer created by Credit Tool 2, copy and paste those features into the appropriate 'Anthro_*feature type*_Clip' layer.
 - Select the feature ~~you want~~ to copy. Hold down SHIFT while clicking features to select additional features.
 - ~~Click~~Select the Copy button () on the Standard toolbar.
 - ~~Click the~~Select Paste Special button () on the Standard toolbar.
 - ~~Click~~Select the 'Anthro_*feature type*_Clip' layer in which to store the pasted feature.
 - ~~Click~~Select 'OK'. The feature is pasted into the appropriate layer.
- Ensure that all features have been captured. It is recommended to set the map scale, located in the bottom-left corner of the map, to 1:3,000 and scan the imagery systematically to ensure that all features have been digitized properly.

[Geoprocessing> Toolboxes> Cartography Tools> Map Series> Grid Index Features]

- Output Feature Class = a new layer named 'GridIndexFeatures'
- Input Features = 'Analysis_Area'
- Generate Polygon Grid that intersects input feature layers or datasets = 'checked'
- Use Page Unit and Scale = 'unchecked'
- Polygon Width = 1000 (in meters)
- Polygon Height = 1000 (in meters)
- All other fields = blank

C8. Run Credit Tool 3

[Catalog> Toolboxes > CreditTools > Credit Tool 3]

- Analysis_Area = the 'Analysis_Area' layer created by Credit Tool 2. This layer MUST be located within the project's geodatabase.
- ASUI -Space Use Index = the Abundance and Space Use Index (ASUI) layer provided by NDOW. This layer should be scaled from 0 - 1 (or within that range) and have the

same extent as the 'Analysis_Area'. See step C6.

- **Current_Anthro_Features (optional)** = leave blank, unless existing anthropogenic features were not delineated within each 'Anthro_*feature type*_Clip' feature in step C7, in which provide the feature class or shapefile in which anthropogenic features were delineated.
- Ensure that the provided layer has a 'Type' and 'Subtype' field in the attribute table, and that the Type and Subtype are categorized according to the 'Type Code' and 'Subtype Code' provided in **Table 1**.
- **Project Folder** = the unique folder for this project. Excel files containing the outputs from this process will be saved to this folder.
- **Project Name (optional)** = a unique name which will be included in the output file name, if desired.

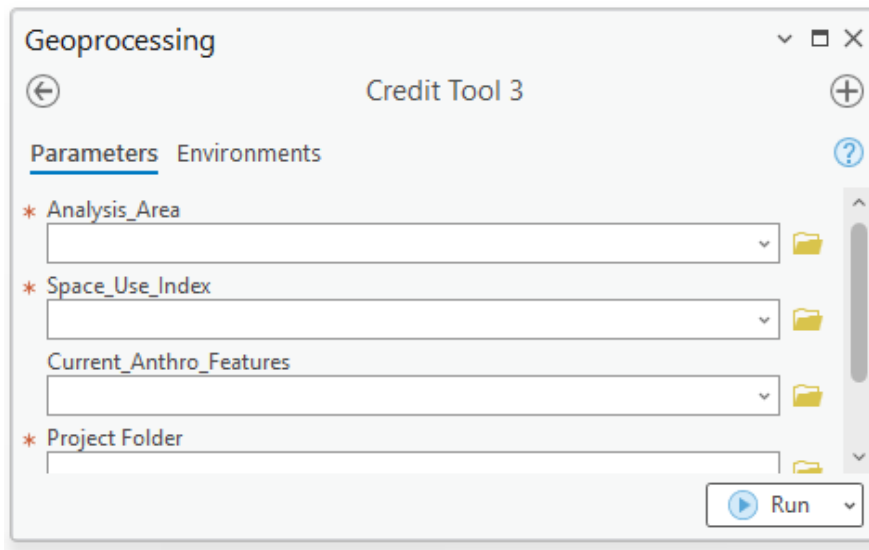


Figure 17: Credit Tool 3 interface

Credit Tool 3 Output:

- Current Anthro Features Layer
- Current Anthro Disturbance Raster
- Seasonal GRSG HSI Rasters
- Credit Quality Raster
- Map Units Dissolve Layer
- Excel files for calculator input

Tips

- If a feature class named 'Map_Units_Dissolve' already exists in the project geodatabase (which may be the case if ~~you did not follow~~ these steps were not followed and but map units were delineated ~~map units~~ through a separate process), that feature class will be overwritten by Credit Tool 3. ~~You may either change~~ Change that the layer's name (we recommend 'Map_Units_Dissolve_Copy') or save a copy outside of the project geodatabase if overwriting that layer is not desired.

C9. Specify number of transects for each map unit

- C9.1** Open the attribute table of the **'Map_Units_Dissolve'** layer.
- C9.2** Populate the 'Transects' field for each map unit with the number of transects to be sampled within each map unit according to the necessary sampling intensity (see [Appendix 4. Minimum Transects Per Map Unit](#)). Refer to [Appendix 3](#) for more guidance in transect generation and screening in the Desktop Analysis. For the map unit associated with existing surface disturbance, and any other map units where field data will not be collected, input '0'.
- C9.3** Save edits ~~and stop editing~~ when done.

Tips

- Transect numbers should only be specified for map units that will be sampled in the field. For map units where field data will not be collected, input '0' in the 'Transects' field.
- After running Credit Tool 3, a raster layer named **'Credit_Quality'** has been added to the map document illustrating the local-scale **GRSG** habitat quality of the project. ~~You may~~ **€**Consider changing the credit project design if local-scale **GRSG** habitat quality is poor. Re-run the Desktop Analysis to evaluate changes to the project design. ~~You may want to~~ **€**Create a new geodatabase so as not to have the original results overwritten.

C10. Acquire an approved Transects layer from the SETT

- C10.1** Provide the **'Map_Units_Dissolve'** shapefile to the SETT with the Transect attribute populated. SETT will generate spatially balanced transects pre-screened for hazards including steep slopes, as well as distance from roads, for each project.

C11. Run Credit Tool 4

[Catalog > Toolboxes > CreditTools > Credit Tool 4]

- **Map_Units_Dissolve** = the 'Map_Units_Dissolve' layer created by Credit Tool 3. Ensure the 'Transects' field of the attribute table has been populated appropriately (if Transects have not been generated through a separate process)
- **Transects** = A point shapefile or feature class that represents transect locations, provided by the SETT
- **Project Folder** = The unique folder for this project. An Excel file with transect locations and bearings will be saved here.
- **Project Name (optional)** = Provide a unique name which will be included in the output file name, if desired.

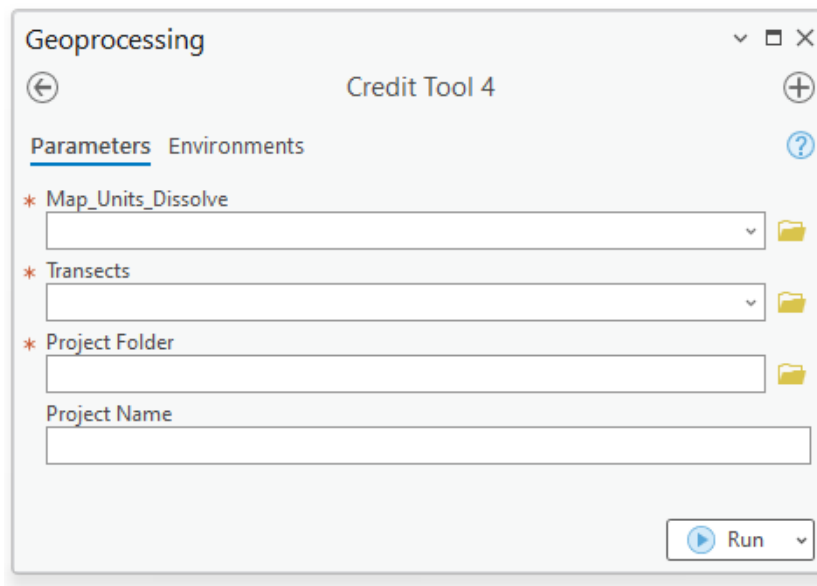


Figure 18: Credit Tool 4 interface

Credit Tool 4 Output:

- Transect SpatialJoin Excel file

C12. Add the exported data to the Credit Project Calculator

- C12.1** Open the project folder to find exported data tables as Excel files.
- C12.2** Copy the relevant columns from the tables and Paste Values into the corresponding worksheets and columns in the Project calculator. Strict copy and paste can lead to cell formatting changes See [Figure 20-Figure 19](#) for a list of data generated during the Desktop Analysis that must be inputted into the Project HQT Calculator.

EXPORT TABLE	CALCULATOR WORKSHEET
<input type="checkbox"/> Map_Units_Dissolve	1.1 Enter Map Unit Data
<input type="checkbox"/> Current_Mgmt_Cat	1.3 Enter Mgmt Cats Data
<input type="checkbox"/> Current_WMZ	1.3 Enter Mgmt Cats Data

<input type="checkbox"/>	Current_PMU	1.3 Enter Mgmt Cats Data
<input type="checkbox"/>	Current_Precip	1.3 Enter Mgmt Cats Data
<hr/>		
<input type="checkbox"/>	Transects_SpatialJoin	1.2 Enter Transects Data

Figure 19: Export Tables generated and corresponding Calculator worksheet

Tips

- The Calculator includes more detailed instructions for how to input data from each field datasheet. See rows 1 and 2 in the relevant worksheet in the Calculator.
- After receiving an approved **'Transects'** layer from the SETT, ~~you are now ready to complete~~ *Section 2. Field Data Collection Method can be completed*. The field crew will confirm the boundaries of map units, add or remove transect locations, and confirm the location of anthropogenic features. When field work is complete, make any necessary revisions to the **'Map_Units_Dissolve'** layer, **'Transects'** layer, and **'Current_Anthro_Features'** layer.
- If the field crews recommend changes to the **'Map_Units_Dissolve'** layer, **'Transects'** layer, and **'Current_Anthro_Features'** layer, ~~you must~~ redo steps C8, C10 and C12. Specify the updated **'Map_Units_Dissolve'** layer for the Map_Units parameter and updated **'Current_Anthro_Features'** layer for the Current_Anthro_Features parameter in Credit Tool 3. Modify the **'Transects'** layer as necessary before running Credit Tool 4.
- Uplift from conifer removal will automatically be reflected in the Projected Seasonal Habitat Functions columns in the **'Map_Units_Dissolve'** layer.
- For Preliminary Credit Estimates, enter 'Yes' in the 'Summary' tab of the Project Calculator (cell F6). Preliminary Credit Estimates are intended to help with project planning and design before field data is collected. The average seasonal HSI value will be used in place of site-scale **GRSG** habitat quality for each map unit.

Field Data

Collection Method

FIELD DATA COLLECTIONS METHODS

The methods outlined below must be used for field data collection of attributes associated with the ~~site-~~ site-scale, which defines GRSG habitat conditions at the site of proposed activities. **Table 2** describes the attributes measured to calculate site-scale functional-acres for specified seasonal GRSG habitats. While non-certified personnel may assist independently in the collection of field data, a **Field Certified Verifier** is required to be within the credit or ~~d~~Debit ~~p~~Project area during field collection.

TIMING OF FIELD DATA COLLECTION

Vegetation sampling of ~~sage-grouse~~GRSG habitat attributes must be conducted during the peak of the growing season. ~~In northern Nevada rangeland, T~~the peak ~~of the~~ growing season ~~on northern Nevada rangeland~~ generally occurs between **April 15th and June 30th**. These dates may vary annually slightly ~~annually~~ due to temperature and precipitation. The peak of the growing season differs varies between sites based ~~upon~~ elevation, latitude, and winter and spring precipitation. ~~Consider Take~~ annual and site-specific variations ~~into account~~ when approximating the peak of the growing season within the permissible window for the site. ~~The P~~peak growing season is indicated when the culms of ~~cool-cool-~~ season grasses have fully elongated and seed heads have emerged (though not necessarily seed-ripe), and the majority of forb species are between early bloom and seed set phenological stages.

Field data must be collected during the permissible window ~~in order~~ for functional acre scores to be official and approved by the Administrator; ~~h~~However, shrub data may be collected ~~during at~~ any time of the year. When making repeat visits to a site, attempt to collect data at a phenologically -similar time, or within two weeks of the first data collection for ~~the that~~ site.

FIELD MATERIALS REQUIRED

The following materials should be collected before the field visit:

1. Credit or Debit Project Calculator (unnecessary in the field)
2. Hand-held GPS unit (1–5-meter accuracy), preloaded with transect start points (accurate to 1-5 m)
3. Field maps, using aerial photos as background
4. Datasheets
5. Camera
6. 50-meter tape (3 recommended)
7. Chaining pins
- 7.8. Compass for transect bearing
- 8.9. 1-meter tape or wooden ruler
- 9.10. PVC or wooden Daubenmire frame (20 X 50 cm)
- 10.11. White board for photo of transects or photo transect datasheets
- 11.12. Rangefinder or 100-meter tape for distance to sagebrush
- 12.13. Plant field guides for the area
- 13.14. A User's Guide to Assessing Proper Functioning Condition for both Lentic and Lotic Areas and the Supporting Science and Checklists, available at: https://sagebrushco.nv.gov/CCS/Program_Documents/
- 14.15. 1.5-meter PVC pole with carabiner (recommended)

Table 2. Attributes measured and summary of data collection methods

ATTRIBUTE	RESOURCE	SAGE-GROUSE SEASON	DATA COLLECTION SUMMARY
Sagebrush canopy cover	Cover Cover and Foraging	<ul style="list-style-type: none"> ▪ BREEDING ▪ LATE BROOD-REARING ▪ WINTER 	The percent canopy cover is estimated with line intercept (% of sagebrush canopy intersecting transect line).
Total shrub canopy cover (including sagebrush)	Cover	<ul style="list-style-type: none"> ▪ BREEDING 	The percent canopy cover is estimated with line intercept (% of total shrub canopy intersecting transect line).
Sagebrush height	Cover and Foraging	<ul style="list-style-type: none"> ▪ WINTER 	The sagebrush height is determined by measuring the tallest point of a shrub that is intersecting the transect line.
Distance to sagebrush cover	Cover -Trigger	<ul style="list-style-type: none"> ▪ LATE BROOD-REARING 	Distance to nearest sagebrush cover (cover equivalent to area of at least ~30x30 m, with density of 10% canopy cover, and average height of 30cm) is measured from the 30 m point along each 50 m transect. <u>If nearest cover is farther than 300m, record distance as 300m.</u>
Perennial forb canopy cover	Foraging	<ul style="list-style-type: none"> ▪ BREEDING ▪ LATE BROOD-REARING 	Percent cover of perennial forbs is determined by sampling within a standard-sized Daubenmire plot (20x50 cm) at 10-meter <u>10-meter</u> increments along a 50 m transect (5 plots total/ transect).
Forb species richness (# of species)	Foraging	<ul style="list-style-type: none"> ▪ BREEDING ▪ LATE BROOD-REARING 	Abundance of forbs (annual and perennial) is determined by sampling within a standard-sized Daubenmire plot (20x50 cm) at 10-meter <u>10-meter</u> increments along a 50 m transect (5 plots total/ transect).
Perennial grass canopy cover	Cover-Trigger Cover	<ul style="list-style-type: none"> ▪ BREEDING ▪ LATE BROOD-REARING 	Species and percent cover of perennial grasses is determined by sampling within a standard-sized area of Daubenmire plot (20x50 cm) at 10-meter <u>10-meter</u> increments along a 50 m transect (5 plots total/ transect).

Invasive annual grass canopy cover	Modifier	<ul style="list-style-type: none">▪ BREEDING▪ LATE BROOD-REARING	Percent cover of annual grasses is determined by sampling within a standard-sized area of Daubenmire plot (20x50 cm) at 10-meter <u>10-meter</u> increments along a 50 m transect (5 plots total/ transect).
---	----------	---	---

DETAILED INSTRUCTIONS

F1. Conduct Site Reconnaissance

Upon ~~arriving initial arrival~~ at the site, field crews should conduct a preliminary check-inspection of the map unit delineations by walking or driving around together. reconnaissance (walking or driving) together to roughly quality check the map unit delineations. ~~It is important to note that map units, Map units,~~ especially in agricultural and meadow areas, ~~often can~~ change from year to year, and may not accurately reflect ~~even relatively~~ recent aerial photography. ~~As well, Some~~ changes in ~~some~~ vegetation communities, ~~may not be evident on aerial photographs,~~ such as understory composition, ~~may not be visible on aerial photographs.~~ If ~~the desktop analysis map indicates the presence of~~ pinyon-juniper, ~~is indicated to be present within the Desktop Analysis map template pinyon-juniper layer, the~~ relevant areas should be verified assessed in the field to confirm if these for verification that pinyon or juniper species are actually indeed present as mapped. There may be occasional misclassifications of other species like The pinyon-juniper layer includes occasional misclassifications of other conifer or deciduous species such as mahogany that need to be verified on the ground. ~~create this need for ground truthing.~~ ~~In addition, it is possible omissions in the pinyon-juniper layer exist that require inclusion.~~

Crews should be prepared to modify-adjust map unit boundaries ~~-(both further sub-dividing maps units and conglomerating existing maps units.)~~ as well as potentially adjusting and potentially the pinyon-juniper layer in the field based on observations in the field. It is crucial for Crews-crews ~~to should also~~ come to a common understanding of the plants present, and the protocol that follows. Additionally, any changes to map units must be noted-documented, and map-unit and relevant GIS data files must be corrected after the field work is completed. ~~In addition, if there is high variability at the sites have high variability~~ that cannot be addressed accounted for through changes in map unit delineations, additional transects should be added ~~to the protocol~~ based on the verifier's best judgement. ~~of the verifier.~~

While checking map units, crews should also assess the are checking out the map units, effort should be expended looking at the terrain and checking the presence of roads in order to identify the presence of roads to determine if alternate routes ~~are areas where alternate routes may be needed.~~ It is essential to confirm the placement and type of anthropogenic features, especially ~~In addition to checking the map unit delineations, crews should also confirm placement and type of anthropogenic features, especially~~ powerlines, and fill out the Anthropogenic Features Datasheet, ~~especially~~ with any changes or additions to the anthropogenic layer.

If a transect falls on private property that is inaccessible, itthe area should be the inaccessible area will need to be delineated as a separate map unit. Additionally, in tab 2.6 (Review Site Scale Quality) of the calculator, ensure that "'No'" is entered into the column labeled "Access to Map Unit for Field Sampling?" for the inaccessible map unit.

F2. Document Anthropogenic Features

- F2.1** The anthropogenic features map developed in the pre-field desktop analysis should be ground-truthed ~~on foot or by in a vehicle.~~ Any additional features ~~that are~~ identified should be marked on the map and digitized in ~~the office in~~ ArcGIS; similarly GPS coordinates collected and recorded in the field should be added to ArcGIS ~~in the office.~~
- F2.2** Newly identified features should be noted on the anthropogenic features datasheet for the project site.
- F2.2(a) If features are marked on the map, be sure to attach the map to the anthropogenic features datasheet.

- F2.2(b) If features are marked using GPS, be sure to record GPS unit name and use the following naming code: **XXX- #** where **XXX** is the three letter abbreviation for project site, and **#** is a unique sequential number for each feature identified in the field. **Make sure to specify which coordinate system you are using is used.**

F3. [Repeat Steps F4 - F12 for each Map Unit]

F4. Complete Map Unit Datasheet

The map unit datasheet should be the first form ~~filled out when completed upon~~ arriving at the site and ~~should~~ continued to be filled out as the sampling is completed (see ~~Appendix 9. Map Unit Datasheet~~ Map Unit Packet). For each map unit, record the date, map unit description, and other mandatory information. ~~After all~~ ~~The total number of~~ map units ~~have been~~ sampled, ~~count and record the total number of map units sampled within the project site.~~ ~~within the project site should be counted and recorded after all map units have been sampled.~~ count and record the total number of map units sampled within the project site.

F5. Complete Resistance & Resilience Scorecard

~~Ensure you Complete completion of e~~ the Resistance and Resilience Score Sheet for each ecological site ~~or /~~ map unit within the project area. ~~You should have already partially filled out t~~ The Resistance & Resilience Scorecard is partially completed during the Desktop Analysis (see *Field Materials Required*), ~~the Resistance & Resilience Scorecard should have been partially filled out during the Desktop Analysis~~, referring Make sure to refer to the accompanying field guide ~~for assistance. Some information will require consultation with the project proponent (e.g., response time of fire suppression resources for initial attack).~~ Once the score cards are complete, calculate the total score for the project site ~~and enter it should be calculated and entered~~ into the Calculator on the Baseline and Reserve Account tab.

F6. Complete Ability to Control Wildfire Scorecard

Complete a Wildfire Score Sheet for each ecological site ~~or /~~ map unit within the project area. ~~You should have already partially filled out the~~ The Wildfire Scorecard is partially completed during the Desktop Analysis (see *Field Materials Required*), ~~the Wildfire Scorecard should have been partially filled out during the Desktop Analysis~~, referring Refer to the accompanying field guide to complete the score sheets. Once the score cards are complete, calculate the total score for the project site ~~and enter it should be calculated and entered~~ into the Calculator on the Baseline and Reserve Account tab.

F7. Complete Lentic or Lotic PFC Checklist (if applicable)

- F7.1 Complete the Lentic or Lotic PFC Assessment Checklists for ~~the C~~ credit P projects only.
- F7.1(a) Proof of PFC training is required and must be renewed every 5 years.
- F7.1(b) One checklist must be completed per riparian system or reach if system can be divided into reaches.
- F7.1(c) At least two people, but three are recommended, must complete PFC together.
- F7.1(d) Each PFC Reach will be named as followed: **XXX-PFC-[ReachName]**
- F7.1(e) Photos should be labeled as 'XXX_PFC_ReachName_##_YYMMDD.jpg'
- (i) Detailed photos should be taken of each reach displaying the reasoning for the final rating. If it is PFC, show a proper functioning reach. If there are issues, display the issues such as a cut bank or lack of vegetation.
- F7.1(f) Datasheets should be compiled together into one ~~scan PDF~~ and labeled 'XXX_PFC_Datasheets_YYYYMMDD.pdf'. Ensure that all portions of datasheets are filled out completely, including the plant list.
- F7.1(g) **XXX** is three letter abbreviation for project site and the **Reach Name** should be a descriptive location name of the reach surveyed (LowerKidCreek; UpperFish)
- F7.1(h) Example: DBR-PFC-Lower, DBR_PFC_Lower_1_20180628.jpg, DBR_PFC_

Datasheets_20180628.pdf

F8. [Repeat Steps F9 - F12 for each Transect]

F9. Navigate to Transect and Begin Data Collection

F9.1 Establishing a Transect

F9.1(a) Navigate to ~~the~~ transect start point ~~using a~~ hand-held GPS. Insert a chaining pin in the ground, and lay out or thread a 50-meter ~~transect in the direction specified by the randomly generated bearing, using magnetic north on a compass. transect using the random bearing generated for that transect, using magnetic north. Ensure that the transect tape is threaded through the base of all vegetation, not laid on top of it.~~ Pull the tape taut and anchor the ~~50-50-meter~~ end with another chaining pin. Populate all fields at the top of transect datasheet (~~Appendix 14. Transect Datasheet~~see Map Unit Packet), with the ~~following information:~~ date, observer initials, site name, map unit number, the transect number and UTM's (including UTM Zone and Datum), GPS type, transect bearing, whether the transect is within an altered or unaltered meadow, photo point numbers, and camera type.

F9.1(b) ~~Always note any changes in transect location, methods, and bearings, as well as the reasons for these changes, on the datasheet if you deviate from the general methods or rejection of a transect occurs. Photograph the changes if necessary to provide justification. Additionally, make a note of any rejections and include these notes with the post-field submissions. Always note any changes in transect location, methods, and bearings and the reason for the change on the datasheet if you deviate from the general methods or reject a transect. Photograph if you need to justify. Always make a note of rejections and include those notes with the post-field submissions.~~

¹ Miller, ~~Richard R.~~ Chambers, ~~Jeanne C.~~ Pellant, ~~Mike~~. 2014. A field guide for selecting the most appropriate treatment in sagebrush and piñon-juniper ecosystems in the great basin: Evaluating resilience to disturbance and resistance to invasive annual grasses, and predicting vegetation response. Gen. Tech. Rep. RMRS-GTR-322 REVISED. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 66 p.

~~**NOTE** Rejections should be made sparingly and logically, with reasons always noted on the datasheets and photos if necessary. Reasons for rejection are, but not limited to, safety-hazard (>50% slopes, large unsafe rock outcrops, talus slopes, or unsafe hiking routes), pre-established bearings do not allow for sampling, or the transect falls on or in a barrier (e.g. a thicket, body of water) and cannot be moved over ≤5m to be out of it even when reflected. **Inclusions, grazing, or non- or over-representation of the landscape or map unit are not reasons for moving or rejecting a transect.**~~

NOTE: Rejections should be made sparingly and logically, with reasons always noted on the datasheets and accompanied by photos if necessary. Acceptable reasons for rejecting a transect include, but are not limited to, safety hazards (e.g., slopes greater than 50%, large unsafe rock outcrops, talus slopes, or unsafe hiking routes), unsuitable pre-established bearings, or if the transect falls on or within a barrier (e.g., a thicket or body of water) and cannot be moved ≤ 5 meters to avoid it. **Factors such as inclusions, grazing, or non- or over-representation of the landscape or map unit are not valid reasons for moving or rejecting a transect.**

NOTE: If a transect crosses a map unit boundary into another map unit or outside of the project area, or runs into a fence, a body of water, or a road, the transect will need to be reflected back into the map unit by 90 degrees at that point of contact, priority to the right, if not, then left. If that doesn't work for all provided bearings, pick the next randomly generated point in that map unit.

NOTE: If a transect passes through a thicket that is too dense to sample properly (e.g., willow, serviceberry, mahogany, desert peach) and the thicket extends along the entire length of the transect (rather than being an issue for only a few meters), reflect the transect 90 degrees to the right at the point of contact. If that is not possible, reflect 90 degrees to the left. If reflecting does not resolve the issue for all provided bearings, select the next randomly generated point for that map unit. If the transect falls on or within a barrier (e.g., a thicket or body of water) and can be moved ≤ 5 meters to avoid it, then move and sample. If moving is not possible, select the next randomly generated point for that map unit.



Figure 20: Transect reflection examples (a. map unit boundary, b. stream, c. moving the transect 3 meters out of dense shrubs, reflecting- other dense shrubs, and sampling through less-dense shrubs)

NOTE: If, upon arriving at the assigned transect, you find it is found that the map unit was mapped incorrectly and the transect now falls outside of the designated map unit, please follow the procedure below:

1. If you can see the correct map unit is visible and within a reasonable distance:

- Starting with North, then moving to East, South, and finally West if the previous directions do not work, determine the direction that will place you within navigate to the correct map unit using the shortest route.
- At the border of the map unit, measure 50 meters in the determined cardinal direction. The end of this 50-meter measurement is where theyour-new transect should be located.
- If moving 50 meters places you outside the desired map unit, move as far as you can possible while remaining within the map unit. This will be the location of yourthe new transect.
- Proceed with your-sampling as normal, adjusting the bearings if needed and reflecting the transect if required. Record the new UTM's and make note of the transect relocation and the chosen direction.

2. If you cannot see the map unit is not visible or it is outside of a reasonable distance:

- Sample and reassign the transect to the map unit it currently falls within.
- Go to the next backup transect for the map unit you-that was originally intended to-for sampling.
- Record the change in transect map unit delineation.

NOTE: When sampling a very small meadow (e.g., upland spring or seep) where a transect might reflect multiple times and potentially overlap onto itself, follow one of the two procedures based on what will be most effective for the site-specific conditions:

- 1. For seeps or springs:** Reflect the transect off the boundary of the map unit using an angle that prevents the transect from overlapping itself. This can be pre-screened in GIS to assess the applicability of this method.
- 1.2. For thin, linear stringer meadows:** Pre-screen your-transect points before field collection to ensure that each point falls in an area where a full 50 meters can be sampled. The goal is to capture the best habitat possible in a representative portion of the map unit. Start at the transect location and choose initial and subsequent bearings that minimize the number of reflections.
- 2.3. Always record the methods and bearings used, and note the reasons for any deviations from or rejections of the general methods on the datasheet. Photograph any justifications if necessary.**

F9.1(c) Transects will be named as followed: **XXX-MU#-T##**

F9.1(d) **XXX** is three letter abbreviation for project site, **MU#** is the map unit number (3-digits), and **T##** is the transect number (3-digits), all of which should be named based on information from the pre-field work desktop analysis.

F9.1(e) Example: DBR-001-001

F9.2 Photo Points

F9.2(a) Using a white board, label it with the project site, date, transect name, and transect direction. Lean it next to the chaining pin it at the ~~0-meter~~0-meter mark of the

transect.

- (i) ~~If the photo board is obstructed at the chaining pin, either move the photo board to make it visible or move the vegetation aside. If someone needs to hold the photo board, ensure they hide their face and crouch low to minimize their visibility. If the photo board is obstructed in any way at the chaining pin, move the photo board until it is visible or move the vegetation aside. Should someone be required to hold the photo board, ensure they hide their face and are crouching low in order to be as least visible as possible.~~

F9.2(b) Stand away from the start of the transect and align camera in the direction of the transect so that the bottom of the white board is at the photo's bottom center (Figure 22) and the camera is in landscape (not portrait) format.

F9.2(c) Take photo.

F9.2(d) Photos will be named as followed: 'XXX_MU#_T##_[Descriptor]_YYYYMMDD.jpg'

F9.2(e) **XXX** is three letter abbreviation for project site, **MU#** is the map unit number, and **T#** is the transect number, all of which should be named the same as the transect or reach name. The Descriptor describes the type of photo. Use **T#** for each photo of the same transect and **AF##_#** for Unknown Photos. For all other photos, use a descriptor with no spaces (BigSagebrush#; MuddyPool#) or a general Miscellaneous descriptor (Misc#), where # is a unique sequential number for each photo of that type.

F9.2(f) Example: DBR_001_001_T3_20180512.jpg, DBR_005_007_AF04_01_20180515.jpg, DBR_003_010_GiantHole01_20180515.jpg, DBR_002_003_Misc07_20180515.jpg

NOTE: For data collection: Always stand on the right side of the transect. Field data should be collected on the left side of the transect.



Figure 21: Transect photo example

NOTE: All species from Line intercept, Daubenmire plots, and general species lists, should be recorded using the following nomenclature. Species names should be recorded using full scientific name or the USDA PLANTS database species code (<http://plants.usda.gov/>).

~~If you can identify the genus, but not the species, use the PLANTS database genus code (http://plants.usda.gov). ALWAYS try to define the genus portion of the code in the notes section of the transect datasheet (e.g., *Artemisia* species = ARTEM). In addition, note if it is annual or perennial for forbs and graminoids.~~

~~Do not use common names.~~

~~If you cannot identify the genus, use the following codes and a short description/drawing:~~

- ~~▪ AF# = Annual forb (also includes biennials)~~
- ~~▪ PF# = Perennial forb~~
- ~~▪ AG# = Annual graminoid~~
- ~~▪ PG# = Perennial graminoid~~
- ~~▪ SH# = Shrub~~

NOTE: All species from Line intercept, Daubenmire plots, and general species lists, should be recorded using the following nomenclature. Species names should be recorded using full scientific name or the USDA PLANTS database species code (<http://plants.usda.gov/>).

~~If you can identify the genus, but not the species, use the PLANTS database genus code (http://plants.usda.gov). ALWAYS try to define the genus portion of the code in the notes section of the transect datasheet (e.g., *Artemisia* species = ARTEM). In addition, note if it is annual or perennial for forbs and graminoids.~~

~~Do not use common names.~~

~~If you cannot identify the genus, use the following codes and a short description/drawing:~~

- ~~▪ AF# = Annual forb (also includes biennials)~~
- ~~▪ PF# = Perennial forb~~
- ~~▪ AG# = Annual graminoid~~
- ~~▪ PG# = Perennial graminoid~~
- ~~▪ SH# = Shrub~~

F10. Distance to Sagebrush Cover

F10.1 Measure the distance to the nearest sagebrush, or sagebrush mixed shrub community, cover from the ~~30-meter-m~~ mark of the transect and record the distance in meters on the datasheet.

F10.1(a) Sagebrush or sagebrush mixed shrub community cover must have at least ~~aof~~ 10% canopy cover in a minimum 30x30 m patch size with ~~an~~ average height of 30 cm.

F10.1(b) If the transect is located within sagebrush cover, then record ~~the~~ distance as ~~0-meters-m~~.

F10.2(c) If the nearest sagebrush cover is greater than 300 meters away from the transect, record the distance as 300 meters.

F11. Line Intercept

F11.1 Shrub Canopy Cover

F11.1(a) ~~You~~ Data collection can begin at the 0-~~meter-m~~ or the 50-~~meter-m~~ mark for line intercept. For the entire length of the transect, record start and stop locations for all shrub species intercepting the transect using the following categories:

- Low sagebrush
- Big sagebrush
- Other

F11.1(b) Interceptions less than 5 cm are not recorded as canopy cover.

F11.1(c) If a gap is greater than or equal to 5 cm stop ~~your~~ intercept recording. Resume intercept ~~upon once you~~ reaching canopy cover that is greater than or equal to 5 cm.

F11.1(d) Dead or decadent shrubs, if still rooted, count towards shrub canopy cover.

- (i) If the entire sagebrush, including the parts not measured, is dead, categorize it as "Other" because it is no longer providing forage.

F11.1(e) ~~Canopy cover for each shrub species is recorded, even if multiple species are overlapping. For multiple sagebrush that overlap, record each shrub individually by adhering to the following procedure: measure from the start of shrub 1 to the end of shrub 1. The end of shrub 1 will be considered the start of shrub 2. Measure to the end of shrub 2. The end of shrub 2 will considered be the start of shrub 3. Repeat for all overlapping sagebrush in the section.~~

F11.1(f) For multiple non-sagebrush shrubs ~~of the same species~~ that overlap, ~~you may~~ record the start and stop of the entire section instead of for each individual shrub.

F11.1 (g) For multiple sagebrush and non-sagebrush shrubs that overlap, adhere to the procedure outlined in F11.1(e). Always measure sagebrush as individual shrubs. "Other" shrubs can be measured as either individual shrubs or lumped into sections when appropriate (see F11.1(f)).

F11.1(~~gh~~) Trees and sub-trees do not count as shrub canopy cover

NOTE: The total lengths of shrubs will be added together over the 50 meters to calculate the percent canopy cover of sagebrush and total shrubs.

NOTE: The following sagebrush species (Low and Big) are the species of sagebrush in Nevada that the CCS recognizes. No other species should be counted as sagebrush. For example, *Artemisia spinescens* and *Artemisia ludoviciana* are “sage” species, but they should not count as sagebrush and should be considered “other” shrub canopy cover.

- *Artemisia arbuscula* (L)
- *Artemisia cana* (B)
- *Artemisia frigida* (L)
- *Artemisia longiloba* (L)
- *Artemisia nova* (L)
- *Artemisia papposa* (L)
- *Artemisia tridentata ssp. tridentata* (B)
- *Artemisia tridentata ssp. vaseyana* (B)
- *Artemisia tridentata ssp. Wyomingensis* (B)
- *Artemisia tripartita* (B)

F11.2 Sagebrush Height

- F11.2(a) For each sagebrush plant intercepting the transect, record ~~once~~ the tallest vegetative portion, to the nearest cm, once per individual shrub (even if it intercepts the transect multiple times). Do not include the inflorescence of sagebrush as height.
- (i) “Other” species do not need height recorded.

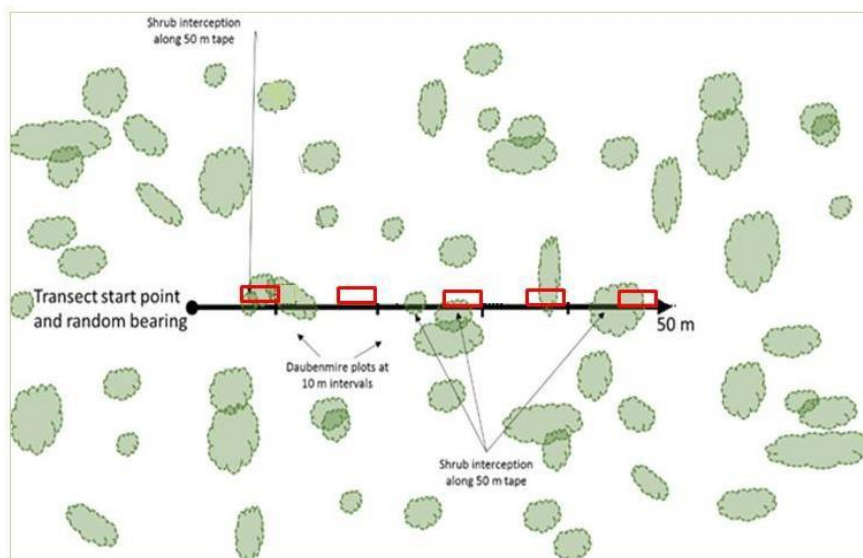


Figure 22: Diagram of transect and plots

F12. Daubenmire Plots

F12.1 Daubenmire Frame Placement

- F12.1(a) Place the top of a Daubenmire frame on the left side of the transect line with the top at the ~~10-meter~~ 10-meter mark, aligned down the transect line (see Figure ~~3322~~). The frame should be placed with the long side parallel to the transect. Take care not to damage any vegetation. Repeat these placements every ~~10-meters-m~~ 10-meters, for a total of 5

plots along the 50 m transect.

F12.2 Grass and Forb Cover

F12.2(a) Record all grass and forb cover that falls within the plot using the following cover classes listed in Table 3. If the plant is rooted outside the plot, but its cover falls within the plot, those estimates should be counted towards cover. Do not include cover of a plant that falls outside of the plot, even if the plant is rooted within the plot.

F12.2(b) Identify cover for each of the following functional group categories:

- PF = perennial forb (live cover only)
- PG = perennial grass (live or residual)
- IAG = invasive annual grass (live or residual)

Table 3. Cover classes for use when estimating cover in Daubenmire frames

COVER CLASS	RANGE OF COVER (%)	MID-POINT OF CLASS (%)
1	0-5	2.5
2	5-25	15.0
3	25-50	37.5
4	50-75	62.5
5	75-95	85.0
6	95-100	97.5

NOTE: The following invasive annual grass species should be included, but not limited to, in the estimate of annual invasive grass cover:

- Cheatgrass (*Bromus tectorum*)
- Medusahead (*Taeniatherum caput-medusae*)
- Red Brome (*Bromus rubens*)
- Rattlesnake chess (*Bromus briziformis*)
- Ventenata (*Ventenata dubia*)

F12.3 Forb Species Count

F12.3(a) For each Daubenmire plot, record the USDA PLANT code or scientific name for each forb species that ~~are-is~~ rooted within the plot, annual and perennial, in the 'Unique Perennial & Annual Forbs in Daubenmire Frames' section. Once all 5 plots are completed for a transect, tally and record the count of all forb species identified within the 5 plots, this will give ~~you~~ a total forb species count per transect.

F12.3(b) Record all plant species encountered along the transect in the notes section of the datasheet, whether or not they fall along the transect tape or within the Daubenmire plot.

F12.3(c) State listed noxious weeds should not be counted in Daubenmire counts ~~nor~~ forb species counts. Noxious weeds list can be found [here](#).

F13. Input Data into Credit or Debit Project Calculator

DATA REQUIRED: All Field Datasheets completed during the Desktop Analysis, Credit or Debit Project Calculator

DATA REQUIRED: All Field Datasheets completed during the Desktop Analysis, Credit or Debit Project Calculator

F13.1 Open the Project Calculator.

For each Field Datasheet:

F13.2 Enter the relevant data into the corresponding worksheets and columns in the Calculator. See **Table 4** for a list of field datasheets completed during the field data collection that must be inputted into the Calculator.

Table 4. Field Datasheets completed during the Field Data Collection and corresponding Calculator Worksheet

FIELD DATASHEETS	REFERENCE STEP	CALCULATOR WORKSHEET
<input type="checkbox"/> Map Unit Datasheets	F4	2.1 Track Field Sheets
<input type="checkbox"/> Resistance & Resilience Scorecard	F5	3.1 Enter Baseline & Rsrv Acct
<input type="checkbox"/> Ability to Control Wildfire	F6	3.1 Enter Baseline & Rsrv Acct
<input type="checkbox"/> Transect Datasheets	F9 - F12	2.2 Enter Field Info 2.3 Enter Shrub Data 2.4 Enter Forbs & Grass Data

NOTE: The Calculator includes more detailed instructions for how to input data from each field data sheet. See row 1 in the relevant worksheet in the Calculator.

NOTE: If the Credit Buyer has decided to use 100% site scale function in lieu of field sampling, change the "Current Average Seasonal HSI" for Spring, Summer, and Winter to 100% in Tab 1.1 Enter Map Unit Data in the Debit Project Calculator.

F14. Scan Datasheets

F14.1 Scanned Datasheets (one .pdf per transect or reach) will be named as followed:

'XXX_MU#_Datasheets_YYYYMMDD.pdf' and 'XXX_Anthro_Datasheets_YYYYMMDD.pdf' **F14.2** XXX is three letter abbreviations for project site and MU# is the map unit number.

F14.3 The order of scanned sheets per transect will be as follows: Map Unit Datasheet, Resistance & Resilience Scorecard, Ability to Control Wildfire Scorecard, Transect 1 Photopoint Datasheet, Transect 1 Datasheets, Transect 2 Photopoint Datasheet, Transect 2 Datasheets, Transect # Photopoint Datasheet, Transect # Datasheets. The Anthropogenic Datasheets should be a separate scan.

F14.4 Example: DBR_052_Datasheets_20180527.pdf, DBR_Anthro_Datasheets_20180512.pdf

POST-FIELD SUBMITTAL

After entering all the collected field data ~~is entered~~ into the calculator and performing an internal quality assessment, a preemptive internal quality assessment is run on it, zip all documents listed in the "List of Uploaded Documents" within the **Verifier Project Assessment Submission Form** into a final package. ~~The Ensure that the all forms should be~~ signed by the appropriate parties, and authorized by the certified verifier for the project. Upload all the required information to the Credit System Verifier FTP site (<https://dcrnftp.ndep.nv.gov/login>) in a its own folder labeled with the project name. Email Notify

~~your the SETT~~ point of contact ~~via email for the SETT~~ that all the information ~~is online~~ has been uploaded. The SETT will confirm all information is accessible and correct before removing the information ~~off off~~ from the FTP site to ensure privacy compliance.

The SETT will ~~run~~ conduct a Post-Field Quality Assessment ~~on the date~~ and return the information ~~it the form~~ to the verifier with any necessary corrections, ~~that need to be made~~. Expect Allow one-month ~~one-month~~ post-submission for a ~~the final~~ Quality Assessment (QA) ~~return on the QA~~ results.

~~For Credit Projects, once the QA is approved and signed, the management plan can be submitted. Please note that if the management plan is not completed within 90 days. Reminder, if the management plan is not completed within 90 days from of the approval of a new version, then the Credits will be subject to the new updated version and must be recalculated run under this version accordingly. Credits are only eligible for sale once the management plan is signed and financial assurances have been received. Only when the management plan is signed are the credits eligible for sale.~~

~~For Debit Projects, once the QA is approved and signed, then credits may be purchased to offset the locked in debit amounts.~~

2. Credit/Credit Obligation Calculation

CREDIT/CREDIT OBLIGATION CALCULATION

This section provides a step-by-step overview of the field process for generating credits and securing credits to offset a credit obligation. These steps will be completed by the Project Proponent, Technical Service Providers, Verifiers and the Credit System Administrator, depending on their roles and skillsets. All pre-field and post-field work steps are detailed in *Sections 3.1 and 3.2* in the CCS Manual or are outlined in the [Project Checklist in the Appendix](#).

Please contact the Sagebrush Ecosystem Technical Team (SETT) with questions on any step in this process.

TOOL PREREQUISITES

- a. Credit or Debit Project Calculator (NOTE: [Section 1: Desktop Analysis](#) and [Section 2: Field Data Collection Methods](#) contain critical information on completing the Calculator.)
- b. Credit Projects
 - i. Pre-Field Work Submittal Checklist (completed) [and required submissions](#)
 - ii. [Post-Field](#) Verifier Project Assessment Submission Packet
 - iii. Quality Assessment
 - iv. [Management Plan](#)
 1. [Once the QA is approved and signed, the management plan can be submitted. Please note that if the management plan is not completed within 90 days of the approval of a new version, the credits will be subject to the updated version and must be recalculated accordingly. Credits are only eligible for sale once the management plan is signed.](#)
 - ~~iv-v.~~ Participant Contract
 - ~~v-vi.~~ Financial Assurances
 - ~~vi-vii.~~ Credit Purchase Agreement ([optional to submit to the SETT](#))
 - ~~vii-viii.~~ Credit Transfer Form
 - ~~viii-ix.~~ Annual Monitoring Form
 - ~~ix-x.~~ Notice of Validation
- c. Debit Projects:
 - i. Pre-Field Work Submittal Checklist (completed) [and required submissions](#)
 - ii. [Post-Field](#) Verifier Project Assessment Submission Packet
 - iii. [Quality Assessment](#)
 1. [Once the QA is approved and signed, then credits may be purchased to offset the locked-in debit amount.](#)
 - ~~iii-iv.~~ Debit Project Review Forms [2 and 3](#)
 - ~~iv-v.~~ Credit Purchase Agreement
- d. Recommended: Current versions of the Nevada [Conservation Credit System CCS](#) Manual and HQT Methods document for reference.

DETAILED STEPS TO CALCULATE CREDITS

The User's Guide covers steps D2 in *Section 3.1: Generating Credits* of the Nevada [Conservation Credit System CCS](#) Manual (Figure 24) and steps B2 in *Section 3.2: Acquiring Credits* of the Nevada [Conservation Credit System CCS](#) Manual for regulatory offset credit Buyers only. Before beginning, ensure the project has been planned in a way that avoids and minimizes residual impact to the maximum practical extent. Review *Section 3: Credit System Operations* of the Manual for more information.

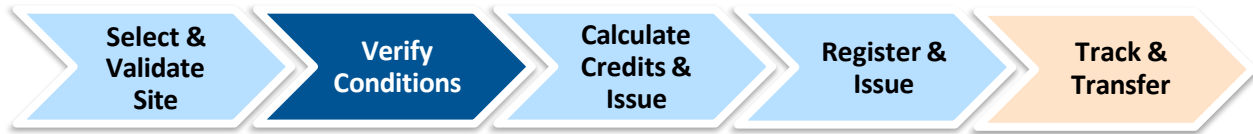


Figure 23: Overview of the process steps to generate credits



Figure 24: Overview of the process to calculate credit obligation and acquire credits

D/B2.1 SUBMIT PROJECT VALIDATION CHECKLIST

The Project Proponent ~~initiates~~ ~~completes~~ an eligibility screening process, providing details about ~~the~~ ~~describing~~ a potential project and completing ~~preliminary~~ ~~some pre project~~ paperwork. This step is typically supported by a knowledgeable Technical Support Provider, Verifier, or Aggregator, who helps the Project Proponent ~~in~~ ~~completing~~ ~~this the~~ Pre-Field Work Submittal Packet, ~~which~~ ~~This~~ includes a Validation Checklist, ~~the~~ Debit Project Review Form (if applicable), and valid shapefiles of the project site.

~~This~~ checklist ~~captures~~ ~~records~~ proposed management actions, timeline, and ~~the~~ location of a proposed project site. It also confirms ~~that the project meets~~ ~~certain~~ minimum eligibility criteria, ~~including~~ ~~such as~~ basic information related to ownership, site history, and land protection.

~~Product~~ ■ ~~Completed Pre-Field Work Submittal Packet~~

D/B2.2 VALIDATE & IDENTIFY CONSERVATION OPPORTUNITY

~~The Administrator reviews the Pre-Field Work Submittal Packet to ensure that all criteria are met. If everything is in order, the Administrator coordinates approval from relevant validation leads, such as regulatory agencies, and issues a notice of validation to the Project Proponent. This notice signifies that the project is eligible to generate credits, provided all submitted information is accurate and complete. However, it does not specify the number of credits or debits that will be issued.~~

~~If the criteria are not met, the Administrator will outline the reasons for ineligibility, detailing the aspects that disqualify the project from participating in the Credit Conservation System (CCS).~~

~~The Administrator reviews the Pre-Field Work Submittal Packet. If all criteria are met, the Administrator coordinates approval from any additional validation leads, such as relevant regulatory agencies, and issues a notice of validation to the Project Proponent. A notice of validation is a statement that the project is eligible to generate credits if all information provided is accurate and complete. It is not a confirmation of the quantity of credits or debits to be issued.~~

~~If criteria are not met, the Administrator provides reasons why the project may not be eligible to participate in the CCS.~~

D/B2.3 PROJECT VERIFICATION

~~Once a notice of validation is issued, the Verifier, in collaboration with the Project Proponent², can initiate the field verification process. The Verifier first reviews all relevant forms and documentation, scheduling a site visit with the Project Proponent to determine the most logical division of the site for verification. Before any project verification can begin, the pre-field ArcGIS work must be completed and~~

approved by the Administrator.

The Verifier adheres to the Habitat Quantification Tool (HQT) process to delineate the credit project boundaries and calculate pre-project conditions. After map units and sampling locations are approved, field verification of these pre-project conditions can commence. It's important to note that this approval does not specify the number of credits or obligations associated with the project.

For Credit Projects, the baseline GRSG habitat function is calculated using site-scale and regional standards. While the pre-project condition assessment helps the Credit Project Proponent estimate and align with performance standards for post-project GRSG habitat function, for Debit Projects, the baseline is defined as the site's condition prior to any new or expanded anthropogenic disturbance. Debit Projects require a field assessment to verify pre-project conditions, and baseline functional acres must be verified before implementing any disturbances.

Once a notice of validation is submitted, the Verifier, working closely with the Project Proponent, is able to begin the process of field verification. The Verifier performs a review of all relevant forms and documentation, and schedules a site visit with the Project Proponent² to determine the most logical division of the project site for site verification. The pre-field ArcGIS work must be completed and approved by the Administrator prior to any project verification. The Verifier follows the process defined in the HQT to define the credit project boundaries and calculate the pre-project conditions.

Once the map units and sampling locations have been approved, the verifier can then begin field verification of the pre-project conditions. This approval is not a confirmation of the quantity of the credit amount or obligation. Although baseline GRSG habitat function for credit projects is based on the site-scale, regional standard baseline, calculating pre-project condition is necessary for the Credit Project Proponent to confidently estimate and Administrator to agree to post-project GRSG habitat function performance standards. For debits, baseline is defined as the condition of the site prior to any new or expansion of an existing anthropogenic disturbance. Debit sites require a field assessment to determine pre-project conditions. Verification of debit baseline functional acres occurs before the anthropogenic disturbance has been implemented.

² Verifiers follow a defined Verification Protocol that is the focus of the Verifier certification training conducted by the Credit System Administrator.

Complete the Competing Land Use assessment and input contribution percentage from **Table 5** for projects on private land into the Calculator.

Table 5. Competing Land Uses reserve account categories and contribution percentages for credits on privately-owned land

MINIMUM COMPETING LAND USE RELATED REQUIREMENTS	CONTRIBUTION PERCENTAGE
Participant Contract <u>and</u> Conservation Easement <u>and</u> Ownership of Subsurface Rights	0%
Participant Contract <u>and</u> Conservation Easement	1%
Participant Contract <u>and</u> Ownership of Subsurface Rights	3%
Participant Contract	4%

The Verifier is responsible for compiling the pre-project field inventory data and completing the necessary calculations using the Habitat Quantification Tool (HQT). They submit this information to the Administrator as part of the Verifier Project Assessment Submission Packet. This packet must include:

- All GIS data within a geodatabase, adhering to specified naming conventions
- Completed transect and map unit datasheets
- Transect photographs and field maps
- Detailed notes, including meaningful observations or assumptions
- Anthropogenic disturbance review forms
- Proper Functioning Condition (PFC) checklists for each riparian area
- Resistance & Resilience (R&R) and wildfire scorecards for each map unit
- A completed HQT calculator showing the estimated credits
- The Verifier Project Assessment Submission Form
- Any notes on assumptions, discrepancies, or potential issues

Following the submission, the Verifier works with the Administrator through a Quality Assessment Process (QA). This process ensures accuracy and completeness and must be signed off by the Administrator before the final credit amount can be established.

Once the QA process is approved, the Credit Project Proponent can draft the Management Plan and begin moving the project forward. Detailed guidelines for all pre-field and post-field steps are available in Sections 3.1 and 3.2 of the CCS Manual or outlined in the Project Checklist in the Appendix.

The Verifier fills in the pre-project data results from the field inventory, completes any necessary calculations using the HQT, and provides the completed Verifier Project Assessment Submission Packet to the Administrator. This packet should include all GIS data within a geodatabase with the appropriate naming conventions, transect and map unit datasheets, transects photographs, field maps, meaningful notes, anthropogenic disturbance review forms, PFC checklists for each riparian area, R&R and Wildfire scorecards representing each map unit, the completed HQT calculator indicating the credit estimate, the Verifier Project Assessment Submission Form, as well as notes on any assumptions made, potential discrepancies, issues, etc.

The Verifier must then work with the Administrator to go through a Quality Assessment Process, which must be signed by the Administrator before the credit amount can be finalized. From the approval of a Quality Assessment Process, the Credit Project Proponent begins drafting a Management Plan and can move forward with the project.

All pre-field and post-field work steps are detailed in Sections 3.1 and 3.2 in the CCS Manual or are

~~outlined in the Project Checklist in the Appendix.~~

~~Product ■ Verifier Project Assessment Submission Packet~~

~~Product ■ Quality Assessment~~

APPENDICES

APPENDIX 1. GUIDANCE FOR DELINEATING ANTHROPOGENIC FEATURES

APPENDIX 2. GUIDANCE ON CLASSIFYING OVERLAPPING AND EXISTING ANTHROPOGENIC FEATURES

APPENDIX 3. GUIDANCE FOR DELINEATING MAP UNITS

APPENDIX 4. MINIMUM TRANSECTS PER MAP UNIT

APPENDIX 5. DEBIT TOOL OVERVIEW

APPENDIX 6. CREDIT TOOL OVERVIEW

APPENDIX 7. DATA DESCRIPTIONS

APPENDIX 1. GUIDANCE FOR DELINEATING ANTHROPOGENIC FEATURES

The layers of anthropogenic features provided in the Nevada Data Package are to be used initially when delineating disturbance within the analysis area. Every project will require extensive research and manually searching of the Analysis Area ~~in order~~ to accurately assess existing anthropogenic disturbance. The layers provided for many features are only intended to help identify locations for certain disturbances, and further delineating of boundaries and information regarding status will be needed. The sections below describe further explanations and guidance for individual or groups of anthropogenic features.

General Guidance

~~All anthropogenic features should be digitized as polygons. If preferred, linear features like transmission lines can be digitized as line features, then buffered to create polygons. Follow these steps:~~

~~1. **Digitizing Linear Features:** Use the buffer tool to convert linear features (e.g., roads, transmission lines) into polygons. For this:~~

~~—Add a new field called Buff_Dist to the attribute table, with the data type set to "long integer."~~

- ~~▪ As you digitize, record half of the estimated width of the feature in this field. Suggested diameters: General buffer distances for linear features with unknown widths:~~

- ~~1. Powerlines: 5 meters~~
- ~~2. Roads: 5 meters~~
- ~~3. Distribution lines: 3 meters~~
- ~~4. General underground LROW: 0.5 meters~~
- ~~5. Railway: 4 meters~~

- ~~▪ Apply the buffer using the value from the Buff_Dist field to create the polygon feature class.~~

~~2. **Assigning Features:** Once digitized, copy the new anthropogenic polygons to the appropriate, pre-generated layer.~~

~~3. **Mining or Renewable Energy Facilities:**~~

- ~~▪ For infrastructure like roads and powerlines within or adjacent to active mining/renewable energy operations, categorize them under "Mining" or "Renewable Energy."~~
- ~~▪ Roads or powerlines outside the project footprint (e.g., connecting the project to existing infrastructure) should be categorized as roads or powerlines, not part of the main operation.~~
- ~~▪ Active roads or powerlines in inactive operation areas should be weighted and buffered according to their respective types, not included in the inactive footprint.~~

~~4. **Non-Habitat Features:** Features such as homesteads, feedlots, or clearings that don't fit standard classification can be assigned:~~

- ~~▪ **Type:** "Other"~~
- ~~▪ **Subtype:** "No Indirect Dist" This indicates they are direct disturbances without an indirect buffer.~~

~~5. **Exploration Features:** Exploration features are categorized as "Exploration" in both the Type and Subtype attributes. These features don't require indirect buffers in the Analysis Area, as they won't impact HOT calculations.~~

~~All anthropogenic features should be digitized as polygon features. If you prefer, you may digitize linear features such as transmission lines as line features, then use the buffer tool to buffer each feature by the appropriate distance to create a polygon feature class. Add a 'Buff_Dist' field, type—"long integer", to the attribute table as you are digitizing and record half of the estimated road or transmission line width in this field (we recommend 5 m diameter for powerlines and roads, 3 m diameter for distribution lines, 0.5 m diameter for general underground LROW, and 4 m diameter for Railway). The buffer is related to the width of the transmission or distribution line, not the weight. Use the 'Buff_Dist' field as the buffer distance in the buffer tool. Then copy the new anthropogenic polygons over to their appropriate, pre-~~

~~generated layer.~~

~~For mining or renewable energy facilities, proposed infrastructure such as roads and powerlines that are located within or immediately adjacent to anthropogenic features should be categorized as mining or renewable energy features, however this only applies to active operations. Roads or powerlines or sections of the roads or powerlines that fall outside of the project footprint, such as those connecting the project to existing infrastructure, should be categorized as roads and powerlines. Active roads or powerlines within inactive operations should receive their respective weights and distances and not be incorporated within the inactive operation footprint.~~

~~Features that are pulled out as non-habitat (i.e., homesteads, feedlots, clearings, etc.) and do not fall within a classification type can be assigned 'Other' in the Type and 'No_Indirect_Dist' in the Subtype attributes. This will delineate the features as direct disturbance that do not have an indirect buffer. Exploration is classified as 'Exploration' in the Type and Subtype. For these features that do not have an indirect buffer applied, there is no need to delineate these features in the Analysis Area (not occurring in a map unit) because without an indirect buffer applied it will not have any impact on the HQT calculations.~~

NOTE For existing disturbances that have not mitigated through the CCS, delineate the disturbance boundaries using aerial imagery.

For disturbances that have mitigated through the CCS, delineate them using the authorized boundary that was used in the HQT analysis for the project. Contact the SETT to confirm CCS mitigated disturbances are included within a new HQT analysis.

Towers

When searching for towers at the end of winding mountain roads, follow these guidelines:

1. **Identify Dead-End Roads:** Look for roads that lead up into mountainous terrain, especially those that appear to stop without connecting to other routes.
2. **Topography and Elevation:** The roads will often lead to higher elevations, where cell towers, radio towers, or fire lookout towers are commonly placed to maximize coverage.
3. **Key Indicators:**
 - Use satellite imagery or maps to trace these roads. Towers are often located on peaks or ridges.
 - Look for clearings at the end of roads, as these areas might be used for tower infrastructure.
4. **Utility Lines or Fencing:** These may indicate the presence of electrical infrastructure, suggesting a tower or communication station nearby.
5. **Aerial Views or Drones:** In remote areas, aerial imagery might provide the best confirmation of tower locations if ground access is unclear or blocked.

This approach is helpful for identifying and confirming tower locations in rugged or less accessible terrain.

Look for towers at the end of seemingly dead-end roads that wind up into the mountains.

Types of Towers

- **Communications (Communications):** Tall structures designed to support antennas for telecommunications and broadcasting and any associated above-ground facilities. This includes satellites or large telescopes.
- **Meteorological (Meteorological):** Tall structures designed to support meteorological measuring instruments, including those installed to test the feasibility of wind farms and any associated above-ground facilities.

Powerlines

The Powerlines layer contains some powerlines. However, ~~they still need to be verified using imagery or field checked, as there are some discrepancies in the data layer compared to powerlines as built on the landscape. This~~ this layer only includes ~~the~~ larger transmission lines and does not include ~~the~~ majority of the smaller distribution and other transmission lines. This layer ~~will~~ serves as a starting point only, additional effort should be made to identify other powerlines within a project area including use of aerial imagery, contacting local rural electric associations, and field verification.

- **Nest Facilitating** (Nest_Facilitating): Major and minor three phase electrical power transmission and distribution lines with cross members, supporting arms, etc, and any associated above-ground facilities. Do not include buried transmission lines.
- **Non-Nest Facilitating** (Non_Nest_Facilitating): Single phase distribution lines or any three phase distribution lines with no or a single cross arm that does not support nesting raven or raptor occupancy, and any associated above-ground facilities. Documentation is required if not obvious from aerial imagery.

Mines

The Mines layer identifies the location of some current mining operations during various stages of activity. It is the responsibility of the verifier to confirm and obtain accurate footprints, status, and other information from the BLM or other sources to delineate a mining mine as an anthropogenic disturbance. Delineate the individual existing or authorized features of mining sites, not a Plan of Operations (PoO) area or Project Area. The CCS analyzes and mitigates for the proposed footprint of a disturbance, not the greater extent of a PoO. For most mines, this will involve delineating the existing features that are visible using aerial imagery. If a project has mitigated using the CCS, then the authorized footprint may be used as existing disturbance even if it has not been built out yet, this is because those impacts have already been mitigated for.

- **Active – Large** (Active_Large): Total area of 60 acres or more, active
- **Active – Medium or Small** (Active_Small): Total area less than 60 acres, active
- **Inactive – Large** (Inactive_Large): Total area of 60 acres or more, inactive. No longer removing material from the ground and very little, if any, associated human activity. Some infrastructure, hard structures, or facilities are still present on the site. Do not include reclaimed mines or non-reclaimed mines with no remaining infrastructure.
- **Inactive – Medium or Small** (Inactive_Small): Total area less than 60 acres, inactive (see above definition of inactive).
- **Ancillary – Large** (Active_Large_Ancillary): Features at the discretion of the Administrator to include but not limited to: rapid infiltration basins (RIBs), production shafts, pipelines, quarries, and other structures that are not located within the primary footprint of the anthropogenic feature and will generally be located away from the main disturbance.
- **Ancillary – Medium or Small** (Active_Small_Ancillary): Same description as Ancillary – Large.

Inactive Mines

Inactive mines are ~~defined as~~ those that are no longer removing material from the ground and exhibit minimal ~~very little, if any,~~ associated human activity. This includes mines undergoing reclamation, where the that are actively being reclaimed. The entire footprint ~~of a mine~~ during ~~the~~ reclamation ~~process~~ is considered inactive. If a mine ~~The footprint of a mine that~~ is not actively being reclaimed but still has significant ~~contains some major~~ infrastructure, hard structures, or facilities, it may be ~~considered~~ categorized as "NA" in the subtype. This classification accounts for direct disturbance from existing

~~features, but no indirect impacts assigned inactive in some cases. In most cases, historic disturbances that were never reclaimed will be classified as~~

'NA' in the subtype. This will account for the direct disturbance of existing features, however an indirect impact will not be assigned to the disturbance.

For mines considered reclaimed, the delineation and classification process should focus on specific permanent features and follow these steps:

- Reclaimed Mines: Only the permanent feature, such as the pit, should be delineated and classified as an inactive mine.
- No need to include temporary infrastructure or areas that have been restored or revegetated as part of reclamation.
- Non-Reclaimed Mines: If a mine lacks infrastructure but hasn't been formally reclaimed, only the permanent pit should be delineated and classified as inactive.
- All other areas without visible ongoing disturbance can be excluded unless they represent significant, un-reclaimed features.
- Historic and Inactive Underground Mines: For these sites, focus on visible surface disturbances such as entrances, shafts, or other signs of the underground mine. Delineate only these visible disturbances, and classify them as 'NA' in the subtype field to distinguish them from active or more recently closed operations.

This process helps ensure that reclamation and disturbance status are accurately reflected in your mapping and classification efforts.

~~For mines that are considered reclaimed, only the permanent feature (i.e., pit), should be delineated and classified as an inactive mine. Non-reclaimed mines with no remaining infrastructure are not considered inactive, except for the permanent pit. For historic and inactive underground mines that show little to no surface disturbance (may include entrances or shafts), only delineate the visible surface disturbance from an aerial view and classify them as 'NA' in the subtype.~~

Urban

The Urban layer should be ~~used~~ used as it is, 'as-is.' ~~Based on S~~ Specific criteria ~~were~~ used to delineate areas ~~meeting a threshold to~~ qualifying as a low or high urban areas. **Do not digitize houses, ranches, ranching or agricultural infrastructure as Urban.** ~~If within the project area,~~ these features are within the project area, they should will be delineated as a non-habitat map unit and ~~removed~~ excluded from the HQT analysis ~~when running the HQT.~~

Oil and Gas

The Oil and Gas layer is a point feature shapefile that identifies the location of ~~some~~ current oil and gas operations ~~and thier~~ during various stages of activity. It is the responsibility of the verifier to obtain an accurate footprint, status, and other information from the BLM or other sources to delineate ~~an~~ Oil and Gas anthropogenic disturbances.

- **Producing** (Producing): Activity (excluding exploration) and production is occurring at the well pads.
- **Inactive** (Inactive): Activity is not occurring at the location.

The layers for oil and gas projects vary extensively in activity status and boundaries, ensure that adequate research is conducted to verify the extent of active energy projects.

Roads

- **Interstate** (Interstate): Roads with an Interstate functional classification as defined by the Federal Highway Administration.
- **High Use – Paved or Improved; Commercial** (High_Use): Roads with an Arterial or

Major Collector functional classification as defined by the Federal Highway Administration. Roads to commercial facilities (e.g., mines, geothermal plants), which may not necessarily be classified by the Federal Highway Administration.

- **Low Use – Improved; Local** (Low_Use): Roads with a Minor Collector or Local functional classification as defined by the Federal Highway Administration.

The Roads layer should be used as it is 'as is' unless there is justification for adding or removing or adding roads. ~~Given the There is substantial~~ subjectivity in delineating roads ~~(particularly primarily smaller, secondary roads and two tracks); so to avoid potential for bias, the layer should be used consistently across projects is crucial to avoid bias for all projects. C~~ However, changes in road classification (e.g., Low_Use to High_Use) will likely need to be made in situations where may be necessary when increased activity is anticipated or planned exists or is planned as part of debit projects, such as road access to a mine or other industrial/~~or~~ commercial development.

Some roads ~~that are~~ authorized for mine use or other commercial/industrial purposes and access may not be included in the Roads layer. In such cases, r Roads should be ~~recharacterized~~ reclassified from Low-Use to High Use if they will experience increased traffic due to mine operations or similar commercial activities. when mines and other commercial/industrial facilities are present or being developed that have or are going to increase the amount of traffic along ingress/egress routes that were previously low use roads as high use until they intersect with other high use roads. New roads for similar commercial purposes should also be characterized as high use within or as part of debit projects. Please coordinate with the SETT to add roads that are included and authorized for project proponent use in a mine or other operation. Similaly, new roads related to these commercial purposes should also be classified as High Use. Coordinate with the SETT to include any authorized roads for project use in a mine or other operation.

For mining or renewable energy facilities, ~~proposed~~ infrastructure such as roads and powerlines ~~that are~~ located within or immediately adjacent to anthropogenic features should be categorized as mining or

renewable energy features. ~~Proposed roads~~ or powerlines that fall outside of the project footprint, ~~such as including~~ those ~~that~~ connecting the project to existing infrastructure, should be categorized as roads and powerlines.

Do not digitize pipeline rights-of-way as roads, unless the right-of-way contains a road that meets the definitions above.

Railways

The Railways layer is a polygon feature shapefile that identifies the footprint of current railway operations. ~~Use the~~ Railways layer ~~should be used as is as it is~~, unless there is clear justification for removing or adding railways. ~~Note that some~~ railways ~~that are~~ authorized for mine use may not be included in the Railways layer.

Please coordinate with the SETT to add any railways that are ~~included and~~ authorized ~~by the~~ project proponent ~~use~~ in a mine or other operation.

Renewable

The Renewable layer is a polygon feature shapefile that ~~only~~ identifies the location of current ~~renewable~~ energy operations ~~during at~~ various stages of activity. It is the verifier's responsibility ~~of the verifier~~ to obtain ~~an~~ accurate information, including the footprint, status, and other ~~information relevant detail~~, from the BLM or other sources to properly delineate a ~~renewable~~ energy-related anthropogenic disturbances.

- **Geothermal** (Geothermal): Utility-scale geothermal projects
- **Geothermal Ancillary** (Geothermal_Ancillary): Any above-ground facilities associated with utility-scale geothermal projects at the discretion of the Administrator to include predominantly above ground pipelines and other structures that are not located within the primary footprint of the anthropogenic feature and will generally be located away from the main disturbance.
- **Solar** (Solar): Utility-scale solar projects and any associated above-ground facilities.
- **Wind** (Wind): Utility-scale wind farm projects and any associated above-ground facilities.

The Renewable layer (wind, solar, geothermal) includes leased parcels, which may or may not be in development or production. These boundaries ~~serve as a~~ are a very rough guideline to ~~help~~ identify areas that ~~may could~~ have renewable energy development. It is essential to conduct ~~and~~ further research to confirm the current status ~~is essential of these areas~~. ~~Exclude transmission lines~~ connecting to the main grid ~~should be excluded from this layer and categorized as "Power Lines."~~ (~~category as "Power Lines"~~).

Linear Rights of Way

Linear Rights of Way (LROW) ~~include encompass~~ linear features that do not fall under the classification of Roads, Railways, or Powerlines ~~classifications~~. Linear features that are permitted within Linear Rights of Way can include but are not limited to pipelines, buried transmission lines, buried fiber optic cables, ~~etc.~~ LROW ~~will fall under~~ is divided into two categories:

- **LROW – High:** A linear feature that meets one of the following criteria 1) height greater than 48 inches or 2) width (ground disturbance) greater than 25 feet.
- **LROW – Low:** A linear right of way feature that is less than 48 inches in height and 25 feet in width.

Substations ~~that are~~ associated with a LROW feature should be classified based on ~~according to~~ the height and width criteria that determine ~~classifies~~ whether a ~~the~~ feature falls within a ~~the~~ Low or High LROW category. If a substation includes ~~contains~~ aa ~~communications tower~~, ~~that substation it~~ should be classified as a Tower rather than a LROW feature.

Mineral Exploration

~~Mineral exploration encompasses activities associated with CCS-defined disturbances, including mining, oil and gas, and renewable energy.~~

~~**For calculating debits that require mitigation for an exploration Debit pProject:**~~

~~If the precise locations of drill sites or roads are uncertain, the Plan of Operations Project Area (or its equivalent) may be used as the proposed disturbance boundary. This approach allows for the calculation of an average local-scale GRSG habitat functional score, which, along with the HQT analysis, will apply to the actual planned disturbance acreage. By analyzing a broader area than the anticipated disturbance, the proposed boundary does not need to be spatially explicit, providing greater flexibility in exploration project analysis. If the exact disturbance footprint is known, the SETT will collaborate with the project proponent to define an appropriate and sufficiently large area, allowing for the proper placement of transects within the project boundary.~~

~~**For delineating exploration as part of the analysis of other Debit Pprojects:**~~

~~Recent exploration that has undergone mitigation can be classified as 'Exploration' in the Type and Subtype fields within the 'Current Anthro Features' layer, covering both the direct and indirect impact areas of Debit pProjects. The exception is in areas where permanent disturbance is planned, as there is often a significant disparity between the terms of impact for short-term and permanent disturbances. Exploration cannot be delineated in these areas.~~

~~If mitigated exploration has not yet been implemented and the exact location of plans remains uncertain, contact the SETT to determine if it can be accounted for. In landscapes that remain largely denuded of vegetation and unrestored, likely due to historical exploration activities, these areas can be delineated as separate map units and sampled. Recent exploration that occurred prior to mitigation requirements may also be treated similarly, though ongoing reclamation efforts should aim to restore these disturbances to a more naturalized state in the near future.~~

~~Mineral exploration includes exploration associated with CCS defined disturbances, including mining, oil and gas, renewable, etc.~~

~~For calculating the debits that need to be mitigated for an exploration debit project: If drill locations or road locations are not yet certain, a Plan of Operations Project Area, or equivalent, can be used as the~~

~~proposed disturbance boundary in order to get an average local scale GRSC habitat functional score. This score (along with rest of the HQT analysis) will be applied to the actual acres planned for disturbance. By analyzing a greater extent or project area than what is expected, the proposed disturbance does not have to be spatially explicit, which increase flexibility when analyzing exploration projects. If the exact disturbance footprint is known, the SETT will work with the proponent to define a large enough and acceptable area to allow transects to be placed within the project area. For delineating exploration as part of the analysis of other debit projects: Recent exploration that has been mitigated for can be delineated as 'Exploration' in the Type and Subtype within the Current Anthro Features layer in the direct and indirect impact areas of debit projects. An exception to this is the area in which permanent disturbance is planned, due to the vast incongruency of planned terms of impact when transitioning from short term to permanent disturbance. Exploration cannot be delineated in this area. If this mitigated exploration has yet to be implemented on the ground and the precise location of plans is still uncertain, contact the SETT if there is interest in accounting for it. When areas on the landscape still appear largely denuded of vegetation and unrestored but are very likely the result of historical exploration, they can be delineated as their own map unit and sampled. Recent exploration that occurred prior to mitigation requirements can be treated similarly, though reclamation efforts should be occurring to better naturalize these disturbances in the near future.~~

Other Disturbance

For disturbances that do not ~~fall~~ within an ~~previously identified existing~~ anthropogenic category (e.g., hydroelectric power projects, gravel pits, mineral materials sites, renewable or non-renewable energy projects beyond solar, wind, and geothermal, maintenance or transfer stations, staging areas), ~~it these~~ will default to the **Other Disturbance** category. ~~Consultation with~~ The SETT will provide guidance on the most appropriate ~~determine which~~ subtype ~~is most appropriate~~ for the proposed disturbance, ~~however~~ The following guidance criteria will ~~be used to~~ assist in determining the subtype:

- Other Disturbance – High*: Proposed disturbance will be of high impact and will exhibit one or more of the following impacts:
 - Structures that could be used as perching and nesting by ravens.
 - Consistent or continuous noise from construction and operation of the disturbance (i.e., greater than 10 dBA following disturbance).
 - Subsidies that would act as predator attractants.
 - Continuous activity and other attributes that suggest large-scale disturbance (e.g., ground disturbance, heavy use or traffic).

* The SETT intends to capture the majority of disturbances within the provided weights and distances. If warranted, the SETT may determine the 75% weight for the High category be adjusted to 100% under certain circumstances. The SETT would bring any proposed disturbances that may warrant a 100% weight to the SEC for consideration.

- Other Disturbance – Medium: Proposed disturbance may exhibit similar impacts as listed above but have been minimized or have a lower scale of impact and could include:
 - Disturbances that are minimized using measurable methodologies.
 - Intermittent or less continuous noise and activity (i.e., noise less than 10 dBA following disturbance).
- Other Disturbance – Low:
 - Does not exhibit significant indirect impacts as listed above. General presence of infrastructure, direct GRSC habitat loss, and potential for invasive weed spread from ground disturbance will be the primary impacts expected from a Low category.
- Other Disturbance – No Indirect Disturbance:
 - Does not exhibit indirect impacts. Direct GRSC habitat loss will be the primary impacts expected from a No Indirect Disturbance category.

A ranking of disturbance criteria and a comparative analysis will be conducted using established anthropogenic disturbances and emerging scientific research to new science as guidance will determine ~~which category is the~~ most appropriate category for ~~a given each~~ disturbance.

Excluded Features

Anthropogenic features not described in **Table 1** are considered 'de minimus' and should not be Digitized. ~~These~~ include~~ing~~:

- Fences
- Agricultural or ~~R~~anching-related activities or infrastructure

Anthropogenic Feature Review

When changes are made that deviate from the provided layers ~~provided~~ or when classifying the status of mines or other anthropogenic features, the SETT will require a brief synopsis outlining the with justification and rationale behind these decisions. This ~~ensures is primarily to ensure~~ that changes (i.e., adding or removing roads) are applied consistently done in a consistent manner across credit and ~~Debit p~~Projects. It also helps maintain records to enhance transparency during the HQT process. Please refer to the Anthropogenic Disturbance Review Form in Appendix 8: Anthropogenic Features Datasheet. ~~This will also aid in maintaining records to increase transparency during the HQT process. See the Anthropogenic Disturbance Review Form in Appendix 8. Anthropogenic Features Datasheet.~~

APPENDIX 2. GUIDANCE ON CLASSIFYING OVERLAPPING AND EXISTING ANTHROPOGENIC FEATURES

Version 1.6 of the Habitat Quantification Tool (HQT) introduced two new attributes required to classify existing anthropogenic features: 'Overlap_Status' and 'Returned' which are required for classifying existing anthropogenic features. These fields may need to be edited for two specific scenarios:

1. (1) Debit Projects where the proposed surface disturbance overlaps existing anthropogenic features, and
- 1.2. (2) Debit Projects that propose to permanently remove or reduce the impact of existing anthropogenic features, permanently.

These new attributes provide greater control over the handling of how existing anthropogenic features during are handled during the Desktop Analysis.

For Debit Projects with Overlapping Features

Where existing anthropogenic features are **co-located** with proposed features such that they occupy the same point on Earth geographic point, they are said to be considered overlapping. These existing features may be either retained or removed, depending on the specifics of the Debit Project that overlap proposed features may be retained or removed. For example, an existing powerline that is co-located with a proposed roadway is an example of a feature that will/would be retained and during the debit project, it should be classified as 'Retained' in the 'Overlap_Status' field in the attribute table.

When a Debit Project proposes to involve upgrading an existing feature from one subtype to another, the existing feature should be classified as 'Removed'. For example, if a low-low-use road is upgraded to a high-use road from a mine project during the permit term, it should be marked as that a mine project proposes to use during the permit term, which will be upgraded to a high use road during the permit term, should be classified as 'Removed'. The portion of the road that will be upgraded must be included in the shapefile representing the proposed surface disturbance. Similarly, if a low-use road is overlapped by the mine site, it should also be classified as 'Removed,' and the overlapping portion would be upgraded to the "Mine" classification. to a high use road must be included in the shapefile that represents the proposed surface disturbance. A low use road that is overlapped by the mine site should also be classified as 'Removed' and that portion of overlapping road would be upgraded to mine.

For temporary debit project Debit Projects, the 'Returned' field for all existing anthropogenic features must be classified as 'True,' as it is assumed that temporary debit project Debit Projects return the landscape will be returned to its original condition following after the project concludes.

For existing features that overlapping permanent impacts (i.e., where when the 'Surface_Disturbance' field in the 'Proposed_Surface_Disturbance_Debits' feature class is classified as 'Permanent') the 'Returned' field should be classified as 'False' in the attribute table.

For Debit Projects that Proposed to Remove or Reduce the Impact of Existing Features

Debit Project Debit Projects proposing to remove or reduce the impact of existing anthropogenic features should select the "Debit Project Debit Project will remove or modify existing anthropogenic features (optional)" checkbox in Debit Tool 1 and follow the steps outlined in the User's Guide to properly account for the removal or modification of these features.

Update the 'Subtype As Modified' field to reflect the subtype that best represents the feature's status during the permitted term of the debit project Debit Project. If the feature will be removed, update the 'Subtype As Modified' field to 'N/A' (do not classify it as 'Removed').

If the feature will be removed, update the 'Subtype As Modified' field to 'N/A' (do not classify as 'Removed').

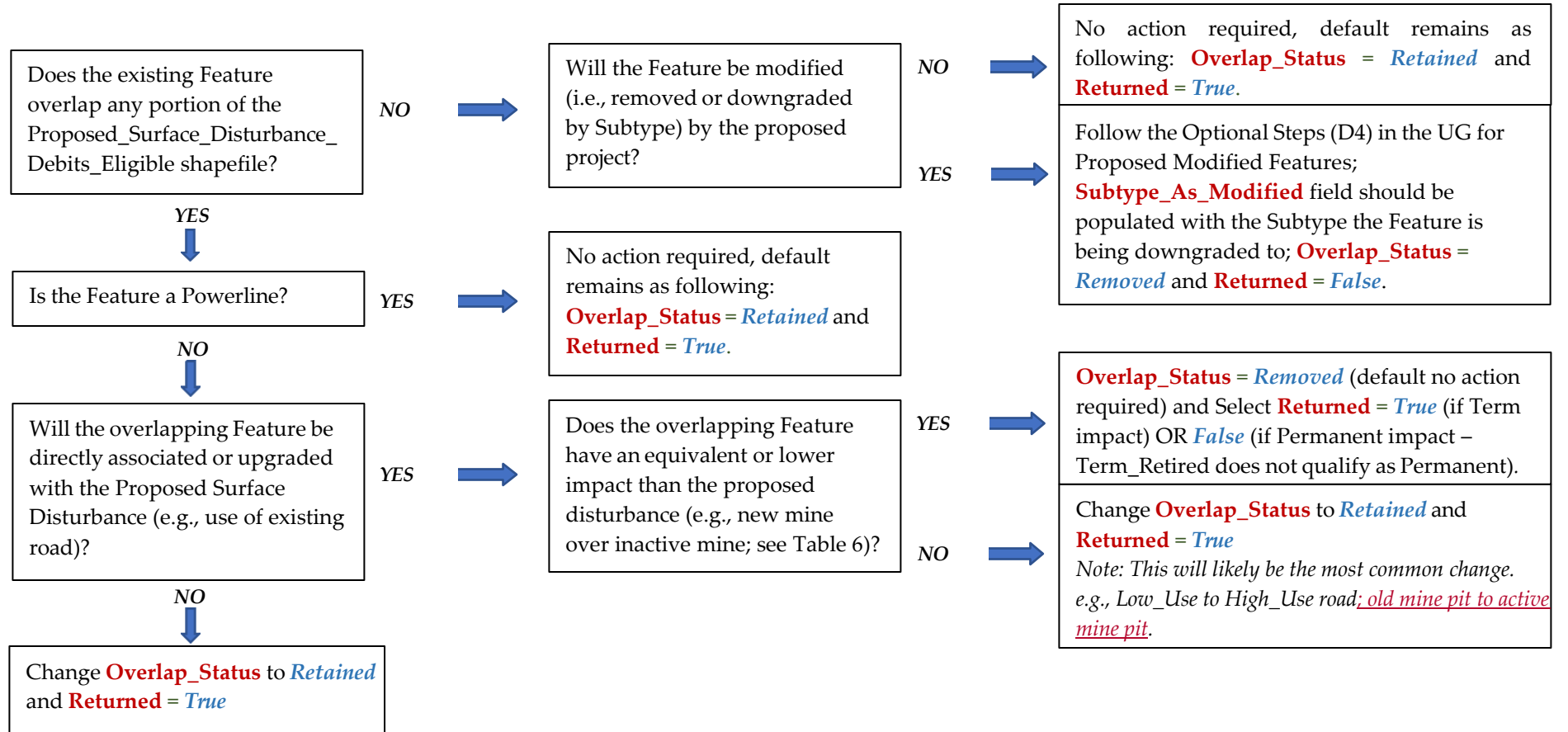
Decision Tree when overlapping features exist on Debit Projects

For each existing anthropogenic feature class following **Steps D7 – D9** in the **User's Guide (UG)**, new column headers have been added in each '**Anthro_Feature Type**' layer:

- **Overlap_Status** and **Returned** are new column headers in each **Anthro_Feature Type** layer. **Overlap_Status** options are: either **Retained** or **Removed**.
- **Returned** options are either: **True** or **False**.

The **Subtype_As_Modified** field is not new, but it now **includes** additional options to reflect modification more accurately.

IMPORTANT: In general, the only changes from **the default settings** will **be occur** when an existing **feature** overlaps with, and has a greater impact (weight, distance) than the proposed disturbance. In these cases, this will require a change from default **the Overlap_Status should be changed from the default setting of **Removed** to **Retained**.** – **Removed to Overlap_Status = Retained.** The following flowchart **provided** should guide the classification process for the most majority of situations; scenarios. However, there are scenarios some situations that may not align with fit the pathways listed outlined below. Ensure to consult with the SETT when working on a Debit project Debit Project that has For unique or complicated complex conditions in a Debit project Debit Project, be sure to consult with the SETT for guidance.



General descriptions for new column headings in the '**Anthro_Feature_Clip**' layers:

New or edited Category Description

<i>Overlap_Status = Retained</i>	Existing features that can either overlap or not overlap any proposed disturbance and will not be modified, upgraded, or removed during the project, or will not be utilized used in the project's permit or operation. (e.g. Road in analysis area, existing powerline overlapping a proposed mine site).
<i>Overlap_Status = Removed</i>	Existing features that overlap with any proposed disturbance that will be either replaced by the proposed disturbance (e.g., existing Low Use road will be replaced by new Mine); existing features that will be upgraded by Subtype by (e.g. Low Use to High Use Road); or existing features that will be downgraded by Subtype.
<i>Returned = True</i>	Existing features that will be returned to their current subtype. If feature is classified as <i>Removed</i> , select <i>True</i> for a Term impact. If the feature is classified as <i>Retained</i> , Returned field should always be <i>True</i> .
<i>Returned = False</i>	Existing features that will not be returned to their current subtype. If feature is classified as <i>Removed</i> , select <i>False</i> for a Permanent impact. Not applicable for <i>Retained</i> features. Projects that propose to modify features will select <i>False</i> as the feature will be removed or downgraded.
<i>Subtype_As_Modified</i>	If <i>Retained</i> , the Subtype_As_Modified should always be the same as the Current Subtype. If the project proposed to modify features, the Subtype_As_Modified should reflect the removal or downgrade of the existing feature (e.g., High Use Road to a Low Use Road). Put inputs here: Overlap_Status = Removed and Returned = False

Table 6. Ranking of all Anthropogenic Features by degree of impact

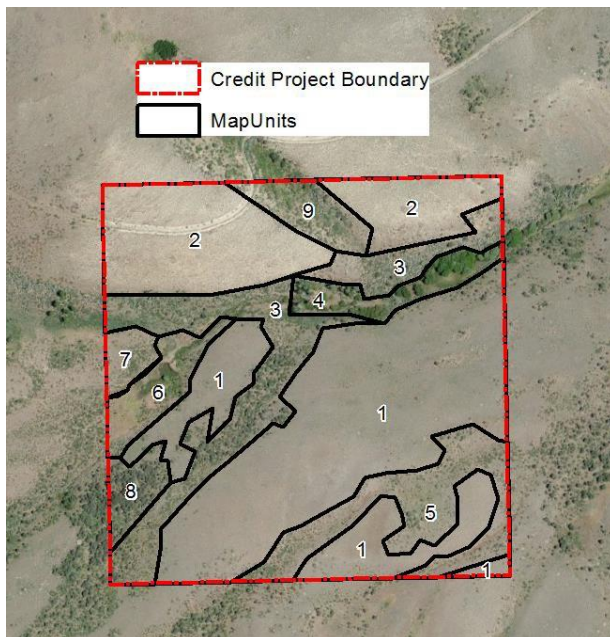
Rank	Type	Subtype
1	Mines	Active_Large
2	Urban	High
3	Roads	Interstate
4	Renewable	Geothermal
5	Mines	Active_Small
6	Oil & Gas	Producing
7	Roads	High_Use
8	Railways	Railways
9	Exploration	Exploration
10	Other	No_Indirect
11	Towers	Communications
12	Towers	Meteorological
13	Powerlines	Nest Facilitating
14	Other	High
15	Urban	Low
16	Mines	Ancillary_Large
17	Renewable	Geothermal_Ancillary
18	Other	Medium
19	Mines	Ancillary_Small
20	Mines	Inactive_Large
21	LROW	LROW_High
22	Powerlines	Non-Nest Facilitating
23	Renewable	Wind
24	Renewable	Solar
25	Other	Low
26	Roads	Low_Use
27	LROW	LROW_Low
28	Mines	Inactive_Small
29	Oil & Gas	Inactive

THIS PAGE INTENTIONALLY LEFT BLANK

APPENDIX 3. GUIDANCE FOR DELINEATING MAP UNITS

Project Area: The project area refers to the entire area being evaluated, encompassing all is the area that is being evaluated, and includes all habitats ecotypes within the defined boundaries of what is delineated as the project area. For Credit P projects, the project area represents the full is the extent of the obligation undertaken by the credit developers. For debit project Debit Projects, the project area is the extent of it includes both the proposed surface disturbance and the area affected by indirect impacts. plus the indirect effects area.

Map Units: MThe map units are sub-divisions of the project area, defined based on unique vegetation communities, structural characteristicse, and site potential. These division are necessary Map units need to be defined in order to to capture differences at in the site-scale GRSG habitat attributes, which are crucial for -assessed to more-accurately inform-determining the functional acre scores. For a complete list of assessed attributes, See refer to the Field Data Collection Methods. for a list of attributes assessed. When delineating map units, it is important to keep these consider the attributes in mind as they are the that drivers of the GRSG habitat function scores. For example, variations in sagebrush canopy cover and proximity to sagebrush should guide delineation. Other factors like elevation, slope, aspect, and soil type must also be considered, as they influence vegetation distribution. map units should be delineated based on expected variation in sagebrush canopy cover and distance to sagebrush cover. Elevation, slope, aspect, soil type and other factors should also be considered, as they may impact vegetation distribution.



At the least, E-ensure map units are divided by WAFWA zone. No map unit should cross a WAFWA boundary.

Although map units can be somewhat subjective, they should encompass areas with relatively homogeneous vegetation. The delineation of map units should also consider the site's potential to support a specific vegetation community, ensuring the relevance of boundaries over time. Map units should be based on ecological sites, recent aerial photography, and ground verification.

Major distinctions, such as changes in vegetation community, species abundance, water versus terrestrial areas, shrubland versus meadow, and roads versus undeveloped spaces, can be identified through aerial photography. Supplementary GIS data layers can further aid in distinguishing features like topography (elevation, slope, aspect) or soil changes that affect vegetation composition.

Defining map units requires a strong understanding of GRSG habitats and local site conditions. A site visit is highly encouraged to inform the map unit delineation process before starting the Desktop Analysis. Map unit boundaries may be modified based on conditions identified during field data collection. If field crews recommend changes to the 'Map Units Dissolve' layer, you must update this layer and repeat steps D12/C8 and D16/C12. Ensure to specify the updated 'Map Units Dissolve' layer for the Map Units parameter in step D12/C8.

~~Although map units can be somewhat subjective, a map unit should encompass a relatively homogenous area of vegetation. Map units should also be delineated based on the potential of the site to support a particular vegetation community, so that map unit boundaries will not become less relevant over time. Map units should be delineated based on ecological sites, recent aerial photography, and ground verification. Major breaks such as changes in vegetation community, relative abundance of species, water vs. terrestrial, shrub land vs. meadow, and roads vs. undeveloped area, are relatively straight forward to delineate via aerial photography. In addition, supplemental data layers within GIS can help identify other distinctions such as changes in topography (elevation, slope, and aspect) or soils which may affect vegetation composition. Defining map units requires a good working knowledge of the GRSG habitats important to sage grouse and local site conditions. If possible, a site visit is encouraged to help inform the map unit delineation process prior to initiating the Desktop Analysis. Map unit boundaries may also be modified based on site conditions identified during field data collection. If the field crews recommend changes to the Map Units Dissolve layer, you must update the Map Units Dissolve layer and redo steps D12/C8, and D16/C12. Specify the updated Map Units Dissolve layer for the Map Units parameter in step D12/C8.~~

Meadows:

A meadow is generally defined as a mesic area dominated by obligate or facultative wetland forbs and grasses and typically free of upland shrubs. These areas are usually wet for most of an average water year and remain green (NDVI > 0.3) through late summer, often serving as late brood-rearing habitat. Dry meadows—upland patches of non-riparian grasses—are not considered meadows.

Meadows that have dried to the point where they are unlikely to function as late brood-rearing habitat in the future (e.g., upland shrub encroachment or loss of riparian vegetation) should not be classified as meadows. However, meadows dried due to drought but with the potential to function normally when water conditions return to average should still be considered.

~~A meadow is generally defined as a mesic area containing obligate or facultative wetland forbs and grasses that is typically free of upland shrubs. This area will typically be wet for most of an average water year, and thus green (NDVI > 0.3) through the end of summer that likely serve as late brood-rearing habitat. Dry meadows (upland patches of non-riparian grasses) are not considered to be meadows. Meadows that are dried to the extent that they are not likely to be functioning in the future as late brood-rearing habitat (i.e., encroachment of upland shrubs, loss of riparian plants expected over time) should not be considered. Meadows that are dried due to drought but have the potential to function when the water year approaches normal, should still be considered.~~

Map units automatically delineated as **meadows** due to their inclusion in the 'NV Wet Meadows' layer (Saito 2020; <https://www.dri.edu/project/wetland-mapnvnew/>) should be confirmed using aerial imagery and other relevant sources, and refined as needed. The 'NV Wet Meadows' layer, available in the MXD, provides additional detail in the attribute table, which can assist with refinement. It's important to note that this layer is a rough delineation, and irrigated areas that meet meadow habitat system definitions may have been excluded. These areas often require delineation, with the exception of **center pivot agriculture**, which should be excluded entirely from all projects as **non-habitat**. Map units that have been automatically delineated as meadows due to their presence in the NV Wet Meadows layer (derived from Saito 2020 <https://www.dri.edu/project/wetland-mapnvnew/>) should be confirmed as such using

~~aerial imagery and other sources or refined as appropriate. The NV_Wet_Meadows layer is also present in the mxd, which has further detail in the attribute table that might aid in refining delineations. It should be noted that this layer is a rough delineation and irrigated areas that meet definitions of meadow habitat system in the program have often been excluded. These will often need to be delineated as well, with the exception of center pivot agriculture, which should be excluded from all projects in their entirety as non-habitat. Unaltered meadows are defined at naturally occurring wetland complexes, dominated by wetland vegetation and soils (e.g. stringer meadows, springs, seeps) where the hydrology has been minimally altered or is currently not being managed. Altered meadows are defined as receiving either controlled irrigation, where the hydrology is currently being altered or managed (e.g. diversions, spreaders), or where the landscape is being functionally altered.~~

Unaltered meadows are naturally occurring wetland complexes dominated by wetland vegetation and soils (e.g., stringer meadows, springs, seeps), where hydrology has not been ~~minimally~~ altered or is not actively managed. Altered meadows are those receiving controlled irrigation or where hydrology is currently altered or managed (e.g., diversions/water piped off-site, spreaders, ~~water piped off site~~), or where the landscape has been functionally altered.

~~If an area appears to potentially be a meadow, err on the side of classifying it as a meadow. If reconnaissance or field sampling later determines that it is not a meadow or falls within the exceptions noted above, it is simpler to merge the polygon into a larger upland map unit rather than having to separate it out as a small meadow later. Ensure that all potential meadows are visually confirmed in the field from the ground. If it appears to possibly be a meadow, err on the side of it being a meadow. If reconnaissance or field sampling determines it to not be a meadow or falling within the above exceptions, it is easier to merge the polygon into a larger upland map unit than to divide it out as a small meadow later. All potential meadows should be visually confirmed.~~

Stepwise Order of Additional Sources to Use in Delineation of Meadow Map Units:

- Aerial Imagery within GIS and compared to other sources (i.e., Google Earth, or OnX).
 - a. Begin to define general meadow areas, which may appear as low-lying green areas along named or unnamed streams. Compare the topographic layers to see flood plains and valley bottoms or flat areas near perennial streams and springs.
 - b. Compare ~~various previous~~ years' imagery (Various layers or the Google Earth Timeline).
- SGI Mesic Resources Layer (Detailed 30-year NDVI average during the brood-rearing season).
 - a. See Data Required Section for access instructions.
 - b. **Note:** Target areas with a 30-year average NDVI value of $>.0.3$, which are the four shades of green provided in the Mesic Resources – Persistence layer. If different management practices have been applied over the last 30 years that have significantly altered the management of water in an area, utilize-use the online interactive map to get an average NDVI that reflects current management for the appropriate period of time.
 - c. **Note:** This only helps fine-tune delineation of large meadows and lotic systems and will generally not pick up smaller riparian systems.
- Ensure that all features have been captured. It is recommended to set the map scale, located in the bottom-left corner of the map, to 1:3,000 and scan the imagery systematically to ensure that all features have been digitized properly.
- Review other layers for additional insight such as Annual Grass or Topography.

Stepwise Order of Sources to Use for Further Map Unit Delineation:

1. DRG or ESD layer provided in Data Packet.
 - a. Clip, then Union the DRG layer with the Map Units Layer.
 - b. Visually inspect, and if more detail is needed, ~~utilize~~ use the ESD layer for smaller scale delineation.
 - c. **Note:** This only helps delineate general ecosite boundaries and fine tuning may be needed.
2. Aerial Imagery within GIS and compared to other sources (i.e., Google Earth).
 - a. Visually confirm DRG or ESD delineation and adjust and further define as needed.
 - b. **Note:** Aerial imagery should verify that map units should be relatively homogenous.
3. Examine NRCS Soil Series Maps to get to a more fine-scale map unit delineation.
 - a. See [Data Required](#) Section for access instructions.
4. Review other layers for additional insight such as Fire, PJ, Annual Grass, Topography, etc.
5. **Note:** DRGs will typically be sufficient for larger-scale Debit Projects in addition to meadow delineation, while finer-scale ecosite delineation is needed for Credit Projects.
6. **Note:** Areas known to exhibit higher annual invasive abundance are recommended to be separate map units. Aspect should also be considered when reviewing map unit delineation due to the greater propensity of annual invasive dominance on South-facing slope.

Additional rules for map unit delineation:

1. ~~The Minimum~~ minimum map unit size should ~~generally~~ be 0.5 acres, unless there are features such as stringer meadows that are appropriate to delineate at a smaller scale. Map units less than 5 meters in width may be excluded from the credit or debit calculation.
2. Clusters of willow or other dense ~~p~~-catches of woody riparian vegetation within meadows should not be delineated as separate map units. ~~However, t~~ **Transects should not be run through long stretches (> 5m) of dense (closed shrub, 70-100% canopy cover) impassible - willow patches.**
3. For ~~D~~ debit ~~P~~ projects, ~~delineate~~ map units ~~should first be delineated by~~ based on the indirect disturbance area, proposed surface disturbance, and already existing disturbance areas respectively. Subdivide the Indirect-indirect and proposed disturbance areas should then be further subdivided according to the standards guidelines. Existing disturbance areas do not require further subdivision, as no sampling will occur in these areas. These map units will be assigned a site scale score of zero, and no transects will be generated within them. No sampling will occur in existing disturbance areas, so no further subdivision is needed. This map unit will be assigned a site scale score of zero and no transects will be generated in this map unit.
4. For ~~D~~ debit ~~P~~ projects, term features should be separate map units from permanent features.
5. For debit projects, reclaimed mine (or other disturbance type) areas should be delineated as separate map units
6. For Credit ~~p~~ Projects, ~~treatment~~ uplift/restoration -areas ~~where a change in the site scale score is anticipated~~ should be delineated as separate map units. (Even if currently they are similar in vegetation to other areas, but a change is not expected in those areas.)

7. Run the Intersect tool to ensure there are no overlapping polygons.

NOTE: While pinyon-juniper is mapped automatically, if changes to the PJ layer are necessary after ground-truthing, then please make changes based on the coverage of pinyon-juniper observed and delineated in the field in a clipped version of the pinyon-juniper layer. Photo documentation of the ground-truthed area will be required to support these changes. This updated layer should be submitted to the SETT when completed so that the necessary changes can be made at the administrative level prior to running the final Desktop Analysis. This process is similarly necessary if there was an omission of pinyon-juniper in the layer that is present within the project area.

APPENDIX 4. MINIMUM TRANSECTS PER MAP UNIT

After delineating map units to maximize area while minimizing variability within each unit, the next step is to determine the number of transects required for assessment. This section outlines the minimum number of transects needed per map unit, taking into account area, vegetation type (meadow vs. upland), and project type. Guidance is provided on when it might be necessary to sample additional transects beyond the minimum requirements. These requirements aim to clarify SETT expectations for both pre-field and post-field submissions, reflecting the variability in GRSG habitat value and how the collected data will be utilized. After delineating map units that seek to maximize map unit area while minimizing variability within each map unit, the number of transects to be assessed per map unit needs to be determined. This section provides requirements for the minimum numbers of transects per map unit based on area, habitat type (meadow vs. upland), and project type with guidance on when to consider sampling additional transects. Minimum transect requirements are outlined to solidify SETT expectations for pre-field and post-field submissions. These minimum requirements also reflect the differences in GRSG habitat value, variability, and how the data will be used.

Additional transects are required for meadows, uplift areas, and heterogeneous uplands due to the following reasons:

- **Meadows:** Meadows are typically smaller in size and are highly valued within the CCS framework (with an 8x multiplier). They present significant opportunities for habitat uplift and can exhibit considerable variability, particularly in highly naturalized states such as stringer meadows. Transects in meadows generally require less time to sample, making it feasible to increase their number for more accurate assessment.
- **Uplift Areas:** Uplift areas require additional transects to compare pre-project conditions with post-improvement conditions for quantifying uplift credits. Even in projects where pre- and post-project comparisons are not required, such as pinyon-juniper projects, capturing the variation in habitat vegetation between areas with pinyon-juniper and the surrounding regions is important.
- **Heterogeneous Uplands:** Map units consisting of heterogeneous uplands require more transects to accurately characterize the variability in habitat vegetation. This ensures that all ecological conditions within these diverse areas are represented in the assessment.

For ~~debit projects~~ **Debit Project**, there is a distinct category for uplands. Transects are generated based on debit project impacts, which use a decay curve where impacts decrease with distance from the disturbance. Field data collection focuses on areas closer to the impact, with further removed areas representing lower impacts and resulting in fewer debits. The following table (Figure 26) indicates the minimum number of transects required within map units of different types based on acreage.

Meadows, uplift areas, and heterogeneous uplands require more transects for the following reasons:

Meadows tend to be smaller, are highly valued within the CCS (8x), tend to be opportunities for uplift, and, in highly naturalized states such as stringer meadows, can also exhibit quite a bit of variation. Transects in meadows also generally take far less time to sample.

- Uplift areas also require more transects due to the need for pre-project conditions to be compared to post-improvement conditions in the future to quantify uplift credits. Even when these pre- and post-project comparisons are not necessary to quantify uplift as with pinyon-juniper projects, the variation in habitat vegetation between areas with pinyon-juniper and the surrounding areas is important to try to capture.
- Map units consisting of heterogeneous uplands require more transects to more accurately characterize the habitat vegetation.

Acres	Meadows, Uplift Areas, Heterogeneous Uplands on Credit		
	Projects	Homogeneous Uplands on Credit Projects	Uplands on Debit Projects
> 0*	2-4	2	2
10	4	2	2
25	5	3	3
100	6	4	4
200	7	5	5
250	7	5	5
300	8	5	5
350	8	6	6
400	9	6	6
450	9	7	7
500	10	7	7
550	10	8	8
1000	11	9	9
1250	11	9	9
1500	12	10	9
1750	12	10	9
2000	13	11	10
2500	13	11	10
2750	14	12	10
3000	14	12	10
3250	14	12	11
3500	15	13	11
4000	15	13	11
4250	16	14	11
4500	16	14	12
5000	17	15	12
5500	17	15	12
6000	17	15	12
6500	18	15	13
7000	18	15	13
7500	18	16	13
8000	19	16	14
8500	19	16	14
9000	19	17	14
9500	20	17	14
10000	20	17	15
10500	20	18	15
11000	21	18	15
11500	21	18	15
12000	21	19	15

12500	22	19	16
13000	22	19	16
13500	22	20	16
14000	23	20	16
14500	23	20	17
15000	23	21	17
16000	24	21	17
17000	24	21	17
18000	24	21	17
19000	24	22	18
20000	25	22	18
21000	25	22	18
22000	25	23	18
23000	25	23	18
24000	26	23	19
25000	26	23	19
26000	26	24	19
27000	26	24	19
28000	27	25	19
29000	27	25	20
30000	27	25	20

Figure 25: The minimum transects required for sampling various map unit types on a power trend.

*Meadow map units between 0 - 10 acres may allow for, and require up to 4 transects, depending on shape, size, and homogeneity.

Considerations for Transect Numbers

- **Variability and Map Unit Size:** The variability of the habitat ecosystem within the map unit should be considered when determining whether additional transects are needed. The figures provided should be viewed as absolute minimums. For Credit Projects, map units should be no larger than 6,000 acres. For Debit Project, map units should not exceed 30,000 acres. If aerial imagery and other observations reveal a mosaic of vegetation or patchiness within a map unit, increasing the sampling intensity as per the guidance for heterogeneous uplands may be necessary to adequately capture the map unit's characteristics.
- **Adjustment Based on Observations:** Should the technician determine that more transects are needed to accurately represent the landscape, they should increase the number of transects as appropriate. Additional transects can be completed in sequential order from backup batches if initial results do not seem to adequately represent the landscape.

~~Variability of the habitat ecosystem within the map unit should be considered as to whether additional transects are needed, but the above figures should be taken as an absolute minimum. Map units should be no more than 6000 acres large in credit projects nor more than 30,000 acres in debit projects. When aerial imagery and other observations reveal more of a mosaic of vegetation or patchiness within a map unit, the greater level of sampling intensity associated with heterogeneous uplands may better capture a map unit. Should the technician feel more transects are needed, please increase as appropriate. More transects can always be completed in sequential order from the backup batches of transects if the results do not seem to adequately represent the landscape.~~

Additional guidance for generating random transect locations and bearings:

1. ~~When Transects~~ ~~transects that~~ are covered by clusters of willow or other dense (closed shrub, 70-100% canopy cover) patches of riparian woody vegetation within meadows, adjustments should have an alternate bearing chosen or be reflected off the shrubs ~~made to ensure accurate sampling:~~

- ~~-~~ Alternate Bearing: If possible, choose an alternate bearing or reflect the transect off the shrubs to ensure coverage outside the dense vegetation.
- Movement of Transects: If the transect falls within the thicket but can be moved less than 5 meters to be outside the dense area, or if the thicket is only a few meters in length, relocate and sample accordingly.
- Alternative Sampling Point: If the transect cannot be moved effectively or the dense vegetation persists over a significant distance, select an alternative random sample point for assessment.

~~To prevent creating an incentive to modify riparian areas that support GRSG habitats but are not directly used by GRSG (and thus do not receive credits),~~ clusters of willows or other riparian woody vegetation will receive the habitat function score of the map unit in which they are contained. This approach ensures that these areas are appropriately represented in the assessment without incentivizing unnecessary modifications. ~~the transect falls within the thicket and can be moved over <5m and be out of it or the thicket only lasts a few meters, then move and sample. If not, then an alternative, random sample point should be chosen. To avoid creating an incentive to modify riparian habitat areas that supports sage grouse GRSG habitats but is are not used directly by sage grouse GRSG, and thus does not receive credits,~~ clusters of willows or other riparian woody vegetation will receive the habitat function score of the map unit that it is contained within.

2.

If a transect crosses a map unit boundary into another map unit or extends outside the project area, the field crew should reflect the transect back into the original map unit at the point of contact and continue sampling. This ensures that transects are not discarded near map unit boundaries, which could bias the results. ~~If a transect will cross a map unit boundary into another map unit or outside of the project area or runs into a fence, a body of water, or a road, the transect will need to be reflected back into the map unit at the point of contact by the field crew and continued. Do not discard transects near map unit boundaries, as this would bias results. If a transect encounters obstacles such as fences, bodies of water, or roads, it should be reflected back into the map unit at the point of contact and continued. Transects should not be discarded due to these obstacles, as this could lead to incomplete or biased data.~~

3. ~~Transects located in areas with steep slopes (> 50%), large unsafe rock outcrops, talus slopes, or unsafe hiking routes can be rejected. In such cases, select an alternative random sample point in sequence.~~ Transects falling within areas having steep slopes (>50%), large unsafe rock outcrops, talus slopes, or unsafe hiking routes can be rejected and an alternative random sample point be used in sequence. The SETT will do an initial pre-screening for these features to exclude these areas. If transects are rejected in the field, document all rejected points and justification for the rejection. ~~The SETT will perform an initial pre-screening to exclude these unsafe or inaccessible areas. If a transect must be rejected in the field, document all rejected points along with the justification for each rejection. This ensures transparency and maintains the integrity of the sampling process.~~

4.3. ~~The pre-field submission calculator~~ must ~~should~~ include the number of transects planned for each map unit. Include ~~and~~ a roads layer, to the best of the Verifier's knowledge, and identify roads that are accessible by vehicle, ATV, or UTV that will is planned to be used during

~~fieldwork by the Verifier.~~

Do not sample transects that originate in or cross existing surface disturbance. Discard ~~these transects~~ and select an alternative, random sample point.

APPENDIX 5. DEBIT TOOL OVERVIEW

This appendix provides an overview of the underlying processes and calculations performed by each Debit Tool. Understanding these details helps users gain a clearer insight into how the Debit Tools operate and how they contribute to the overall assessment and analysis. This appendix describes what each Debit Tool is doing 'under the hood' so users have a better

understanding of how the Debit Tools work.

Debit Tool 1

Debit Tool 1 prepares the user for the digitization and/or categorization of the proposed surface disturbance of the a debit project. If a feature class or 'Proposed Surface Disturbance' shapefile is provided as Proposed_Surface_Disturbance, the tool performs the following steps: projects the provided layer to the standard coordinate system of the Desktop Analysis, adds the layer named 'Proposed_Surface_Disturbance_Debits' to the map document, adds fields for Type, Subtype, Surface Disturbance, and Reclassified Subtype, and applies domains for the added fields to restrict data entry to valid inputs.

1. Projects the provided layer to the standard coordinate system used in the Desktop Analysis.
2. Adds a layer named 'Proposed Surface Disturbance Debts' to the map document.
3. Adds fields for Type, Subtype, Surface Disturbance, and Reclassified Subtype.
4. Applies domains to these fields to ensure that data entry is restricted to valid inputs.

If a feature class or shapefile is not provided, the tool creates an empty feature class with the same projection, fields, and domains, is created and added-adds it to the map document. The map document is then saved before the tool finishes-completes its process.

Debit Tool 2

Debit Tool 2 uses-processes the 'Proposed_Surface_Disturbance_Debits' feature class as edited by the user to create-generate the 'Proposed_Surface_Disturbance_Eligible' feature class. The tool performs the following steps:

1. Clips out any impact areas located on private lands from the 'Proposed Surface Disturbance Debts' layer.
2. Adds a new field named Disturbance Type- to the 'Proposed Surface Disturbance Eligible' feature class to indicate whether the features represent direct disturbance by clipping out any impact located on private lands. A new field 'Disturbance_Type' is added to the Proposed_Surface_Disturbance_Eligible feature class to indicate these features represent direct disturbance (as opposed to indirect disturbance).
3. Buffers the The-'Proposed_Surface_Disturbance_Eligible' feature class is-buffered by the distance effect associated with each feature type, to create-creating the 'Debit Project Area'. The 'Subtype' field is used to lookup the appropriate buffering distance for buffering each feature, as specified in Table 1. It is crucial that the 'Subtype' field values are exact matches with those listed in Table 1.
4. The Analysis Area creations uses the buffered Proposed Surface Disturbance Eligible feature class to define the to create the 'Analysis_Area' by applying the specified buffering distances.
1. Distances for each subtype are provided in Table 1. It is important that the Subtype field is populated and all values are exact matches of those found in Table
1. All existing anthropogenic features within the "Analysis_Area should be digitized within the Anthro_Feature classes of the within the Nevada Data Package prior to before proceeding to Debit Tool 3.
6. The 'Debit_Project_Area' is also saved as a shapefile in the project's folder so that the ASUI layer from NDOW can be acquired from NDOW within its extent.

The map document is saved before the tool finishes.

Debit Tool 3

Debit Tool 3 ~~uses—processes~~ the **'Proposed_Surface_Disturbance_Eligible'** feature class to identify potential ~~overlapping—overlaps with~~ existing anthropogenic features. ~~The tool performs the following steps:~~

1. ~~Detects overlapping areas between the 'Proposed Surface Disturbance Eligible' and existing anthropogenic features.~~
2. ~~Introduces new fields to the overlapping features to record:~~
 - a. ~~**Overlap Status:** Indicates the status of the existing feature during and after the proposed project.~~
 - b. ~~**Returned:** Indicates whether the feature is expected to return to its original condition post-project.~~
 - c. ~~**Overlap Type:** Records the type of disturbance from the **'Proposed Surface Disturbance Eligible'** feature class that overlaps the existing feature.~~
 - d. ~~**Overlap Subtype:** Records the subtype of the overlapping feature.~~
3. ~~Clips the existing anthropogenic features to the **Analysis Area** to focus on relevant impacts.~~
4. ~~After running Debit Tool 3, the user must review and update the **Overlap Status** and **Returned** fields for overlapping features within the ~~with the proposed disturbance. For overlapping features, new fields are added to identify the status of the existing feature during and after the proposed project ('Overlap_Status' and~~~~
- 2.4. ~~'Returned'). Also, the type and subtype of the feature in the **'Proposed_Surface_Disturbance_Eligible'** feature class that overlap the existing feature are recorded in the 'Overlap_Type' and 'Overlap_Subtype' fields. Existing anthropogenic features are clipped to the **Analysis_Area**. Following Debit Tool 3, the user must review and update the 'Overlap_Status' and 'Returned' fields for overlapping features within the **"Anthro_*feature type*_Clip"** feature classes if they do not conform for the default classifications **do not apply**.~~
- 3.5. ~~The map document is saved before the tool finishes.~~

Debit Tool 4

Debit Tool 4 completes a majority of the geoprocessing necessary to evaluate the debit project. It takes as input the **'Analysis_Area'** created in Debit Tool 2 (which MUST be located within the project's geodatabase) and a folder to save the output Excel files within. Optionally, a feature class or shapefile containing current anthropogenic features within the **'Analysis_Area'** may be provided. This layer will be copied to the project's geodatabase (overwriting any existing feature class named **"Current_Anthro_Features"**) and used instead of merging the individual anthropogenic feature layers. This is intended to allow users who have previously digitized anthropogenic features through a different process to use those data. It is not recommended; ensure that the Subtype field is populated appropriately.

~~Debit Tool 4 merges all anthropogenic feature layers to create **"Current_Anthro_Features"**, and then calculates the indirect anthropogenic disturbance associated with those features by using the Subtype field to lookup the weight and distance associated with that feature, which is provided in Table 1. The **"Current_Anthro_Disturbance"** raster is created in the project's geodatabase. It repeats this process for **"Projected_Anthro_Features"**, which is created by merging the proposed surface disturbance with the current anthropogenic features (less any features that are classified as removed), and updating the Subtype field with the Subtype as Modified value for features that are classified as 'Modified'. The process is repeated for **"Permanent_Anthro_Features"**, which is created by merging proposed surface disturbance that is classified as 'Permanent' or 'Term_Reclassified', where the Subtype is updated with the Reclassified Subtype value, and existing features that are classified as 'Returned' equals True or~~

where the 'Subtype_As_Modified' field is not equal to the 'Subtype' field and 'Returned' equals False; the Subtype is updated with the Subtype_as_Modified value.

Next, the tool calculates the seasonal local-scale modifiers for each term by multiplying the rasters created above by the appropriate seasonal modifiers. See the HQT Methods Document for information on which modifiers apply to which seasons. Using these results, the tool creates a visual depiction of the project impact by selecting the maximum per season impact from each seasonal local-scale GRSG habitat raster.

The tool then creates the Map_Units layer. First, it creates map units for areas that overlap existing surface disturbance, and areas categorized as 'de minimus' GRSG habitat quality based on pinyon-juniper cover and annual grass cover. It also creates map units for the proposed surface disturbance. Finally, it adds

fields for 'Map_Unit_ID', 'Map_Unit_Name', and 'Meadow' and assigns domains to those fields. The map document is saved before the tool finishes.

Debit Tool 4 handles a significant portion of the geoprocessing necessary to evaluate the debit project. It performs the following tasks:

1. It takes the 'Analysis Area' as input from Debit Tool 2, which must be located within the project's geodatabase. Then it accepts a folder to save the output Excel files. It can optionally, accept a feature class or shapefile containing current anthropogenic features within the 'Analysis Area'. If provided, this layer is copied to the project's geodatabase (overwriting any existing feature class named "Current Anthro Features") and used in place of merging individual anthropogenic feature layers. Note: It is recommended to populate the Subtype field appropriately if using this option.
2. Merges all anthropogenic feature layers to create 'Current Anthro Features'. Calculates indirect anthropogenic disturbance by using the Subtype field to lookup the weight and distance associated with each feature (as provided in Table 1) and creates the 'Current Anthro Disturbance' raster. Merges proposed surface disturbance with current anthropogenic features (excluding those classified as 'Removed') to create 'Projected Anthro Features', updating the Subtype field with the Subtype as Modified value for features classified as 'Modified'. Creates 'Permanent Anthro Features' by merging proposed surface disturbance classified as 'Permanent' or 'Term Reclassified' with existing features classified as 'Returned' equals True or where the Subtype As Modified field differs from the Subtype field and Returned equals False. Updates the Subtype field with the Subtype as Modified value.
3. Calculates seasonal local-scale modifiers for each term by multiplying the rasters created above by the appropriate seasonal modifiers. Refer to the HQT Methods Document for information on which modifiers apply to which seasons. Creates a visual depiction of project impacts by selecting the maximum per season impact from each seasonal local-scale GRSG habitat raster.
4. Creates map units for areas overlapping existing surface disturbance and areas categorized as 'de minimus' GRSG habitat quality based on pinyon-juniper cover and annual grass cover. Includes proposed surface disturbance in the map units. Adds fields for 'Map Unit ID', 'Map Unit Name', and 'Meadow', and assigns domains to these fields.
5. The map document is saved before the tool completes its process.

Debit Tool 5

Debit Tool 5 is run after the user has delineated map units based on vegetation types. The tool creates another set of unique map units and then dissolves all multi-part map units to create Map_Units_Dissolve. The tool calculates the area in acres for each map unit. The tool calculates the proportion of each map unit in each Management Category, WAFWA management zone, Priority Management Unit, and Precipitation zone. These proportions are exported to Excel files in the project's folder. The tool calculates the average HSI value for each season and the average local-scale modifier for

each season. Finally, the tool adds a 'Transects' field to the Map_Units_Dissolve layer to allow the user to create a number of transects per map unit. The map document is saved before the tool finishes. Debit Tool 5 is executed after the user has delineated map units based on vegetation types. It performs the following tasks:

1. Creates a new set of unique map units from the delineated vegetation types. Dissolves all multi-part map units to produce the 'Map Units Dissolve' layer.
2. Calculates the area in acres for each map unit.
 - Determines the proportion of each map unit within various categories:
 1. Management Category
 2. WAFWA management zone
 3. Priority Management Unit
 4. Precipitation zone
 - Exports these proportions to Excel files stored in the project's folder.
- 2.3. Computes the average Habitat Suitability Index (HSI) value for each season. Calculates the average local-scale modifier for each season.
- 3.4. Adds a 'Transects' field to the 'Map Units Dissolve' layer to enable users to specify the number of transects per map unit.
5. Saves the map document before the tool completes its process.

Debit Tool 6

Debit Tool 6 performs a spatial join of the transects feature class provided by the SETT with the 'Map_Units_Dissolve' layer. ~~and~~ It exports the data table to an Excel file within the project's folder.

APPENDIX 6. CREDIT TOOL OVERVIEW

This appendix describes what each Credit Tool is doing ‘under the hood’ so users have a better understanding of how the Credit Tools work.

Credit Tool 1

For most Credit Projects, Credit Tool 1 prepares the user for digitizing map units within the credit project boundaries. A feature class or shapefile defining the outer extent of the credit project must be provided as ‘**Credit_Project_Boundary**’. If the provided layer contains multiple features, those features will be retained (e.g., the provided layer is not dissolved; multiple features are acceptable). The tool projects the provided layer to the standard coordinate system of the Desktop Analysis, clips out any areas that are not within management categories PHMA, GHMA, or OHMA (this is normal), and names this feature class ‘**Credit_Project_Area**’. The tool uses that to create the **Map_Units** layer, adds the layer to the map document, adds fields for ‘Map_Unit_ID’, ‘MapUnitName’, and ‘Meadow’, and applies domains for the added fields to restrict data entry to valid inputs.

For projects that propose to modify or remove existing anthropogenic features, the user should check the corresponding box before running Credit Tool 1. The user may also, but is not required to, provide a feature class or shapefile defining the outer extent of the feature to be modified or removed. If that is not provided, the tool will create a template. The tool adds fields for ‘Type’ and ‘Subtype’ and applies domains for the added fields to restrict data entry to valid inputs. If the provided feature class or shapefile already has those fields present, the tool will copy those fields to a new field named ‘Type_copy’ or ‘Subtype_copy’. The user must populate the ‘Type’ and ‘Subtype’ fields with the *current* status of the feature. The map document is saved before the tool finishes.

Credit Tool 2

For most Credit Projects, Credit Tool 2 uses the ‘**Map_Units**’ feature class as edited by the user to create the ‘**Analysis_Area**’ and clip all provided anthropogenic feature templates to the ‘**Analysis_Area**’ for the user to digitize new features and confirm existing. The feature class provided by the user **MUST** be located within the project’s geodatabase, however, it may be a different feature class than that created as an output of Credit Tool 1. This is intended to allow the user to use geoprocessing tools as necessary when digitizing the map units. Credit Tool 2 creates the ‘**Analysis_Area**’ by buffering the ‘**Map_Units**’ layer by the maximum distance found in Table 1. This is to ensure that any anthropogenic features that may have an indirect impact on the project are captured during digitization of existing anthropogenic features.

For projects that proposed to modify or remove existing anthropogenic features, Credit Tool 2 uses the ‘**Proposed_Modified_Features**’ layer to calculate the area of indirect benefit of the project, named ‘**Indirect_Benefit_Area**’. Any areas that are not within management categories PHMA, GHMA, or OHMA are clipped out. The tool also adds a field named ‘Subtype_as_Modified’ to each clipped anthropogenic feature layer for the user to indicate which features will be modified or removed, and to what status they will be modified. The map document is saved before the tool finishes.

Credit Tool 3

Credit Tool 3 completes a majority of the geoprocessing necessary to evaluate the credit project area. It takes z as input, the ‘**Analysis_Area**’ created in Credit Tool 2 (which **MUST** be located within the project’s geodatabase) and a folder to save the output Excel files within. Optionally, a feature class or shapefile containing current anthropogenic features within the ‘**Analysis_Area**’ may be provided. This layer will be copied to the project’s geodatabase (overwriting any existing feature class named ‘**Current_Anthro_Features**’) and used instead of merging the individual anthropogenic feature layers. This is intended to allow users who have previously digitized anthropogenic features through a different

process to use those data. It is not recommended; ensure that the Subtype field is populated appropriately.

Credit Tool 3 merges all anthropogenic feature layers to create **“Current_Anthro_Features”**, and then calculates the indirect anthropogenic disturbance associated with those features by using the Subtype field to lookup the weight and distance associated with that feature, which is provided in Table 1. The **“Current_Anthro_Disturbance”** raster is created in the project's geodatabase. It repeats this process for projected condition for **C**redit **P**rojects that propose to modify or remove existing anthropogenic features by using the 'Subtype_As_Modified' field instead of the 'Subtype' field. The area of indirect benefit is merged with the **'Map_Units'** layer and a field named 'Indirect' is added to the **'Map_Units'** layer signifying 'True' if the map unit is outside of the credit project boundary but within the indirect benefits area. For most **C**redit **P**rojects, the 'Indirect' field will read 'False' for all map units.

Next, the tool calculates the seasonal local-scale modifiers for each term by multiplying the rasters created above by the appropriate seasonal modifiers. See the HQT for information on which modifiers apply to which seasons. A multiplier for removal of pinon juniper is also applied depending on the cover (i.e., phase) of pinon juniper present. For map units where the actual percent cover is less than 1%, this multiplier is removed at a later step. Using these results, the tool creates a visual depiction of the project benefit by selecting the maximum per season benefit from each seasonal local-scale **GRSG** habitat raster, subtracting the regional average site-scale **GRSG** habitat quality and multiplying by the management importance factor. This visualization is intended as an aid only, site-scale **GRSG** habitat quality data must be collected before credits can be known.

The tool then dissolves all multi-part map units to create **'Map_Units_Dissolve'**. The tool calculates the area in acres for each map unit. The tool calculates the proportion of each map unit in each Management Category, WAFWA management zone, Priority Management Unit, and Precipitation zone. These proportions are exported to Excel files in the project's folder. The tool calculates the average HSI value for each season and the average local-scale modifier for each season.

Finally, the tool adds a 'Transects' field to the **'Map_Units_Dissolve'** layer to allow the user to create a number of transects per map unit. The map document is saved before the tool finishes.

Credit Tool 4

Credit Tool 4 performs a spatial join of the transects feature class provided by the SETT with the **'Map_Units_Dissolve'** layer and exports the data table to an Excel file within the project's folder.

APPENDIX 7. DATA DESCRIPTIONS

Provided Data

- Nevada Wet Meadows (**NV_Wet_Meadows**): This feature class delineates the boundaries of possible riparian areas in Nevada.
- Distance to Brood-Rearing Habitat (**Dist_Brood**): This raster represents **habitat**-function associated with distance to **GRSG** brood-rearing habitats in Nevada. Use to calculate the Distance to Brood-Rearing Habitat modifier.
- SEP Management Categories Map (**Mgmt_Cat**): This feature class delineates the boundaries of Sagebrush Ecosystem Program (SEP) Management Categories in Nevada. Use for informing the Credit System's Mitigation Ratio.
- Biological Significant Units (**NV_BSU**): This feature class delineates the boundaries of the Biological Significant Units in Nevada.
- Nevada Counties (**NV_Counties**): This feature class represents county boundaries in Nevada.
- Nevada Disturbance Response Groups (**NV_DRG**)³: This feature class delineates the boundaries of ecological sites that have been grouped into identified disturbance response groups.
- Nevada Ecological Site Descriptions (**NV_ESD**): This feature class delineates the boundaries of ecological sites.
- Priority Conservation Areas (**NV_PCA**): This feature class delineates the boundaries of Priority Conservation Areas, which are defined as the intersection between Sagebrush Focal Areas and (SFA) and Priority Habitat Management Areas (PHMA) in Nevada.
- Population Management Units (**NV_PMU**): This feature class delineates the boundaries of the NDOW Population Management Units in Nevada.
- Public (non-private) Lands: This feature class delineates land ownership that is not private land in the state of Nevada.
- WAFWA Management Zones (**NV_WAFWA**): This feature class delineates the boundaries of the WAFWA Management Zones in Nevada.
- MVRN Meadows (**NV_Wet_Meadows**): This feature from Saito 2020 MVRN shapefile delineates wet meadows from existing geospatial and remote sensing data.
- Percent Cover of Pinon Juniper (**PJ_Cover**): This raster represents percent cover of pinon juniper at a 30m pixel resolution.
- Phase III Pinon-Juniper (**PJ_Phase_III**): This feature class represents areas of Phase III (>20% cover) pinon-juniper.
- Pinon-Juniper Phase Map (**PJ_Phases**): This feature class represents pinon-juniper by phase, where phase I is <10% cover, phase II is 10% - 20% cover, and phase III is >20% cover.
- Uplift from Pinon-Juniper Removal (**PJ_Uplift**): This raster represents the multiplier applied to **Credit P** projects that propose to remove pinon juniper.
- Precipitation Regime (**Precip**): This feature layer is reclassified such that areas with less than 25.4 cm of precipitation are categorized as arid, and areas with greater than 25.4 cm are categorized as mesic. It is derived from the 30-year normal PRISM dataset available at <http://prism.oregonstate.edu/normals/>. Use for identifying the precipitation regime of individual map units.

³ [Tamzen K. Stringham, T.K., Patti Novak-Echenique, P., Devon K. Snyder, D.K., Sarah Peterson, S., and](#)

[Keirith A. Snyder, K.A.](#) Disturbance Response Grouping of Ecological Sites Increases Utility of Ecological Sites and State-and-

~~Transition Models for Landscape Scale Planning in the Great Basin. Tamzen K. Stringham, Patti Novak Echenique, Devon K. Snyder, Sarah Peterson, and~~

~~Keith A. Snyder. *Rangelands* 2016 38 (6): 371-378.~~

- Breeding Habitat Suitability Index (**Spring_HSI**): This raster dataset provides an index of local-scale GRSG habitat functionality ~~for sage-grouse~~ in Nevada during the spring season, which corresponds to the breeding life history period for ~~sage-grouse~~GRSG.
- Late Brood-rearing Habitat Suitability Index (**Summer_HSI**): This raster dataset provides an index of local-scale GRSG habitat functionality ~~for sage-grouse~~ in Nevada during the summer season, which corresponds to the late brood-rearing life history period for ~~sage-grouse~~GRSG.
- Over-Wintering Habitat Suitability Index (**Winter_HSI**): This raster dataset provides an index of local-scale GRSG habitat functionality ~~for sage-grouse~~ in Nevada during the winter season, which corresponds to the over-wintering life history period for ~~sage-grouse~~GRSG.
- **Anthropogenic Features Geodatabase (Anthro_Features.gdb)**
 - Anthro_Attribute_Table: This table provides the indirect-effect weights and distances of anthropogenic features. Data in this table is also provided in Table 1.
 - emptyRaster: This raster is used to ensure consistent raster processing by serving as a snap raster and providing cell sizes for raster calculations.
 - Exploration: Empty feature class to allow users to more easily delineate exploration areas.
 - LROW: Empty feature class to allow users to more easily delineate linear rights-of-way.
 - Mines: Federal mine locations derived from Mineral Resource Data System (MRDS) data.
 - Oil_Gas: Federal oil and gas well locations derived from Automated Fluid Mineral Support System (AFMSS) data dated 12/2012.
 - Powerlines: Empty feature class to allow users to more easily delineate powerlines.
 - Renewable: Geothermal leases dated 2013.
 - Roads: State, federal, and county roads compiled by Nevada Department of Transportation (NDOT).
 - Towers: Communications tower locations derived from FCC data.
 - Urban: Boundaries of census blocks in Nevada categorized based on a Wikipedia search of all cities/townships.
- **Layer_Files Folder:** Includes layer files that may be used to standardize the symbology of outputs of the Desktop Analysis. Instructions for applying symbology to layers using layer files are provided throughout the User's Guide at appropriate steps.
- **Scripts Folder:** Contains text of the Python scripts used to generate the Desktop Analysis Tools, to be used for reference if desired.



For information and questions about the Nevada Conservation Credit System, please contact:

Sagebrush Ecosystem Technical Team (SETT)
(775) 687-2000