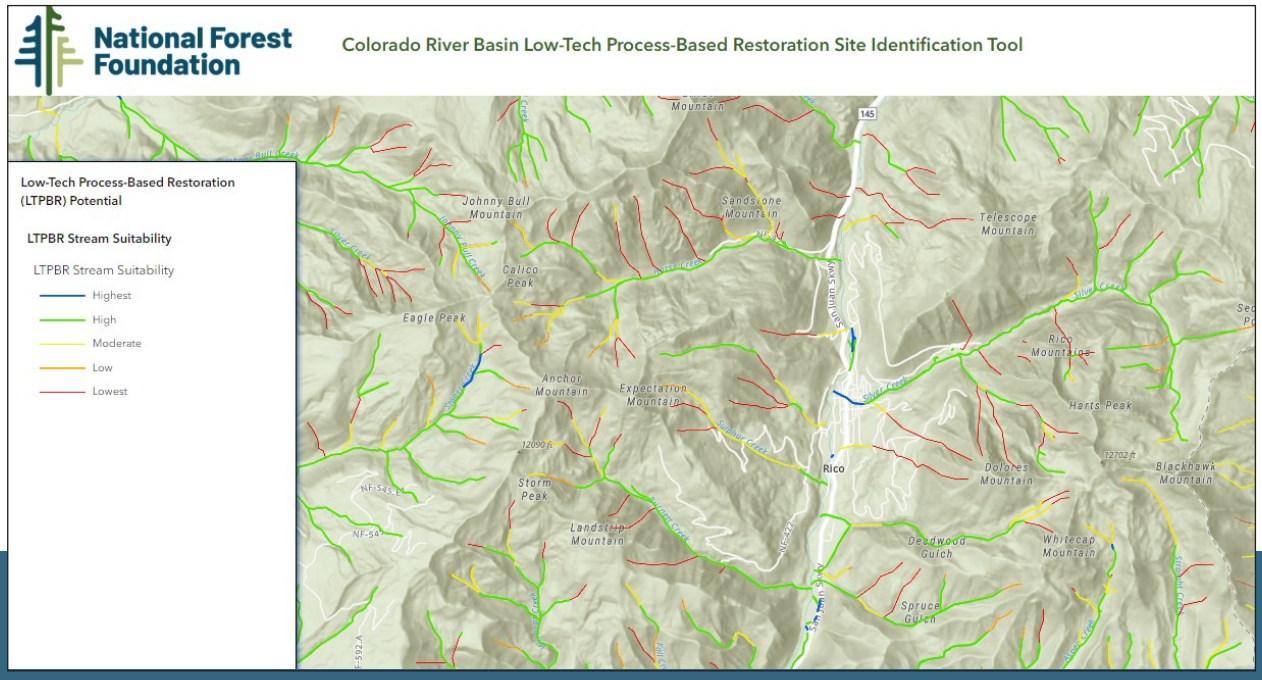
September 2023

COLORADO RIVER BASIN

Geospatial Analysis and Online Map Methodology Report



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Acronyms and Abbreviations

BPS	Biophysical Settings
BRAT	Beaver Restoration Assessment Tool
CRB	Colorado River Basin
DEM	Digital Elevation Model
EVT	Existing Vegetation Type
HUC	hydrologic unit code
km	kilometer
LTPBR	low-tech process-based restoration
NED	National Elevation Dataset
NFF	National Forest Foundation
NHD	National Hydrography Dataset
Tool	CRB LTPBR site identification tool
US	United States
USFS	US Forest Service
USGS	US Geological Survey

1. INTRODUCTION

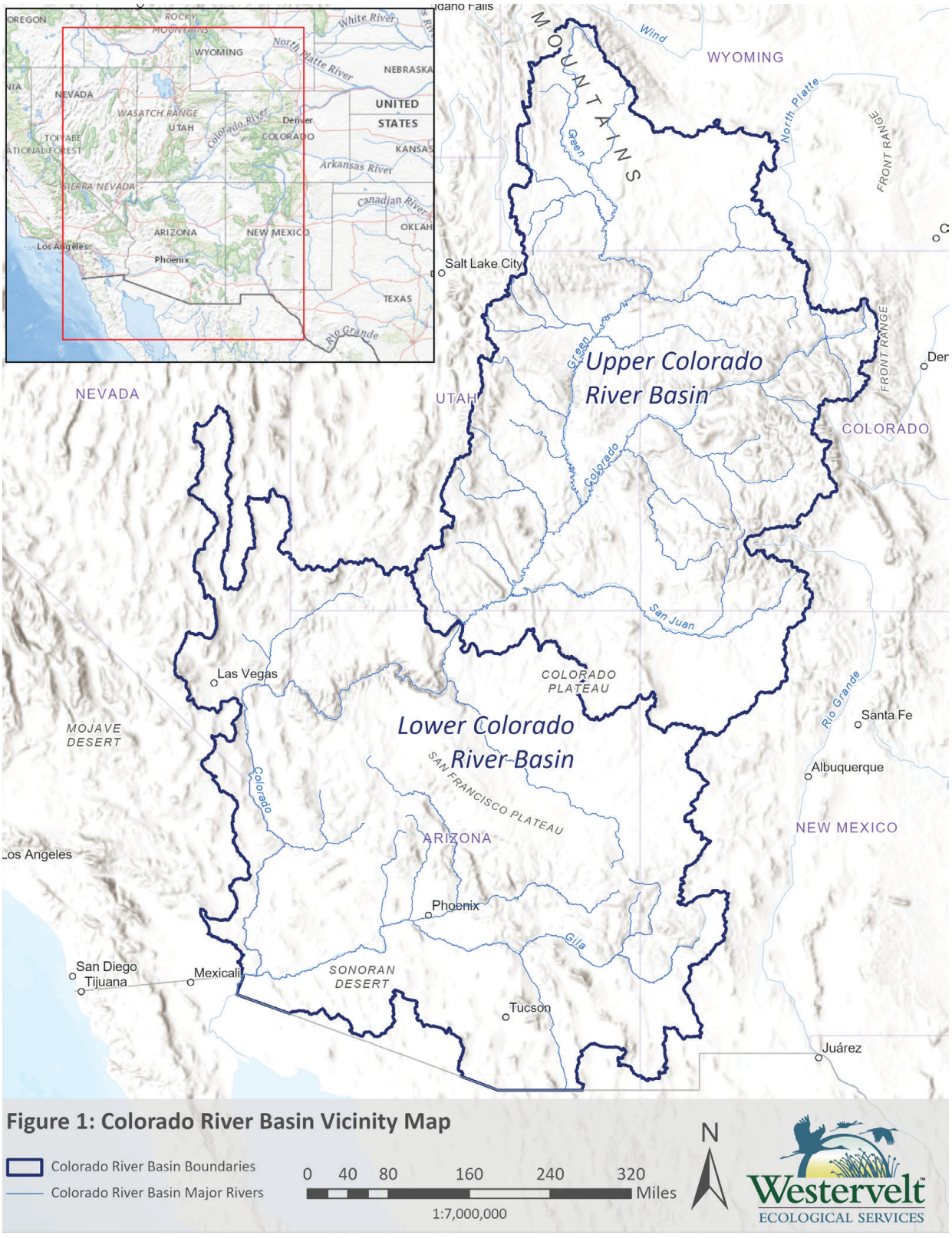
Westervelt Ecological Services, LLC and Platte River Analytics (hereinafter referred to as the Project Team) are pleased to submit the Colorado River Basin (CRB) Geospatial Analysis and Online Map Methodology Report to the National Forest Foundation (NFF). This report summarizes the methodology used to develop the CRB low-tech process-based restoration (LTPBR) site identification tool (Tool; https://www.nationalforests.org/regional-programs/rocky-mountain-region/colorado-river-restoration-initiative). With support from the Walton Family Foundation, and in close coordination with the United States Forest Service (USFS), the NFF developed this Tool to help identify LTPBR sites throughout the CRB. Additionally, the NFF is making the Tool publicly available on their website.

The Tool uses the Beaver Restoration Assessment Tool (BRAT), an open-source product designed to help identify streams that can support the habitat and natural infrastructure required for beaver reintroduction (Utah State University, 2023). This Tool utilizes the BRAT model as a proxy for identifying LTPBR sites throughout the CRB and was refined by the Project Team to meet the NFF's mapping goals. As such, the NFF and other users can explore the potential suitability of LTPBR restoration techniques in public and private riverscapes throughout the CRB. LTPBR techniques typically comprise relatively minimal structural inputs (e.g., beaver dam analogs, trees, wood) to rivers and riparian areas to mimic beaver functions and start specific hydrologic processes (Wheaton et al., 2019). These restoration projects can provide immediate benefits to water quality, native flora and fauna, and the watershed.

The CRB comprises seven states in the western United States (US)—Arizona, California, Colorado, Nevada, New Mexico, Utah, and Wyoming—and is further divided into an upper and lower basin (Figure 1). Population growth and development over the last century have increased the need for dependable water resources within the CRB, resulting in numerous dam installation projects and the implementation of water management strategies (Zamora et al., 2012). Historically, the North American beaver (*Castor canadensis*) population was estimated to be between 60 and 400 million individuals, with beaver activity present in rivers throughout the continent. Precipitous population declines occurred in the early 19th century due to beaver trapping and the commercial fur trade, leading to near extirpation of the species throughout its range. Removing beavers from the landscape has significantly affected CRB water storage, groundwater recharge, and general river health (Scamardo et al., 2022).

The NFF recognizes the positive impacts beaver activities have on watershed health and, thus, has created the Tool to catalyze beaver analog restoration efforts throughout the basin. This Tool sources publicly available data in a user-friendly web-based interactive map that allows users to identify suitable LTPBR sites throughout the CRB. The data behind the Tool's outputs is also available for download, allowing users a more detailed and customized application to their areas of interest.

Figure 1: Project Vicinity Map



2. APPROACH AND METHODOLOGY

The NFF's primary goal in developing the CRB geospatial analysis and online map is to identify suitable sites for LTPBR techniques throughout the CRB. The Tool, developed by the Project Team from May to September 2023, with a go-live online mapping date of September 1, 2023, integrates basin-wide BRAT model runs with pertinent geospatial layers.

2.1. Beaver Restoration Assessment Tool Model

The BRAT was created by the Wheaton Ecogeomorphology and Topographic Analysis Laboratory at Utah State University as a planning tool to help predict the capacity of riverscapes to support dam-building activities by beavers. It consists of a suite of open-source tools belonging to the Riverscapes Consortium's collection of planning models.

The BRAT model contains 30 Python scripts, 2 Python toolboxes, and 76 symbology layers. This project used the latest release of the BRAT package, pyBRAT 3.1.0 (with ArcPy 10.x dependencies; Riverscapes Consortium, 2023a). The technical name for the package is pyBRAT; however, for simplicity and clarity, it is referred to in this report as the BRAT or BRAT model.

Fundamental to the BRAT is the beaver dam capacity model—an estimation of the maximum dam density an individual stream reach can support (Macfarlane et al., 2015). The capacity model looks at five data sets to determine the viability of a stream reach for natural beaver dam-building activity (Utah State University, no date):

- Availability of water to support beaver ponds
- Availability/extent of woody building material
- Ability of beaver to build dams at baseflow
- Likelihood of dams to withstand high flows
- Likelihood that a stream is small enough to dam

The BRAT beaver dam capacity outputs were used as a proxy for restoration potential and were utilized to identify suitable LTPBR stream lengths throughout the CRB. The familiarity of ecosystem restoration experts with BRAT outputs, the open-source nature of the model, and the more than 10 years of refinement behind the current BRAT model all factored into the NFF's decision to use the BRAT model to assist in identifying LTPBR sites.

2.2. Project and Data Preparation

Prior to running the BRAT model, it is necessary to pre-process five publicly available geospatial data sources: LANDFIRE Biophysical Settings (BPS); LANDFIRE Existing Vegetation Type (EVT), National Hydrography Dataset (NHD) stream network, National Elevation Dataset (NED), and Streamflow Regression Equations (Table 1).

These geospatial data sources were processed using steps described in the BRAT documentation. The processed data is then used as inputs for running the BRAT model. The requisite geospatial data sources and their post-processed BRAT inputs are detailed in Table 1.

Table 1: Required Beaver Restoration Analysis Tool Geospatial Data Sources

Source	Source Data	Data Type	Source URL	Data Description	BRAT Input
LANDFIRE	BPS	Raster	https://www.landfire.gov/vegetation.php	Vegetation types that would have been typi-cal prior to Euro-American settlement. Mate-rial coded 0 is least suitable, while material coded 4 is the most suitable for beaver dam building.	Input historical vegetation raster
LANDFIRE	EVT	Raster	https://www.landfire.gov/vegetation.php	Existing vegetation types that were coded according to dam-building suitability. Material coded 0 is least suitable, while material coded 4 is the most suitable for beaver dam building.	Input existing vegetation raster
USGS	NHD	Vector	https://apps.nationalmap.gov/services/	Waterway flowlines and watershed bounda-ries throughout the US.	Input segmented stream network
USGS	NED	Raster	https://elevation.nationalmap.gov/arcgis/rest/services 3DEPElevation/ ImageServer	The extents of raster elevation data from the USGS National Map. Input elevation data included 10-meter DEMs.	Input elevation layer; input drainage area rasters
USGS	Streamflow Regression Equations	Function Equation	USGS research papers	USGS research papers were used to derive and assign HUC8 watersheds with peak flow and baseflow regression equations.	Input Python language baseflow and peak flow equations

BPS – Biophysical Settings; BRAT – Beaver Restoration Assessment Tool; DEM – Digital Elevation Model; EVT – Existing Vegetation Type; HUC – hydrologic unit code; NED – National Elevation Dataset; NHD – National Hydrography Dataset; USGS – US Geological Survey.

Note: All data was sourced on March 22, 2023.

2.2.1. Existing Vegetation Cover

The LANDFIRE EVT data is 30-meter raster data, identifying the vegetation types present on the landscape by species and community (LANDFIRE, 2022a). For beaver reintroduction, this represents currently available woody vegetation necessary for dam-building material (Macfarlane et al., 2015).

LANDFIRE BPS rasters depict vegetation types likely present before Euro-American settlement (LANDFIRE, 2022b). This data assesses historical land disturbance (Riverscapes Consortium, 2023b).

It is necessary to process the EVT and BPS rasters for the BRAT model to run correctly. LANDFIRE EVT and BPS rasters from 2022 were downloaded and clipped to the study area. Vegetation codes (veg codes) were then established to rank material according to its suitability for dam building, with 0 being the least suitable material for beaver dam construction and 4 being the most suitable. Veg coding is subjective and was used by Project Team wildlife biologists to assign values (Attachment A). The resulting post-processed rasters provide inputs for the BRAT of existing vegetation and historical vegetation values across the CRB (Figure 2).

2.2.2. National Hydrologic Dataset

Stream network data from the NHD was used for the stream path flowlines, onto which the BRAT outputs are projected. Flowlines categorized as artificial paths, pipelines, canals/ditches, coastline, connectors, and underground conduits were omitted from the dataset and were not considered. All flowlines were then projected into the World Geodetic Survey 1984 Web Mercator projection.

Hydrologic unit code (HUC)8 watershed boundaries were also obtained from the NHD and were used for bounding data within individual HUC8 watersheds. The NHD stream network was clipped to each of the HUC8 watershed boundaries to produce a discrete stream network input for each HUC8 area.

Figure 2: Post-processed Rasters for Existing and Historical Vegetation BRAT Inputs

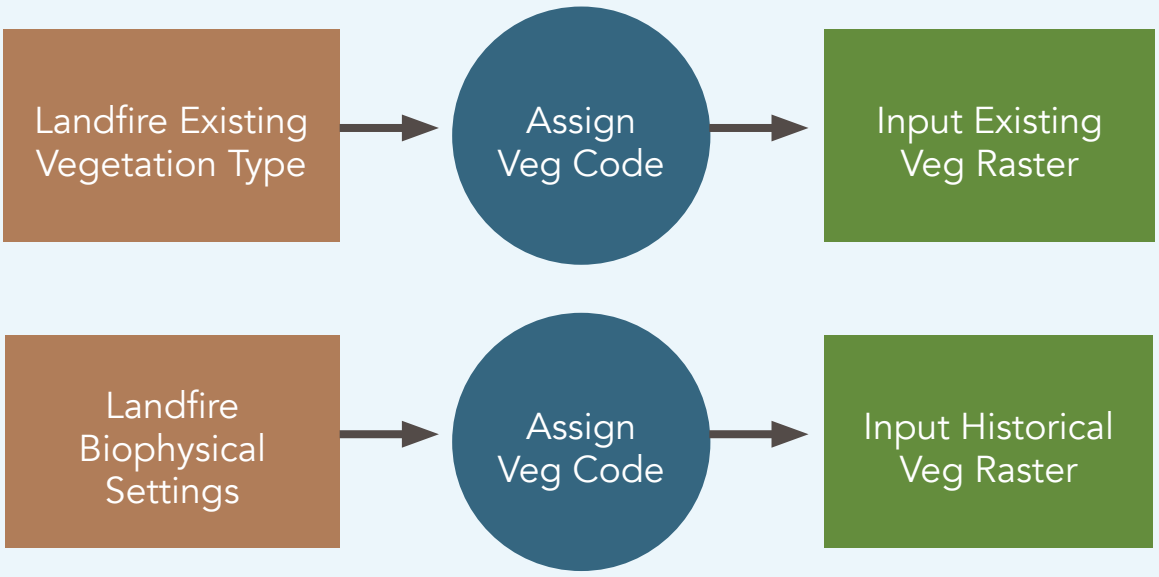
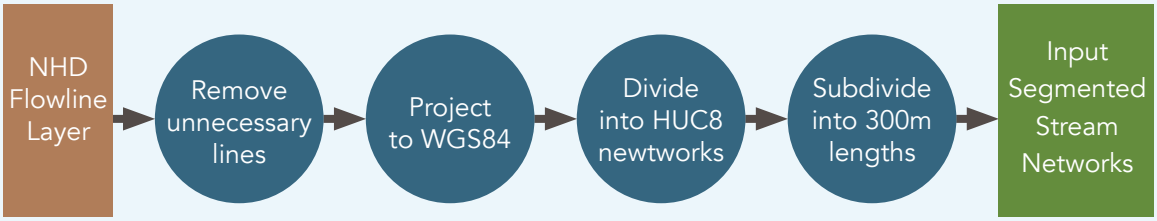


Figure 3: Post-processed Rasters for Stream Network BRAT Inputs



The BRAT model required stream networks to be divided into segments of up to 300 meters. The Project Team used the StreamSegment tool included in the BRAT "Supporting Tools" folder to segment the stream networks into 300-meter segments, while retaining the NHD attributes (Riverscapes Consortium, 2023a). The post-processed data provides an input of segmented stream networks throughout the CRB for use within the BRAT model (Figure 3).

2.2.3. National Elevation Dataset

The BRAT model is designed to use 1/3 arc-second (10-meter) Digital Elevation Models (DEMs) as inputs for elevation data. Individual 10-meter DEMs for the continental US were downloaded for the entire study area from the US Geological Survey (USGS) National Map 3DEP (USGS, 2023). Following the DEM download, all DEMs were processed as a raster mosaic to create a single, continuous input elevation raster covering the CRB (Figure 4).

The Project Team's original intent comprised processing the upper and lower CRB watersheds as large cohesive drainage areas. After some trial and error, however, the Project Team used an HUC8 drainage area approach, which decreased processing time, reduced output errors, and resulted in proper baseflow and peak flow values (Section 2.2.4). The input elevation raster created in the previous step was copied into a new file. This file was then repeatedly clipped and stored as individual HUC8-sized DEM rasters across the study area. In total, 138 separate HUC8 DEMs were created and organized.

Each of the 138 HUC8 DEMs were manipulated using standard ArcHydro tools from ESRI (ESRI, 2023a). This involved running the Fill, Flow Direction, and Flow Accumulation tools in ArcGIS Pro and manipulating the DEM by converting it to square miles using the Raster Calculator tool. The resulting post-processed data is the input drainage area raster required for running the BRAT model (Figure 5).

Figure 4: DEM Processing for Input Elevation Layer

2.2.4. Streamflow – Baseflow and Peak Flow

Baseflow and peak flow regression equations are hydrological attributes required to run the BRAT script. The BRAT code allows for the manual input of these equations, written as a function of drainage area, or for the selection of a pre-programmed regional code. Three pre-programmed regression equations for Utah are available in the BRAT script by default: Upper Green River, Box Elder County, and Oregon Region 5. For the remainder of the CRB, regional USGS equations were used to assign baseflow and peak flow values (Figure 6; Capesius and Stephens, 2009; Kennedy et al., 2015; Miller, 2003; Paretti et al., 2014; Thomas et al., 1997; Waltemeyer, 1996; Waltemeyer, 2002; Waltemeyer, 2006; and Wilkowske et al., 2008). Each USGS regression equation is designed to cover a discrete regional area; therefore, each HUC8 falling within the regression region was assigned a corresponding regression equation (Attachment B). Some areas in the CRB without published USGS regression equations were assigned regression equations of nearby areas with similar terrain.

Across the various regions, regression equations varied in mathematical structure and inclusion/exclusion of variables. Most regression equations generally used basin elevation in feet, mean annual precipitation in inches, mean basin slope in percent, drainage area in square miles, mean January precipitation, and total square miles of basin lying above 7,500 feet of elevation. Slope and elevation values were calculated with

Figure 5: DEM Processing for Input Elevation Layer

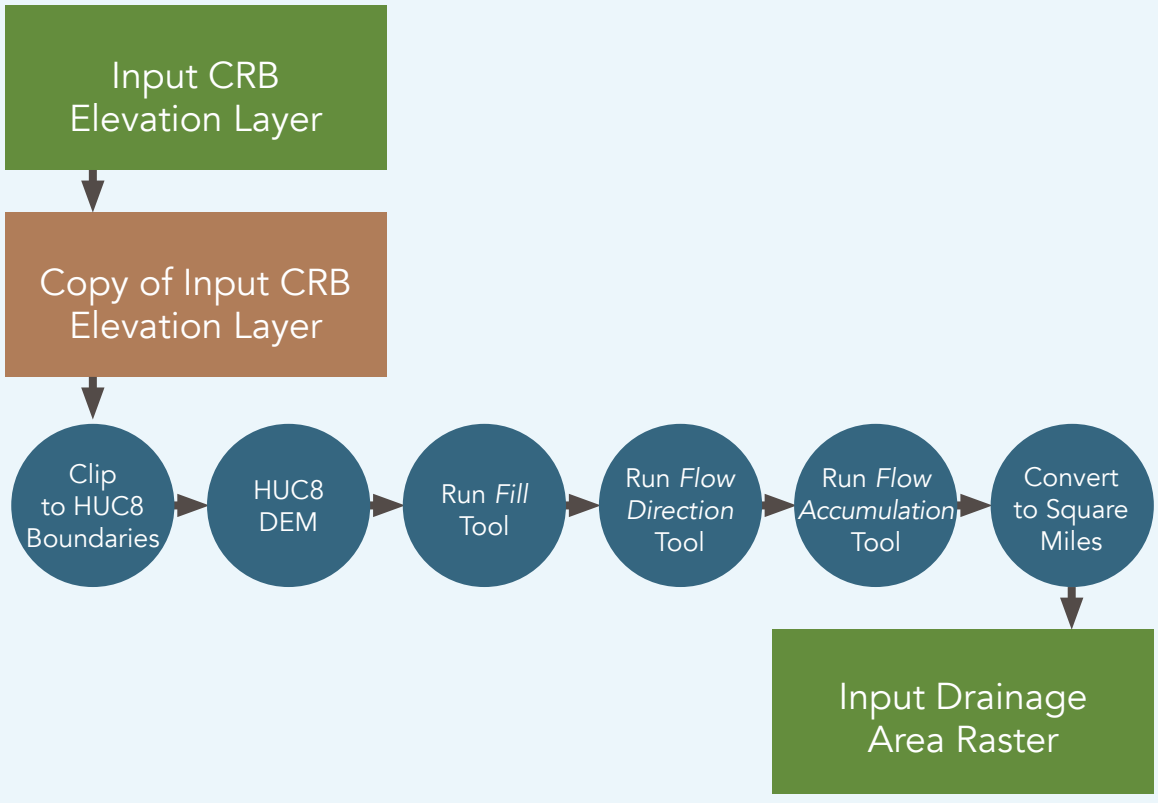


Figure 6: Regional Areas and Regression Equations

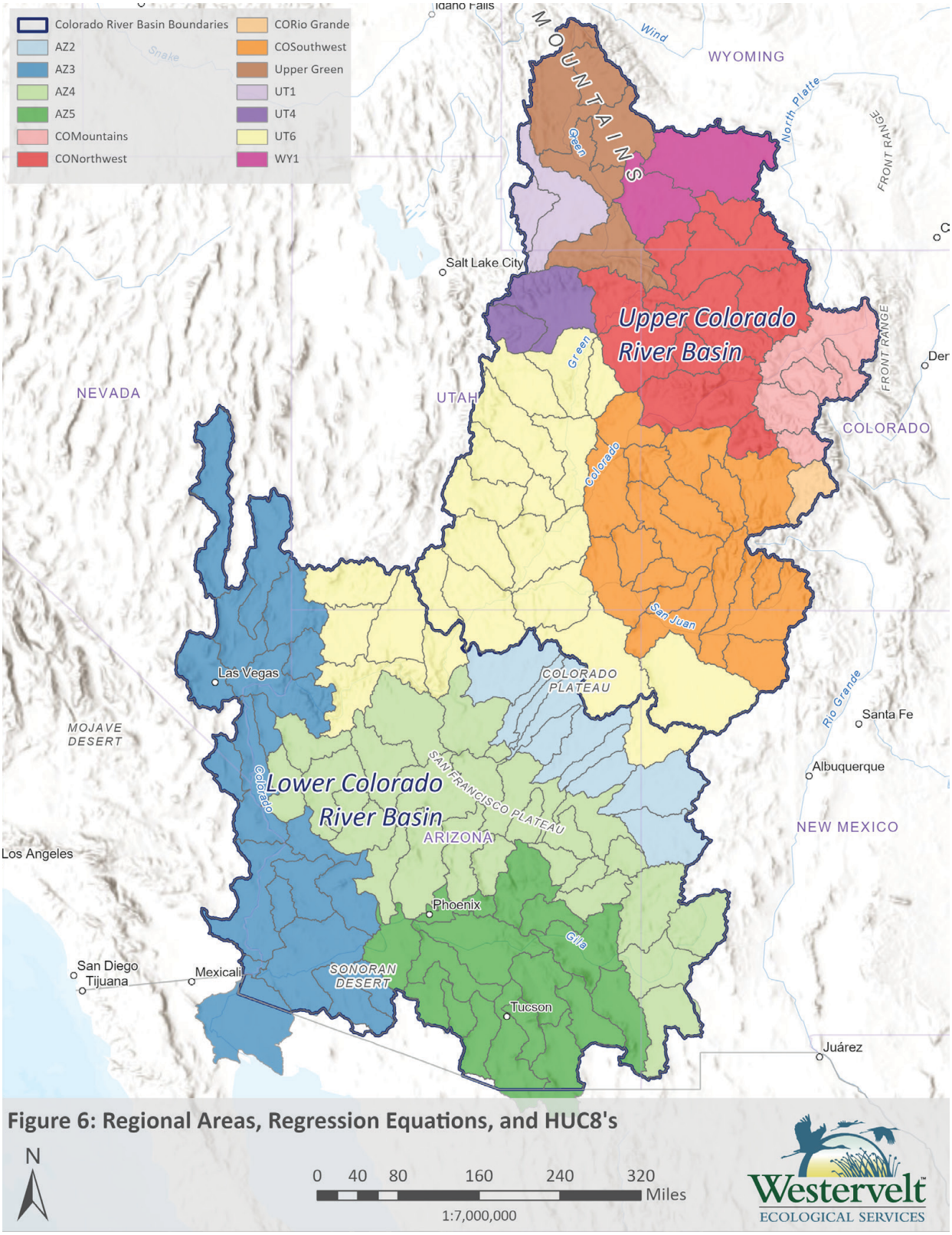


Figure 6: Regional Areas, Regression Equations, and HUC8's

the Summarize Elevation tool in ArcGIS Pro. Precipitation data was gathered from WorldClim as part of ESRI's Living Atlas dataset (ESRI, 2023b). Drainage areas for each HUC8 were calculated by converting square meters to square miles. The different sources and tools used to derive these variables are summarized in Table 2.

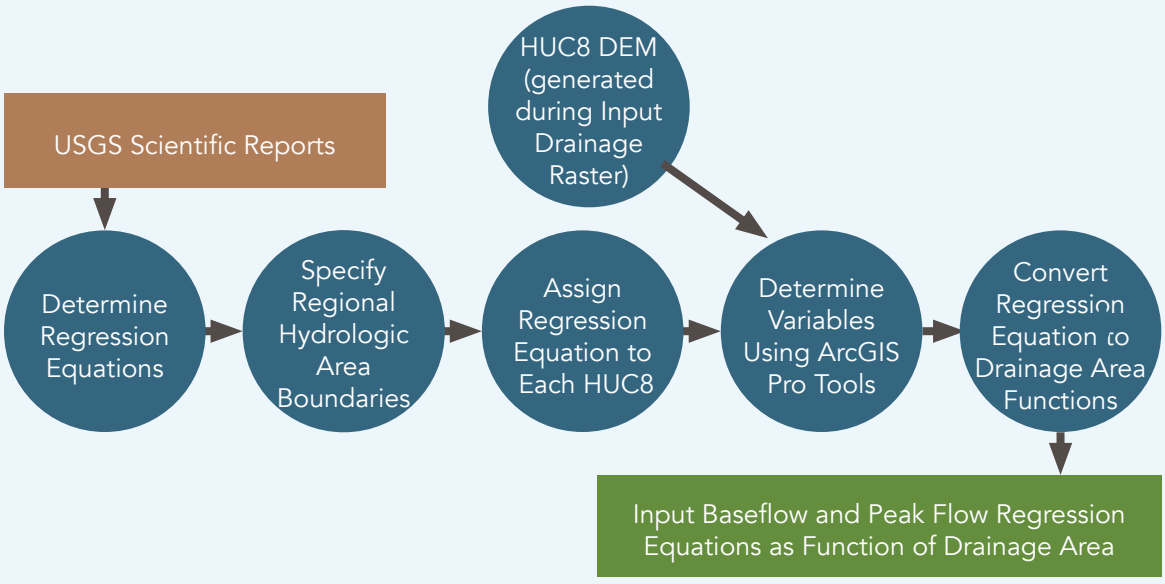
All variables shown in Table 2 were converted to the required units and were used to reduce the regression equations into a function of the drainage area for each of the 138 HUC8 DEMs assessed. Finally, the mathematical functions were coded in Python language to create input baseflow and peak flow regression equations as a function of drainage area (Figure 7).

Table 2: Baseflow and Peak Flow Variable Sources and Derivatives

Variable Name	Source Data	Source URL	Derivation of Values	Unit
Drainage Area	NHD HUC8 Watershed Boundaries	https://apps.nationalmap.gov/downloader/#/	Converted HUC8 drainage area from meters to square miles.	Square miles
Slope	National Elevation Dataset (NED)	https://apps.nationalmap.gov/downloader/#/	ArcPro Summarize Elevation Tool	Percent
Average Elevation	NED	https://apps.nationalmap.gov/downloader/#/	ArcPro Summarize Elevation Tool	Feet
Precipitation	Esri WorldClim Global Mean Precipitation	https://www.arcgis.com/home/item.html?id=e6ab693056a9465cbc3b26416f0dd2c	Average precipitation value derived from WorldClim data across each HUC8 watershed	Inches

Note: All data was sourced on March 22, 2023.

Figure 7: Baseflow and Peak Flow Regression Equations as a Function of Drainage Area



2.3. Geospatial Analysis Using the Beaver Restoration Assessment Tool

The BRAT model used in this effort comprises the latest release of the BRAT package, pyBRAT 3.1.0 with ArcPy 10.x dependencies (referred to as BRAT or BRAT model; Riverscapes Consortium, 2023a).

Python scripts from this latest BRAT version are designed to be compatible with ESRI's legacy ArcMap software. This software is anticipated to be phased out by 2026. Since ongoing coordination between the NFF and the Project Team is anticipated to run through 2028, the Project Team opted to reconfigure the BRAT model to be compatible with ESRI's ArcGIS Pro 2.7.0 software. These reconfigurations included changes to the Python library, ArcPy functionality, and file organization with the migration to ArcGIS Pro.

The BRAT model has been run on various scales, from small singular-stream drainage areas to statewide analysis projects (Riverscapes Consortium, 2023b). For this project, the 138 individual CRB HUC8 watersheds were stitched together into two final outputs: one for the upper CRB and one for the lower CRB.

The following steps describe data inputs into various ArcGIS Pro tools to run the BRAT model and receive a dam capacity model output.

1. BRAT Project Builder tool
    a. The script creates empty folders and copies input data required to run the remaining tool. It sets up the input data in a structure that allows the subsequent tools to be applied.
2. BRAT Table tool
    a. The inputs for this tool include HUC8 DEM, input drainage area raster, input existing vegetation raster, input historical vegetation raster, and input HUC8 segmented stream networks.
    b. This tool creates intermediate data, such as 30-meter and 100-meter buffers around each stream reach, and computes several variables used to determine dam capacity in layer tools. These attributes include maximum/minimum elevation found within a buffer around each reach, length of reach, average slope of reach, maximum drainage area value found in each buffer around each stream reach, and average existing and historical vegetation codes within each buffer.
3. BRAT iHyd Streamflow Attributes tool
    a. The inputs for this tool include either the regional code for a pre-coded hydrological regression equation region (three regions in Utah) or both the region-appropriate input baseflow and peak flow regression equations as a function of drainage area (in square miles).
    b. For each reach, the following is calculated: values for low and high streamflow (cubic feet per second) in the reach, and the stream power (watts) for low and high streamflow.
4. Vegetation Dam Capacity Model tool
    a. This tool takes the BRAT table created in earlier steps and uses the various vegetation attributes that have been calculated to assess the beaver dam capacity based on vegetation.
5. Combined Dam Capacity Model tool
    a. This tool predicts the maximum number of dams each stream could support based on vegetation dam capacity, hydrological attributes, and topographic characteristics of each reach.

The BRAT model uses a fuzzy inference system to combine and analyze various outputs throughout the workflow. The final output, which most BRAT users are familiar with, is the combined dam capacity model (beaver dam capacity). The beaver dam capacity is the main feature in the web-based interface that users will view and interact with to identify potential LTPBR sites.

2.4. Web-Based Interactive Map

A web-based interactive map was created to host the beaver dam capacity output data using the Experience Builder tool within the ArcGIS Online platform. With the Experience Builder, the interactive map includes the following navigation features: introduction, coordinates, map layers, legend glossary, geographic search, and base map gallery. Pop-up features from the navigation pane can be moved and positioned around the screen as desired. A legend is present on the left side of the screen.

2.4.1. Low-Tech Processed Based Stream Suitability Outputs

The BRAT outputs, specifically the beaver dam capacity, have been utilized as a proxy for LTPBR stream suitability. LTPBR stream suitability is stored within the web map as three separate tiled vector layers. The first layer indicates rivers with the highest capacity for supporting in-stream structures. This layer is intended to be used as a lightweight search layer for navigating to areas with the best LTPBR capacity. The other two layers show all LTPBR stream suitability layers across the upper and lower CRB, respectively.

A fourth layer symbolizes the LTPBR stream suitability within the legend on the left side of the screen. The symbology qualitatively shows the LTPBR capacity at various levels. These levels were grouped into five categories of Lowest, Low, Moderate, High, and Highest. These values correspond with the respective BRAT dam capacity outputs of None: (0 dam/mile), Rare: 0-1 dam/km (0-2 dams/mile), Occasional: 1-5 dams/km (2-8 dams/mile), Frequent: 5-15 dams/km (8-24 dams/mile), and Pervasive: 15-40 dams/km (24-64 dams/mile).

2.4.2. Colorado River Basin Layers of Interest

The Project Team worked closely with the NFF to determine what additional geospatial data layers would be useful to users of the Tool. The result is a suite of layers showing various types of roads, railways, public lands, soils, wetlands, LANDFIRE data, and priority restoration areas (Attachment C). These layers are designed to be turned on and off separately to allow users to customize their experience with the Tool and tailor the visuals to their needs.

While not fundamental to the development of the LTPBR stream suitability outputs, LANDFIRE Fuel Disturbance layers were included in the Colorado River Basin Layers of interest. This layer is updated regularly and provides users with visual indicators of land disturbance via fire, insects, and other sources. The Fuel Disturbance layer may assist users of the Tool with identifying negatively impacted areas that could benefit from LTPBR projects.

An NFF default layer was also developed to allow for a quick look at layers, which the NFF views as important to assess potential LTPBR sites. For example, USFS land ownership, priority restoration areas, and USFS trails and roads are all easily accessible from this layer. This gives users the ability to quickly toggle key layers on and off without navigating the full suite of available layers.

2.5. Refinement of the Beaver Restoration Assessment Tool

Throughout the CRB LTPBR Tool development, the Project Team worked with the NFF to incorporate Tool edits and refinements to ensure the map meets NFF expectations. Feedback included omitting unnecessary and/or duplicate layers, such as SSURGO and LANDFIRE layers, that were determined to be unnecessary in determining LTPBR site suitability and map color schemes, symbology, and layout preferences. The Project Team overcame multiple challenges during the data preparation and geospatial analysis, namely script reconfiguration in the BRAT model package for compatibility with ArcGIS Pro (as opposed to ArcMap, the model package for which the program was designed). The BRAT Model Script Error Log has been included as Attachment D.

2.6. Web-Based Interactive Map Publication, Final Report, and Data Delivery

The final Web-Based Interactive Map was made available to the public on September 1, 2023, at https://www.nationalforests.org/regional-programs/rocky-mountain-region/colorado-river-restoration-initiative. This CRB Mapping Methodology Report satisfies the final report deliverable and outlines methodologies, workflows, data sources, limitations, assumptions, and other information used to develop the CRB LTPBR Tool. Full data delivery to the NFF occurred in September 2023.

3. CONCLUSION

In conclusion, the Colorado River Basin Low-tech Process-based Restoration Tool was developed, with funding by The Walton Foundation, by the NFF as an interactive web-based map to identify potential sites suitable for LTPBR projects throughout the upper and lower CRB. The Project Team has worked diligently with the NFF to achieve a user-friendly web-based map. This Tool, available free to the public, will be used by the NFF and other users to successfully identify potential sites suitable for LTPBR projects. The Project Team will continue to work with the NFF through 2024 to address any issues that may arise with the Tool. The Project Team will host, edit, and maintain the web-based interactive map through December 31, 2028.

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ATTACHMENT A:

LANDFIRE BRAT Veg Codes

Type	Veg Code (0-4)
Beach Meadow	0
Black Oak Woodland and Savanna	2
Caribbean Herbaceous	1
Caribbean Shrub/Herbaceous Wetland	1
Depressional Wetland	4
Eastern Floodplain Forests	3
Eastern Small Stream Riparian Forests	3
Floodplain Forest and Shrubland	1
Freshwater Marsh	1
Glades and Barrens	0
Great Lakes Alvar	0
Herbaceous Meadow	1
Inland Marshes and Prairies	1
Introduced Annual and Biennial Forbland	1
Introduced Herbaceous Wetland Vegetation	1
Mixedgrass Prairie	1
Pacific Coastal Scrub	1
Pacific Islands Littoral/Strand Vegetation	1
Pacific Islands Swamp/Marsh	1
Prairies and Barrens	0
Sand Prairie	1
Shortgrass Prairie	1
Shrub and Herbaceous Floodplain Wetland	1
Shrub and Herbaceous Peatlands	1
Shrub Tundra	0
Tallgrass Prairie	1
Tidal Marsh	1
Transitional Herbaceous Vegetation	1
Tussock Tundra	0
Western Herbaceous Wetland	1
Western Oak Woodland and Savanna	2
Wet Meadow	1
Atlantic Swamp Forests	3
Balsam Poplar-Aspen Woodland	4
Beech-Maple-Basswood Forest	3
Bigtooth Maple Woodland	2
Birch-Aspen Forest	4
Black Oak Woodland and Savanna	2
Black Spruce Forest and Woodland	2
Bur Oak Woodland and Savanna	2
California Mixed Evergreen Forest and Woodland	2
Caribbean Deciduous Forest	3
Caribbean Evergreen Forest	2
Caribbean Forested Wetland	2
Caribbean Mixed Evergreen Deciduous Forest	2
Chaparral	3
Chestnut Oak Forest and Woodland	2
Chestnut Oak-Virginia Pine Forest and Woodland	2
Coastal Plain Oak Forest	3
Conifer-Oak Forest and Woodland	2
Cypress	3
Depressional Wetland	4
Douglas-fir Forest and Woodland	2
Douglas-fir-Grand Fir-White Fir Forest and Woodland	2
Douglas-fir-Ponderosa Pine-Lodgepole Pine Forest and Woodland	2
Douglas-fir-Western Hemlock Forest and Woodland	2
Eastern Floodplain Forests	3
Eastern Small Stream Riparian Forests	3
Glades and Barrens	0
Hammocks	1
Hardwood Flatwoods	3
Inland Marshes and Prairies	1
Introduced Upland Vegetation-Treed	1
Introduced Woody Wetland Vegetation	2
Jack Pine Forest	2
Juniper Woodland and Savanna	2
Juniper-Oak	3
Limber Pine Woodland	3

Type	Veg Code (0-4)
Lodgepole Pine Forest and Woodland	2
Longleaf Pine Woodland	2
Managed Tree Plantation	0
Mangrove	3
Maritime Forest	3
Mesquite Woodland and Scrub	2
Montane Oak Forest	3
Mountain Hemlock Forest and Woodland	2
Pacific Islands Limestone Forest	2
Pacific Islands Littoral/Strand Vegetation	1
Pacific Islands Lowland Forest	3
Pacific Islands Mangrove Forest	3
Pacific Islands Ravine Forest	3
Pacific Islands Scrub Forest/Shrub	1
Pacific Islands Swamp/Marsh	1
Pacific Islands Upland Forest	3
Peatland Forests	3
Pine Flatwoods	2
Pine-Hemlock-Hardwood Forest	3
Pinyon-Juniper Woodland	2
Pitch Pine Woodlands	2
Pocosin	4
Polynesian Ruderal Forest	2
Ponderosa Pine Forest, Woodland and Savanna	2
Post Oak Woodland and Savanna	2
Prairies and Barrens	0
Red Alder Forest and Woodland	2
Red Fir Forest and Woodland	2
Red Pine-White Pine Forest and Woodland	2
Redwood Forest and Woodland	2
Ruderal Forest	1
Shortleaf Pine Woodland	2
Shortleaf Pine-Oak Forest and Woodland	2
Sitka Spruce Forest	2
Southern Scrub Oak	1
Spruce Flats and Barrens	0
Spruce-Fir Forest and Woodland	2
Spruce-Fir-Hardwood Forest	2
Spruce-Lichen Woodland	2
Subalpine Woodland and Parkland	2
Sweetgum-Water Oak Forest	3
Texas Live Oak	3
Transitional Forest Vegetation	2
Virginia Pine Forest	2
Western Hemlock-Silver Fir Forest	2
Western Hemlock-Yellow-cedar Forest	2
Western Larch Forest and Woodland	2
Western Oak Woodland and Savanna	2
Western Red-cedar-Western Hemlock Forest	2
White Oak-Beech Forest and Woodland	2
White Oak-Red Oak-Hickory Forest and Woodland	2
White Spruce Forest and Woodland	2
White Spruce-Hardwood Forest and Woodland	2
Yellow Birch-Sugar Maple Forest	3

ATTACHMENT B:

Corresponding Regression Equations

USGS Region	Region Abbreviation	qlow low flow	q2 high flow
AZ - Peak Reg 2	AZ2	(10^(-22.24)) * (DAsqm ** 1.16) * (P **(1.51)) * (E ** (4.65))	q2 = 573 * (DAsqm**(0.431))
AZ - Peak Reg 3	AZ3	(10^(-22.24)) * (DAsqm ** 1.16) * (P **(1.51)) * (E ** (4.65))	q2 = 129 * (DAsqm**(0.505)) * (P**(0.831))
AZ - Peak Reg 4	AZ4	(10^(-22.24)) * (DAsqm ** 1.16) * (P **(1.51)) * (E ** (4.65))	q2 = 30.8 * (DAsqm**(0.614)) * (P**(1.689)) * 10^(-0.161 * (E/1000))
AZ - Peak Reg 5	AZ5	(10^(-22.24)) * (DAsqm ** 1.16) * (P **(1.51)) * (E ** (4.65))	q2 = 10 ^ (5.696 - (2* (DAsqm ^(-0.110))))
CO - Mountains	COMountains	(10**(-26.25)) * (DAsqm ** 1.13) * (P **(1.26)) * (E ** (5.85))	(10**(-2.05)) * (DAsqm**(0.78)) * (S**(0.17)) * (P **(2.10))
CO -Northwest	CONorthwest	(10**(-34.73)) * (DAsqm ** 0.83) * (E ** (-8.56))	(10**(-1.15)) * (DAsqm**(0.75)) * (AE**(-0.41)) * (P **(2.15))
CO -Rio Grande	CORio Grande	(10**(-3.83)) * (DAsqm ** 0.98) * (E **(-10.71))	(10**(-3)) * (DAsqm ** 1) * (P **(2.46))
CO - Southwest	COSouthwest	(10^(-22.24)) * (DAsqm ** 1.16) * (P **(1.51)) * (E ** (4.65))	(10**(1.67) * (DAsqm**(0.64)) * (AE**(-0.10))
Upper Green	Upper Green	4.2758 * (DAsqm ** 0.299)	22.2 * (DAsqm ** 0.608) * ((42 - 40) ** 0.1)
UT Region 1	UT1	q_low = (6.726*10**(-37))*((DAsqm)**0.6244)*(5707.02**9.3200)	q2 = (1.52*(DAsqm)**0.677)*(1.39**(7.07969))
UT Region 4	UT4	q_low = (8.4859*10**(-4))*((DAsqm)**(0.9355))*(10**(0.0927*16.29))	q2 = 0.083*((DAsqm)**(0.822))*(2.72**((0.656*(7666.99/1000))-(0.039*22.19)))
UT Region 6	UT6	q_low = 0.27139*((DAsqm)**(0.5124))	q2 = 4150*((DAsqm)**(0.553))*((8000/1000)**(-2.45))
WY Rocky Mountains -1	WY1	(10**(-26.25)) * (DAsqm ** 1.13) * (P **(1.26)) * (E ** (5.85))	q2 = 0.313 * (DAsqm**(0.866)) *(((E -3000)/1000)**(2.56)) * ((N- 100)**(0.032))

ATTACHMENT C:

Layers Used to Refine the Tool

Source Producer	Webmap Layer Name	Source Data	Data Type	Source URL	Date Accessed	Description
BLM	Public Land Survey System	BLM PLSS	Vector	https://gis.blm.gov/arcgis/rest/services/Cadastral/BLM_Natl_PLSS_CadNSDI/MapServer	3/22/2023	The PLSS is the basis for Federal land ownership. This data includes township, range, section (first Division), and Intersected.
Colorado Parks and Wildlife (CPW)	Wildlife Management Areas/Colorado	Colorado Parks and Wildlife	Vector	https://www.arcgis.com/home/search.html?restrict=false&sortField=relevance&sortOrder=desc&searchTerm=Colorado+Parks+and+Wildlife#content	3/22/2023	CPW state parks and wildlife management areas
ESRI	USA Federal Lands	BLM, DoD, USFS, USFWS, NPS, PADUS 2.1	Vector	https://hub.arcgis.com/datasets/esri::usa-federal-lands/about	3/22/2023	Esri compiled and published this layer in May 2023. See individual agency views for data vintage. There are six layer views available that were created from this service. Each layer uses a filter to extract an individual agency from the service.
LANDFIRE	Aspect	Topographic/Aspect	Raster	https://landfire.gov/aspect.php	3/22/2023	Aspect defines downslope direction in degrees and represents the azimuth (cardinal direction or horizontal angle sunlight is coming from) of the sloped surfaces across a landscape.
LANDFIRE	Biophysical Settings (BPS)	Biophysical Settings (BPS)	Raster	https://www.landfire.gov/bps.php	3/22/2023	Biophysical settings represent the vegetation system that possibly had been dominant on the landscape prior to Euro-American settlement. BPS are based on the current biophysical environment and the approximate historical disturbance regime and is used to portray vegetative reference conditions.
LANDFIRE	Existing Vegetation Type (EVT)	Existing Vegetation Type (EVT)	Raster	https://www.landfire.gov/evt.php	3/22/2023	Existing Vegetation Type (EVT) represents the current distribution of the terrestrial ecological systems classification, developed by NatureServe for the western hemisphere, through 2016. A terrestrial ecological system is defined as a group of plant community types (associations) that tend to co-occur within landscapes with similar ecological processes, substrates, and/or environmental gradients.
LANDFIRE	Fuel Disturbance	Fuel Disturbance	Raster	https://landfire.gov/fdist.php	3/22/3023	Fuel Disturbance uses the most recent 10 years of annual disturbance data. This is a refined product of historical disturbance, made to more accurately display disturbances in the fuels environment. Fuel disturbance is useful for determining forest fire and landslide activity in an area.
Landfire	Slope	Topographic/Slope	Raster	https://landfire.gov/slope.php	3/22/2023	Slope represents the change in elevation over a specific area.
US Census Bureau	Railroads	TIGER/Line U.S. Rails	Vector	https://catalog.data.gov/dataset/tiger-line-shapefile-2019-nation-u-s-rails-national-shapefile	3/22/2023	Railroads throughout the US
US Census Bureau	Roads	TIGER/Line U.S. Roads	Vector	https://catalog.data.gov/dataset/tiger-line-shapefile-2019-nation-u-s-primary-roads-national-shapefile	3/22/2023	Primary roads and interstates, secondary roads, and local roads
US Department of Agriculture (USDA)	USFS Land	USFS Regional Boundaries	Vecotr	https://data.fs.usda.gov/geodata/edw/datasets.php?dsetCategory=boundaries	3/22/2023	Forest service land boundaries throughout the continental US
USDA	USFS Roads and Trails	USDA Enterprise Data Warehouse	Vector	https://data.fs.usda.gov/geodata/edw/datasets.php?xmlKeyword=trails	3/22/2023	Roads and trails managed by USDA and the USFS.
USDA	Soil Survey Geographic Database (SSURGO)	Natural Resource Conservation Service Soil Survey Geographic Database	Vector	https://www.nrcs.usda.gov/resources/data-and-reports/soil-survey-geographic-database-ssurgo	3/22/2023	The Soil Survey Geographic Database (SSURGO) contains information about soil as collected by the National Cooperative Soil Survey over the course of a century. The information was gathered by walking over the land and observing the soil. Many soil samples were analyzed in laboratories.
USDA	Watershed Condition Framework	USFS Watershed Condition Framework	Vector	https://www.fs.usda.gov/naturalresources/watershed/condition_framework.shtml	3/22/2023	Watershed condition framework showing the relative health of watersheds on national forests, national grasslands, and some adjacent areas.
USDA	Wilderness Areas	USFS Wilderness Areas	Vector	https://data.fs.usda.gov/geodata/edw/datasets.php	3/22/2023	Federal and non-federal lands within the National Wilderness Preservation System
US Fish and Wildlife Service (USFWS)	National Wetland Inventory	National Wetland Inventory Boundaries	Vector	https://www.fws.gov/program/national-wetlands-inventory/download-state-wetlands-data	3/22/2023	Current geospatially referenced information on the status, extent, characteristics, and functions of wetland, riparian, deepwater, and related aquatic habitats in priority areas.
US Geological Survey (USGS)	Colorado River Basin	Watershed Boundary Dataset (WBD)	Vector	https://prd-tnm.s3.amazonaws.com/index.html?prefix=StagedProducts/Hydrography/WBD/HU2/	3/22/2023	Outline of the Upper and Lower Colorado River Basin boundaries.
USGS	Protected Land Database	Protected Areas Database (PAD-US) 3.0 Data	Vector	https://www.usgs.gov/programs/gap-analysis-project/science/pad-us-data-download	3/22/2023	PAD-US is America's official national inventory of U.S. terrestrial and marine protected areas that are dedicated to the preservation of biological diversity and to other natural, recreation and cultural uses, managed for these purposes through legal or other effective means. PAD-US also includes the best available aggregation of federal land and marine areas provided directly by managing agencies, coordinated through the Federal Geographic Data Committee Federal Lands Working Group.
Utah Department of Natural Resources (DNR)	Wildlife Management Areas/Utah	Utah Department of Natural Resources	Vector	https://wildlife.utah.gov/wmas.html	3/22/2023	Utah state parks and wildlife management areas

ATTACHMENT D:

BRAT Model Script Error Log

ZeroDivisionError: float division by zero
Step 1

Start Time: Tuesday, April 4, 2023 11:46:58 PM
Traceback (most recent call last):
  File "<string>", line 181, in execute
NameError: name 'reload' is not defined

Failed to execute (BRAT_project_tool).
Failed at Tuesday, April 4, 2023 11:47:02 PM (Elapsed Time: 3.81 seconds)

Import

Start Time: Tuesday, April 4, 2023 11:53:58 PM
Traceback (most recent call last):
  File "<string>", line 183, in execute
  File "C:\Users\cat30\Documents\ArcGIS\Projects\BRAT_2023\PyCharm\BRATProject.py", line 96, in main
    ex_veg_destinations = copy_multi_input_to_folder(ex_veg_folder, ex_veg, "Ex_Veg", is_raster=True)
  File "C:\Users\cat30\Documents\ArcGIS\Projects\BRAT_2023\PyCharm\BRATProject.py", line 284, in copy_multi_input_to_folder
    arcpy.CopyRaster_management(input_path, destination_path)
  File "C:\Program Files\ArcGIS\Pro\Resources\ArcPy\arcpy\management.py", line 19995, in CopyRaster
    raise e
  File "C:\Program Files\ArcGIS\Pro\Resources\ArcPy\arcpy\management.py", line 19992, in CopyRaster
    retval = convertArcObjectToPythonObject(gp.CopyRaster_management(*gp_fixargs((in_raster, out_rasterdataset, config_keyword, background_value, nodata_value, onebit_to_eightbit, colormap_to_RGB, pixel_type, scale_pixel_value, RGB_to_Colormap, format, transform, process_as_multidimensional, build_multidimensional_transpose), True)))
  File "C:\Program Files\ArcGIS\Pro\Resources\ArcPy\arcpy\geoprocessing_base.py", line 512, in <lambda>
    return lambda *args: val(*gp_fixargs(args, True))
arcgisscripting.ExecuteError: Failed to execute. Parameters are not valid.
ERROR 000732: Input Raster: Dataset 'D:\BRAT Model\BRAT Model.gdb\Reclass_LC201_EVT' does not exist or is not supported
ERROR 000472: Name of single band grid cannot have more than 13 characters
Failed to execute (CopyRaster).

Failed to execute (BRAT_project_tool).

Failed at Tuesday, April 4, 2023 11:54:06 PM (Elapsed Time: 8.03 seconds)

Step 1. BRAT Project Builder
==========
Parameters

Select project folder C:\Users\cat30\Documents\ArcGIS\Projects\BRAT_2023\Test Run
Project name Test_Project
Watershed HUC ID
Watershed name
Select existing vegetation datasets
C:\Users\cat30\Documents\ArcGIS\Projects\BRAT_2023\EVT.tif
Select historic vegetation datasets
C:\Users\cat30\Documents\ArcGIS\Projects\BRAT_2023\BPS.tif
Select drainage network datasets
C:\Users\cat30\Documents\ArcGIS\Projects\BRAT_2023\BRAT_2023.gdb\NHDFlow
Select DEM inputs 'D:\BRAT Model\TESTfdem.tif'
Select land use rasters
Select valley bottom datasets
Select roads datasets
Select railroads datasets
Select canals datasets
Select land ownership datasets
Beaver Dam Survey Data
Perennial Stream
==========
Messages

Start Time: Wednesday, April 5, 2023 7:12:49 AM
Traceback (most recent call last):
  File "<string>", line 183, in execute
  File "C:\Users\cat30\Documents\ArcGIS\Projects\BRAT_2023\PyCharm\BRATProject.py", line 104, in main
    network_destinations = copy_multi_input_to_folder(network_folder, network, "Network", is_raster=False)
  File "C:\Users\cat30\Documents\ArcGIS\Projects\BRAT_2023\PyCharm\BRATProject.py", line 286, in copy_multi_input_to_folder
    arcpy.Copy_management(input_path, destination_path)
  File "C:\Program Files\ArcGIS\Pro\Resources\ArcPy\arcpy\management.py", line 7370, in Copy
    raise e
  File "C:\Program Files\ArcGIS\Pro\Resources\ArcPy\arcpy\management.py", line 7367, in Copy

```
    retval = convertArcObjectToPythonObject(gp.Copy_management(*gp_fixargs((in_data,
out_data, data_type, associated_data), True)))
  File "C:\Program Files\ArcGIS\Pro\Resources\ArcPy\arcpy\geoprocessing\_base.py", line 512,
in <lambda>
    return lambda *args: val(*gp_fixargs(args, True))
arcgisscripting.ExecuteError: Failed to execute. Parameters are not valid.
ERROR 000979: Cannot copy between different workspaces.
Failed to execute (Copy).


Traceback (most recent call last):
  File "<string>", line 183, in execute
  File "C:\Users\cat30\Documents\ArcGIS\Projects\BRAT_2023\PyCharm\BRATProject.py", line
104, in main
    network_destinations = copy_multi_input_to_folder(network_folder, network, "Network",
is_raster=False)
  File "C:\Users\cat30\Documents\ArcGIS\Projects\BRAT_2023\PyCharm\BRATProject.py", line
286, in copy_multi_input_to_folder
    arcpy.Copy_management(input_path, destination_path)
  File "C:\Program Files\ArcGIS\Pro\Resources\ArcPy\arcpy\management.py", line 7370, in
Copy
    raise e
  File "C:\Program Files\ArcGIS\Pro\Resources\ArcPy\arcpy\management.py", line 7367, in
Copy
    retval = convertArcObjectToPythonObject(gp.Copy_management(*gp_fixargs((in_data,
out_data, data_type, associated_data), True)))
  File "C:\Program Files\ArcGIS\Pro\Resources\ArcPy\arcpy\geoprocessing\_base.py", line 512,
in <lambda>
    return lambda *args: val(*gp_fixargs(args, True))
arcgisscripting.ExecuteError: Failed to execute. Parameters are not valid.
ERROR 000979: Cannot copy between different workspaces.
Failed to execute (Copy).


Failed to execute (BRAT_project_tool).
Failed at Wednesday, April 5, 2023 7:12:55 AM (Elapsed Time: 6.06 seconds)

Start Time: Wednesday, April 5, 2023 7:19:15 AM
Traceback (most recent call last):
  File "C:\Users\cat30\Documents\ArcGIS\Projects\BRAT_2023\PyCharm\BRATProject.py", line
156, in main
    make_layers(ex_veg_destinations, hist_veg_destinations, network_destinations, topo_folder,
landuse_destinations,
```

```
  File "C:\Users\cat30\Documents\ArcGIS\Projects\BRAT_2023\PyCharm\BRATProject.py", line 211, in make_layers
    make_input_layers(ex_veg_destinations, "Existing Vegetation Suitability for Beaver Dam Building", symbology_layer=ex_veg_suitability_symbology, is_raster=True, file_name="ExVegSuitability")
  File "C:\Users\cat30\Documents\ArcGIS\Projects\BRAT_2023\PyCharm\BRATProject.py", line 358, in make_input_layers
    make_layer(dest_dir_name, destination, layer_name, symbology_layer=symbology_layer, is_raster=is_raster, file_name=file_name)
  File "C:\Users\cat30\Documents\ArcGIS\Projects\BRAT_2023\PyCharm\SupportingFunctions.py", line 114, in make_layer
    arcpy.ApplySymbologyFromLayer_management(new_layer, symbology_layer)
  File "C:\Program Files\ArcGIS\Pro\Resources\ArcPy\arcpy\management.py", line 10020, in ApplySymbologyFromLayer
    raise e
  File "C:\Program Files\ArcGIS\Pro\Resources\ArcPy\arcpy\management.py", line 10017, in ApplySymbologyFromLayer
    retval = convertArcObjectToPythonObject(gp.ApplySymbologyFromLayer_management(*gp_fixargs((in_layer, in_symbology_layer, symbology_fields, update_symbology), True)))
  File "C:\Program Files\ArcGIS\Pro\Resources\ArcPy\arcpy\geoprocessing\_base.py", line 512, in <lambda>
    return lambda *args: val(*gp_fixargs(args, True))
arcgisscripting.ExecuteError: Failed to execute. Parameters are not valid.
ERROR 000968: The symbol layer does not match the input layer
Failed to execute (ApplySymbologyFromLayer).


During handling of the above exception, another exception occurred:

Traceback (most recent call last):
  File "<string>", line 183, in execute
  File "C:\Users\cat30\Documents\ArcGIS\Projects\BRAT_2023\PyCharm\BRATProject.py", line 160, in main
    if err[0][6:12] == "000873":
TypeError: 'ExecuteError' object is not subscriptable

Failed to execute (BRAT_project_tool).
Failed at Wednesday, April 5, 2023 7:19:32 AM (Elapsed Time: 17.41 seconds)

Traceback (most recent call last):
  File "<string>", line 182, in execute
```

```
  File "C:\Program Files\ArcGIS\Pro\bin\Python\envs\arcgispro-py3\Lib\importlib\__init__.py",
line 169, in reload
    _bootstrap._exec(spec, module)
  File "<frozen importlib._bootstrap>", line 613, in _exec
  File "<frozen importlib._bootstrap_external>", line 846, in exec_module
  File "<frozen importlib._bootstrap_external>", line 983, in get_code
  File "<frozen importlib._bootstrap_external>", line 913, in source_to_code
  File "<frozen importlib._bootstrap>", line 228, in _call_with_frames_removed
  File "C:\Users\cat30\Documents\ArcGIS\Projects\BRAT_2023\PyCharm\BRATProject.py", line
163
    else:
    ^
SyntaxError: invalid syntax

Failed to execute (BRAT_project_tool).
Failed at Tuesday, April 11, 2023 12:42:16 PM (Elapsed Time: 0.05 seconds)

Traceback (most recent call last):
  File "<string>", line 182, in execute
  File "C:\Program Files\ArcGIS\Pro\bin\Python\envs\arcgispro-py3\Lib\importlib\__init__.py",
line 169, in reload
    _bootstrap._exec(spec, module)
  File "<frozen importlib._bootstrap>", line 613, in _exec
  File "<frozen importlib._bootstrap_external>", line 846, in exec_module
  File "<frozen importlib._bootstrap_external>", line 983, in get_code
  File "<frozen importlib._bootstrap_external>", line 913, in source_to_code
  File "<frozen importlib._bootstrap>", line 228, in _call_with_frames_removed
  File "C:\Users\cat30\Documents\ArcGIS\Projects\BRAT_2023\PyCharm\BRATProject.py", line
164
    raise arcpy.ExecuteError(err)
IndentationError: unexpected indent

Failed to execute (BRAT_project_tool).
Failed at Tuesday, April 11, 2023 12:43:20 PM (Elapsed Time: 0.05 seconds)

Start Time: Tuesday, April 11, 2023 12:43:30 PM
Traceback (most recent call last):
  File "<string>", line 182, in execute
```

```
  File "C:\Program Files\ArcGIS\Pro\bin\Python\envs\arcgispro-py3\Lib\importlib\__init__.py",
line 169, in reload
    _bootstrap._exec(spec, module)
  File "<frozen importlib._bootstrap>", line 613, in _exec
  File "<frozen importlib._bootstrap_external>", line 846, in exec_module
  File "<frozen importlib._bootstrap_external>", line 983, in get_code
  File "<frozen importlib._bootstrap_external>", line 913, in source_to_code
  File "<frozen importlib._bootstrap>", line 228, in _call_with_frames_removed
  File "C:\Users\cat30\Documents\ArcGIS\Projects\BRAT_2023\PyCharm\BRATProject.py", line
167
    def make_layers(ex_veg_destinations, hist_veg_destinations, network_destinations,
topo_folder, landuse_destinations,
IndentationError: unexpected unindent

Failed to execute (BRAT_project_tool).
Failed at Tuesday, April 11, 2023 12:43:30 PM (Elapsed Time: 0.05 seconds)
Start Time: Tuesday, April 11, 2023 12:43:58 PM
Traceback (most recent call last):
  File "<string>", line 182, in execute
  File "C:\Program Files\ArcGIS\Pro\bin\Python\envs\arcgispro-py3\Lib\importlib\__init__.py",
line 169, in reload
    _bootstrap._exec(spec, module)
  File "<frozen importlib._bootstrap>", line 613, in _exec
  File "<frozen importlib._bootstrap_external>", line 846, in exec_module
  File "<frozen importlib._bootstrap_external>", line 983, in get_code
  File "<frozen importlib._bootstrap_external>", line 913, in source_to_code
  File "<frozen importlib._bootstrap>", line 228, in _call_with_frames_removed
  File "C:\Users\cat30\Documents\ArcGIS\Projects\BRAT_2023\PyCharm\BRATProject.py", line
156
    make_layers(ex_veg_destinations, hist_veg_destinations, network_destinations, topo_folder,
landuse_destinations,
IndentationError: unexpected indent

Failed to execute (BRAT_project_tool).
Failed at Tuesday, April 11, 2023 12:43:58 PM (Elapsed Time: 0.05 seconds)

Start Time: Tuesday, April 11, 2023 12:44:51 PM
Traceback (most recent call last):
  File "<string>", line 182, in execute
  File "C:\Program Files\ArcGIS\Pro\bin\Python\envs\arcgispro-py3\Lib\importlib\__init__.py",
line 169, in reload
    _bootstrap._exec(spec, module)
  File "<frozen importlib._bootstrap>", line 613, in _exec
  File "<frozen importlib._bootstrap_external>", line 846, in exec_module
```

```
  File "<frozen importlib._bootstrap_external>", line 983, in get_code
  File "<frozen importlib._bootstrap_external>", line 913, in source_to_code
  File "<frozen importlib._bootstrap>", line 228, in _call_with_frames_removed
  File "C:\Users\cat30\Documents\ArcGIS\Projects\BRAT_2023\PyCharm\BRATProject.py", line
157
    valley_bottom_destinations, road_destinations, rr_destinations, canal_destinations,
IndentationError: unexpected indent

Failed to execute (BRAT_project_tool).
Failed at Tuesday, April 11, 2023 12:44:51 PM (Elapsed Time: 0.05 seconds)


STEP 2
Start Time: Tuesday, April 11, 2023 12:46:58 PM
Traceback (most recent call last):
  File "<string>", line 372, in execute
  File "C:\Users\cat30\Documents\ArcGIS\Projects\BRAT_2023\PyCharm\BRAT_table.py", line
95, in main
    validate_inputs(seg_network, road, railroad, canal, is_verbose)
  File "C:\Users\cat30\Documents\ArcGIS\Projects\BRAT_2023\PyCharm\BRAT_table.py", line
1236, in validate_inputs
    raise Exception("Input stream network must have a projected coordinate system")
Exception: Input stream network must have a projected coordinate system

Failed to execute (BRAT_table_tool).
Failed at Tuesday, April 11, 2023 12:46:59 PM (Elapsed Time: 0.09 seconds)

Start Time: Tuesday, April 11, 2023 12:49:19 PM
Traceback (most recent call last):
  File "<string>", line 372, in execute
  File "C:\Users\cat30\Documents\ArcGIS\Projects\BRAT_2023\PyCharm\BRAT_table.py", line
95, in main
    validate_inputs(seg_network, road, railroad, canal, is_verbose)
  File "C:\Users\cat30\Documents\ArcGIS\Projects\BRAT_2023\PyCharm\BRAT_table.py", line
1252, in validate_inputs
    raise Exception("Input network must be a shapefile (.shp)")
Exception: Input network must be a shapefile (.shp)

Failed to execute (BRAT_table_tool).
Failed at Tuesday, April 11, 2023 12:49:19 PM (Elapsed Time: 0.10 seconds)

Start Time: Tuesday, April 11, 2023 12:50:04 PM
Adding "iGeo" attributes to network...
```

While calculating iGeo_ElMax, the tool ran into an error. The following ReachIDs did not recieve correct values:
32, 33, 38, 69, 70, 84, 85, 86, 105, 107, 110, 111, 112, 115, 116, 127, 136, 143, 170, 171, 173, 193, 196, 210, 213, 214, 215, 228, 233, 246, 256, 257, 259, and 263

While calculating iGeo_ElMin, the tool ran into an error. The following ReachIDs did not recieve correct values:
32, 38, 69, 82, 84, 109, 110, 111, 112, 115, 116, 142, 143, 170, 171, 172, 173, 188, 192, 193, 212, 213, 214, 215, 227, 228, 233, 241, 245, 256, 257, and 259

```
Traceback (most recent call last):
  File "<string>", line 372, in execute
  File "C:\Users\cat30\Documents\ArcGIS\Projects\BRAT_2023\PyCharm\BRAT_table.py", line 144, in main
    igeo_attributes(seg_network_copy, in_DEM, flow_acc, midpoint_buffer, scratch, is_verbose)
  File "C:\Users\cat30\Documents\ArcGIS\Projects\BRAT_2023\PyCharm\BRAT_table.py", line 550, in igeo_attributes
    row[3] = (abs(row[0] - row[1]))/row[2]
ZeroDivisionError: float division by zero

Failed to execute (BRAT_table_tool).
Failed at Tuesday, April 11, 2023 12:52:10 PM (Elapsed Time: 2 minutes 5 seconds)
Start Time: Tuesday, April 11, 2023 4:14:52 PM
Traceback (most recent call last):
  File "<string>", line 371, in execute
  File "C:\Program Files\ArcGIS\Pro\bin\Python\envs\arcgispro-py3\Lib\importlib\__init__.py", line 169, in reload
    _bootstrap._exec(spec, module)
  File "<frozen importlib._bootstrap>", line 613, in _exec
  File "<frozen importlib._bootstrap_external>", line 846, in exec_module
  File "<frozen importlib._bootstrap_external>", line 983, in get_code
  File "<frozen importlib._bootstrap_external>", line 913, in source_to_code
  File "<frozen importlib._bootstrap>", line 228, in _call_with_frames_removed
  File "C:\Users\cat30\Documents\ArcGIS\Projects\BRAT_2023\PyCharm\BRAT_table.py", line 551
    if row[2] = 0.0:
               ^
SyntaxError: invalid syntax

Start Time: Tuesday, April 11, 2023 4:15:29 PM
Adding "iGeo" attributes to network...
While calculating iGeo_ElMax, the tool ran into an error. The following ReachIDs did not recieve correct values:
```

32, 33, 38, 69, 70, 84, 85, 86, 105, 107, 110, 111, 112, 115, 116, 127, 136, 143, 170, 171, 173, 193, 196, 210, 213, 214, 215, 228, 233, 246, 256, 257, 259, and 263

While calculating iGeo_ElMin, the tool ran into an error. The following ReachIDs did not recieve correct values:
32, 38, 69, 82, 84, 109, 110, 111, 112, 115, 116, 142, 143, 170, 171, 172, 173, 188, 192, 193, 212, 213, 214, 215, 227, 228, 233, 241, 245, 256, 257, and 259

Traceback (most recent call last):
  File "<string>", line 372, in execute
  File "C:\Users\cat30\Documents\ArcGIS\Projects\BRAT_2023\PyCharm\BRAT_table.py", line 144, in main
    igeo_attributes(seg_network_copy, in_DEM, flow_acc, midpoint_buffer, scratch, is_verbose)
  File "C:\Users\cat30\Documents\ArcGIS\Projects\BRAT_2023\PyCharm\BRAT_table.py", line 550, in igeo_attributes
    row[3] = (abs(row[0] - row[1]))/row[2]
ZeroDivisionError: float division by zero

Failed to execute (BRAT_table_tool).
Failed at Tuesday, April 11, 2023 4:16:48 PM (Elapsed Time: 1 minutes 19 seconds)

Failed to execute (BRAT_table_tool).
Failed at Tuesday, April 11, 2023 4:14:52 PM (Elapsed Time: 0.07 seconds)
Start Time: Tuesday, April 11, 2023 4:37:12 PM
Adding "iGeo" attributes to network...
While calculating iGeo_ElMax, the tool ran into an error. The following ReachIDs did not recieve correct values:
32, 33, 38, 69, 70, 84, 85, 86, 105, 107, 110, 111, 112, 115, 116, 127, 136, 143, 170, 171, 173, 193, 196, 210, 213, 214, 215, 228, 233, 246, 256, 257, 259, and 263

While calculating iGeo_ElMin, the tool ran into an error. The following ReachIDs did not recieve correct values:
32, 38, 69, 82, 84, 109, 110, 111, 112, 115, 116, 142, 143, 170, 171, 172, 173, 188, 192, 193, 212, 213, 214, 215, 227, 228, 233, 241, 245, 256, 257, and 259

Calculating drainage area...
While calculating iGeo_DA, the tool ran into an error. The following ReachIDs did not recieve correct values:
32, 33, 38, 69, 84, 107, 109, 110, 111, 112, 115, 116, 143, 145, 146, 172, 173, 213, 214, 215, 228, 233, 245, 256, 257, and 259

Adding "iVeg" attributes to network...
Traceback (most recent call last):

```
  File "<string>", line 372, in execute
  File "C:\Users\cat30\Documents\ArcGIS\Projects\BRAT_2023\PyCharm\BRAT_table.py", line
148, in main
    iveg_attributes(coded_veg, coded_hist, buf_100m, buf_30m, seg_network_copy, scratch,
is_verbose)
  File "C:\Users\cat30\Documents\ArcGIS\Projects\BRAT_2023\PyCharm\BRAT_table.py", line
610, in iveg_attributes
    veg_lookup = Lookup(coded_veg, "VEG_CODE")
  File "C:\Program Files\ArcGIS\Pro\Resources\ArcPy\arcpy\sa\Functions.py", line 6363, in
Lookup
    return Wrapper(
  File "C:\Program Files\ArcGIS\Pro\Resources\ArcPy\arcpy\sa\Utils.py", line 55, in swapper
    result = wrapper(*args, **kwargs)
  File "C:\Program Files\ArcGIS\Pro\Resources\ArcPy\arcpy\sa\Functions.py", line 6358, in
Wrapper
    result = arcpy.gp.Lookup_sa(
  File "C:\Program Files\ArcGIS\Pro\Resources\ArcPy\arcpy\geoprocessing\_base.py", line 512,
in <lambda>
    return lambda *args: val(*gp_fixargs(args, True))
arcgisscripting.ExecuteError: ERROR 001000: Lookup field: Field VEG_CODE does not exist
ERROR 000581: Invalid parameters.
Failed to execute (Lookup).


Failed to execute (BRAT_table_tool).
Failed at Tuesday, April 11, 2023 4:42:13 PM (Elapsed Time: 5 minutes 1 seconds)


Start Time: Monday, April 17, 2023 3:39:30 PM
Adding "iGeo" attributes to network...
While calculating iGeo_ElMax, the tool ran into an error. The following ReachIDs did not recieve
correct values:
32, 33, 38, 69, 70, 84, 85, 86, 105, 107, 110, 111, 112, 115, 116, 127, 136, 143, 170, 171, 173,
193, 196, 210, 213, 214, 215, 228, 233, 246, 256, 257, 259, and 263

While calculating iGeo_ElMin, the tool ran into an error. The following ReachIDs did not recieve
correct values:
32, 38, 69, 82, 84, 109, 110, 111, 112, 115, 116, 142, 143, 170, 171, 172, 173, 188, 192, 193,
212, 213, 214, 215, 227, 228, 233, 241, 245, 256, 257, and 259

Calculating drainage area...
While calculating iGeo_DA, the tool ran into an error. The following ReachIDs did not recieve
correct values:
```

```
32, 33, 38, 69, 84, 107, 109, 110, 111, 112, 115, 116, 143, 145, 146, 172, 173, 213, 214, 215, 228, 233, 245, 256, 257, and 259

Adding "iVeg" attributes to network...
Traceback (most recent call last):
  File "<string>", line 3, in <module>
  File "C:\Users\cat30\Documents\ArcGIS\Projects\BRAT_2023\pyBRAT-3.1.00\bdwsRun.py", line 1, in <module>
    from bdws import BDLoG, BDSWEA
  File "C:\Users\cat30\Documents\ArcGIS\Projects\BRAT_2023\pyBRAT-3.1.00\bdws.py", line 667
    print "output shape different from input DEM"
          ^
SyntaxError: Missing parentheses in call to 'print'. Did you mean print("output shape different from input DEM")?
  File "<string>", line 181
    import importlib
                    ^
IndentationError: unindent does not match any outer indentation level
Traceback (most recent call last):
  File "<string>", line 372, in execute
  File "C:\Users\cat30\Documents\ArcGIS\Projects\BRAT_2023\PyCharm\BRAT_table.py", line 148, in main
    iveg_attributes(coded_veg, coded_hist, buf_100m, buf_30m, seg_network_copy, scratch, is_verbose)
  File "C:\Users\cat30\Documents\ArcGIS\Projects\BRAT_2023\PyCharm\BRAT_table.py", line 616, in iveg_attributes
    zonalStatsWithinBuffer(buf_100m, veg_lookup, 'MEAN', 'MEAN', out_network, "iVeg100EX", scratch)
  File "C:\Users\cat30\Documents\ArcGIS\Projects\BRAT_2023\PyCharm\BRAT_table.py", line 433, in zonalStatsWithinBuffer
    stat = arcpy.sa.ZonalStatisticsAsTable(tmp_buff_lyr, 'ReachID', ras, os.path.join(scratch, 'stat'), 'DATA', stat_type)
  File "C:\Program Files\ArcGIS\Pro\Resources\ArcPy\arcpy\sa\Functions.py", line 10975, in ZonalStatisticsAsTable
    return Wrapper(
  File "C:\Program Files\ArcGIS\Pro\Resources\ArcPy\arcpy\sa\Utils.py", line 55, in swapper
    result = wrapper(*args, **kwargs)
  File "C:\Program Files\ArcGIS\Pro\Resources\ArcPy\arcpy\sa\Functions.py", line 10962, in Wrapper
    result = arcpy.gp.ZonalStatisticsAsTable_sa(
  File "C:\Program Files\ArcGIS\Pro\Resources\ArcPy\arcpy\geoprocessing\_base.py", line 512, in <lambda>
    return lambda *args: val(*gp_fixargs(args, True))
```

arcgisscripting.ExecuteError: ERROR 999999: Something unexpected caused the tool to fail. Contact Esri Technical Support (http://esriurl.com/support) to Report a Bug, and refer to the error help for potential solutions or workarounds.
Expected to find comma, colon or start of array; state : startOfObject; buffer : {3CDFCEE5-A8F7-4719-BC97-01D5E8C2EE35}429222016.cr
Failed to execute (ZonalStatisticsAsTable).

Failed to execute (BRAT_table_tool).
Failed at Monday, April 17, 2023 4:18:02 PM (Elapsed Time: 38 minutes 32 seconds)

*****Used NHD network layer for step 1, segmented layer for step 2

Start Time: Wednesday, April 19, 2023 6:45:38 PM
Adding "iGeo" attributes to network...
Traceback (most recent call last):
  File "<string>", line 372, in execute
  File "C:\Users\cat30\Documents\ArcGIS\Projects\BRAT_Project\ModelScripts\BRAT_table.py", line 144, in main
    igeo_attributes(seg_network_copy, in_DEM, flow_acc, midpoint_buffer, scratch, is_verbose)
  File "C:\Users\cat30\Documents\ArcGIS\Projects\BRAT_Project\ModelScripts\BRAT_table.py", line 540, in igeo_attributes
    zSeg('START', 'iGeo_ElMax')
  File "C:\Users\cat30\Documents\ArcGIS\Projects\BRAT_Project\ModelScripts\BRAT_table.py", line 532, in zSeg
    zonalStatsWithinBuffer(tmp_buff, DEM, 'MINIMUM', 'MIN', out_network, out_field, scratch)
  File "C:\Users\cat30\Documents\ArcGIS\Projects\BRAT_Project\ModelScripts\BRAT_table.py", line 433, in zonalStatsWithinBuffer
    stat = arcpy.sa.ZonalStatisticsAsTable[tmp_buff_lyr, 'ReachID', ras, os.path.join(scratch, 'stat'), 'DATA',
TypeError: 'function' object is not subscriptable

Failed to execute (BRAT_table_tool).
Failed at Wednesday, April 19, 2023 6:46:36 PM (Elapsed Time: 57.61 seconds)

Start Time: Wednesday, April 19, 2023 7:09:36 PM
Validating inputs...
Building folder structure...
Finding network segment midpoints...
Making buffers...
Adding "iGeo" attributes to network...

Preprocessing DEM...
Calculating values for iGeo_ElMax...
While calculating iGeo_ElMax, the tool ran into an error. The following ReachIDs did not recieve correct values:
32, 33, 38, 69, 70, 84, 85, 86, 105, 107, 110, 111, 112, 115, 116, 127, 136, 143, 170, 171, 173, 193, 196, 210, 213, 214, 215, 228, 233, 246, 256, 257, 259, and 263

Calculating values for iGeo_ElMin...
While calculating iGeo_ElMin, the tool ran into an error. The following ReachIDs did not recieve correct values:
32, 38, 69, 82, 84, 109, 110, 111, 112, 115, 116, 142, 143, 170, 171, 172, 173, 188, 192, 193, 212, 213, 214, 215, 227, 228, 233, 241, 245, 256, 257, and 259

Calculating iGeo_Slope...
Calculating drainage area...
Calculating iGeo_DA...
While calculating iGeo_DA, the tool ran into an error. The following ReachIDs did not recieve correct values:
32, 33, 38, 69, 84, 107, 109, 110, 111, 112, 115, 116, 143, 145, 146, 172, 173, 214, 215, 228, 233, 245, 256, 257, and 259

Adding "iVeg" attributes to network...
Creating current veg lookup raster...
Calculating iVeg100EX...
While calculating iVeg100EX, the tool ran into an error. The following ReachIDs did not recieve correct values:
32, 38, 69, 84, 110, 111, 112, 115, 143, 145, 173, 213, 214, 228, 233, 256, and 259

Calculating iVeg_30EX...
While calculating iVeg_30EX, the tool ran into an error. The following ReachIDs did not recieve correct values:
110, 112, 143, 173, 213, 257, 259, 32, 38, 69, 84, 111, 115, 116, 145, 214, 215, 228, 233, and 256

Creating historic veg lookup raster...
Calculating iVeg100Hpe...
While calculating iVeg100Hpe, the tool ran into an error. The following ReachIDs did not recieve correct values:
32, 38, 69, 110, 111, 112, 115, 143, 145, 173, 213, 214, 228, 233, 256, and 259

Calculating iVeg_30Hpe...
While calculating iVeg_30Hpe, the tool ran into an error. The following ReachIDs did not recieve correct values:

110, 112, 143, 173, 213, 257, 259, 32, 38, 69, 84, 111, 115, 116, 145, 214, 215, 228, 233, and 256

Finding multi-threaded attributes...
Checking input fields and if canals shapefile exists...
Finding streams with mutltiple channels...
Traceback (most recent call last):
  File "<string>", line 372, in execute
  File "C:\Users\cat30\Documents\ArcGIS\Projects\BRAT_Project\ModelScripts\BRAT_table.py", line 164, in main
    handle_braids(seg_network_copy, canal, proj_path, find_clusters, perennial_network, is_verbose)
  File "C:\Users\cat30\Documents\ArcGIS\Projects\BRAT_Project\ModelScripts\BRAT_table.py", line 1360, in handle_braids
    FindBraidedNetwork.main(seg_network_copy, canal, temp_dir, perennial_network, is_verbose)
  File "C:\Users\cat30\Documents\ArcGIS\Projects\BRAT_Project\ModelScripts\FindBraidedNetwork.py", line 45, in main
    use_stream_names(fcStreamNetwork)
  File "C:\Users\cat30\Documents\ArcGIS\Projects\BRAT_Project\ModelScripts\FindBraidedNetwork.py", line 51, in use_stream_names
    for row in cursor:
RuntimeError: Cannot find field 'StreamName'

Failed to execute (BRAT_table_tool).
Failed at Wednesday, April 19, 2023 7:23:07 PM (Elapsed Time: 13 minutes 30 seconds)

*****Redid stream seg layer using Riverscape script “segmentNetwork.py”

Received errors on
```
#  select lines from original nhd that are not coded as pipeline (fcdoe 428**)
arcpy.MakeFeatureLayer_management(nhd_flowline_path, 'nhd_flowline_lyr')
# quer = """ "\"FTYPE\" = \'" + 428 + "\'" OR "\"FTYPE\" = \'" + 420 + "\'" OR "\"FTYPE\" = \'" + 566 + "\'" "
#arcpy.SelectLayerByAttribute_management("nhd_flowline_lyr", "NEW_SELECTION", quer)
#arcpy.SelectLayerByAttribute_management('nhd_flowline_lyr', 'SWITCH_SELECTION')
flowline_sel = arcpy.CopyFeatures_management('nhd_flowline_lyr', 'in_memory/flowline_selection')
```

So selected all streams other than pipelines manually and removed from NHD layer

Start Time: Wednesday, April 19, 2023 7:53:57 PM
Validating inputs...
Building folder structure...
Finding network segment midpoints...
Making buffers...
Adding "iGeo" attributes to network...
Preprocessing DEM...
Calculating values for iGeo_ElMax...
While calculating iGeo_ElMax, the tool ran into an error. The following ReachIDs did not recieve correct values:
1, 2, 37, 38, 39, 40, 41, 42, 43, 66, 67, 73, 74, 75, 97, 98, 106, 107, 108, 109, 110, 140, 141, 145, 151, 152, 159, 168, 170, 186, 187, 188, 194, 195, 196, 197, 198, 199, 204, 207, 246, 247, 248, 279, 280, 286, 291, 292, 326, 327, 329, 332, 334, 335, 336, 337, 338, and 339

Calculating values for iGeo_ElMin...
While calculating iGeo_ElMin, the tool ran into an error. The following ReachIDs did not recieve correct values:
1, 2, 37, 38, 39, 40, 41, 42, 43, 73, 74, 96, 97, 99, 106, 107, 108, 110, 117, 122, 139, 140, 144, 145, 151, 159, 170, 186, 187, 188, 193, 194, 195, 196, 197, 199, 204, 246, 247, 279, 291, 292, 293, 322, 326, 327, 328, 329, 330, 334, 335, 336, 337, and 338

Calculating iGeo_Slope...
Calculating drainage area...
Calculating iGeo_DA...
While calculating iGeo_DA, the tool ran into an error. The following ReachIDs did not recieve correct values:
1, 2, 37, 38, 39, 40, 41, 42, 43, 73, 74, 75, 96, 99, 106, 107, 108, 110, 122, 140, 141, 145, 146, 147, 148, 149, 150, 151, 152, 153, 159, 168, 170, 186, 187, 188, 194, 195, 196, 197, 199, 204, 246, 247, 279, 286, 291, 292, 293, 322, 326, 327, 329, 330, 334, 335, 336, 337, and 338

Adding "iVeg" attributes to network...
Creating current veg lookup raster...
Calculating iVeg100EX...
While calculating iVeg100EX, the tool ran into an error. The following ReachIDs did not recieve correct values:
1, 37, 38, 39, 40, 41, 42, 73, 74, 106, 107, 108, 140, 145, 146, 147, 148, 149, 150, 151, 152, 153, 159, 170, 186, 187, 188, 194, 196, 197, 199, 246, 247, 279, 291, 292, 326, 327, 334, 335, 337, and 195

Calculating iVeg_30EX...
While calculating iVeg_30EX, the tool ran into an error. The following ReachIDs did not recieve correct values:

1, 73, 246, 279, 2, 37, 38, 39, 40, 41, 42, 43, 74, 106, 107, 108, 140, 145, 146, 147, 148, 149, 150, 151, 152, 153, 159, 168, 170, 186, 187, 188, 194, 195, 196, 197, 199, 204, 247, 291, 292, 293, 326, 327, 329, 334, 335, 336, 337, and 338

Creating historic veg lookup raster...
Calculating iVeg100Hpe...
While calculating iVeg100Hpe, the tool ran into an error. The following ReachIDs did not recieve correct values:
1, 37, 38, 39, 40, 41, 42, 73, 74, 106, 107, 108, 140, 145, 146, 147, 148, 149, 150, 151, 152, 153, 159, 170, 186, 187, 188, 194, 196, 197, 199, 246, 247, 279, 291, 292, 326, 327, 334, 335, 337, and 195

Calculating iVeg_30Hpe...
While calculating iVeg_30Hpe, the tool ran into an error. The following ReachIDs did not recieve correct values:
1, 73, 246, 279, 2, 37, 38, 39, 40, 41, 42, 43, 74, 106, 107, 108, 110, 140, 145, 146, 147, 148, 149, 150, 151, 152, 153, 159, 168, 170, 186, 187, 188, 194, 195, 196, 197, 199, 204, 247, 291, 292, 326, 327, 329, 334, 335, 336, 337, and 338

Finding multi-threaded attributes...
Checking input fields and if canals shapefile exists...
Finding streams with mutltiple channels...
Writing project xml...
Traceback (most recent call last):
  File "<string>", line 372, in execute
  File "C:\Users\cat30\Documents\ArcGIS\Projects\BRAT_Project\ModelScripts\BRAT_table.py", line 173, in main
    make_layer(os.path.dirname(DrAr), DrAr, "Flow Accumulation", symbology_layer=flow_accumulation_sym_layer, is_raster=True)
  File "C:\Users\cat30\Documents\ArcGIS\Projects\BRAT_Project\ModelScripts\SupportingFunctions.py", line 114, in make_layer
    arcpy.ApplySymbologyFromLayer_management(new_layer, symbology_layer)
  File "C:\Program Files\ArcGIS\Pro\Resources\ArcPy\arcpy\management.py", line 10020, in ApplySymbologyFromLayer
    raise e
  File "C:\Program Files\ArcGIS\Pro\Resources\ArcPy\arcpy\management.py", line 10017, in ApplySymbologyFromLayer
    retval = convertArcObjectToPythonObject(gp.ApplySymbologyFromLayer_management(*gp_fixargs((in_layer, in_symbology_layer, symbology_fields, update_symbology), True)))
  File "C:\Program Files\ArcGIS\Pro\Resources\ArcPy\arcpy\geoprocessing_base.py", line 512, in <lambda>
    return lambda *args: val(*gp_fixargs(args, True))

arcgisscripting.ExecuteError: Failed to execute. Parameters are not valid.
ERROR 000968: The symbol layer does not match the input layer
Failed to execute (ApplySymbologyFromLayer).
FIX: added symbology lyrs to map, changed source to input layers (so file format matches)

Failed to execute (BRAT_table_tool).
Failed at Wednesday, April 19, 2023 8:06:27 PM (Elapsed Time: 12 minutes 29 seconds)

Start Time: Wednesday, April 19, 2023 8:12:18 PM
Validating inputs...
Building folder structure...
Finding network segment midpoints...
Making buffers...
Adding "iGeo" attributes to network...
Preprocessing DEM...
Calculating values for iGeo_ElMax...
While calculating iGeo_ElMax, the tool ran into an error. The following ReachIDs did not recieve correct values:
1, 2, 37, 38, 39, 40, 41, 42, 43, 66, 67, 73, 74, 75, 97, 98, 106, 107, 108, 109, 110, 140, 141, 145, 151, 152, 159, 168, 170, 186, 187, 188, 194, 195, 196, 197, 198, 199, 204, 207, 246, 247, 248, 279, 280, 286, 291, 292, 326, 327, 329, 332, 334, 335, 336, 337, 338, and 339

Calculating values for iGeo_ElMin...
While calculating iGeo_ElMin, the tool ran into an error. The following ReachIDs did not recieve correct values:
1, 2, 37, 38, 39, 40, 41, 42, 43, 73, 74, 96, 97, 99, 106, 107, 108, 110, 117, 122, 139, 140, 144, 145, 151, 159, 170, 186, 187, 188, 193, 194, 195, 196, 197, 199, 204, 246, 247, 279, 291, 292, 293, 322, 326, 327, 328, 329, 330, 334, 335, 336, 337, and 338

Calculating iGeo_Slope...
Calculating drainage area...
Calculating iGeo_DA...
While calculating iGeo_DA, the tool ran into an error. The following ReachIDs did not recieve correct values:
1, 2, 37, 38, 39, 40, 41, 42, 43, 73, 74, 75, 96, 99, 106, 107, 108, 110, 122, 140, 141, 145, 146, 147, 148, 149, 150, 151, 152, 153, 159, 168, 170, 186, 187, 188, 194, 195, 196, 197, 199, 204, 246, 247, 279, 286, 291, 292, 293, 322, 326, 327, 329, 330, 334, 335, 336, 337, and 338

Adding "iVeg" attributes to network...
Creating current veg lookup raster...
Calculating iVeg100EX...

While calculating iVeg100EX, the tool ran into an error. The following ReachIDs did not recieve correct values:
1, 37, 38, 39, 40, 41, 42, 73, 74, 106, 107, 108, 140, 145, 146, 147, 148, 149, 150, 151, 152, 153, 159, 170, 186, 187, 188, 194, 196, 197, 199, 246, 247, 279, 291, 292, 326, 327, 334, 335, 337, and 195

Calculating iVeg_30EX...
While calculating iVeg_30EX, the tool ran into an error. The following ReachIDs did not recieve correct values:
1, 73, 246, 279, 2, 37, 38, 39, 40, 41, 42, 43, 74, 106, 107, 108, 140, 145, 146, 147, 148, 149, 150, 151, 152, 153, 159, 168, 170, 186, 187, 188, 194, 195, 196, 197, 199, 204, 247, 291, 292, 293, 326, 327, 329, 334, 335, 336, 337, and 338

Creating historic veg lookup raster...
Calculating iVeg100Hpe...
While calculating iVeg100Hpe, the tool ran into an error. The following ReachIDs did not recieve correct values:
1, 37, 38, 39, 40, 41, 42, 73, 74, 106, 107, 108, 140, 145, 146, 147, 148, 149, 150, 151, 152, 153, 159, 170, 186, 187, 188, 194, 196, 197, 199, 246, 247, 279, 291, 292, 326, 327, 334, 335, 337, and 195

Calculating iVeg_30Hpe...
While calculating iVeg_30Hpe, the tool ran into an error. The following ReachIDs did not recieve correct values:
1, 73, 246, 279, 2, 37, 38, 39, 40, 41, 42, 43, 74, 106, 107, 108, 110, 140, 145, 146, 147, 148, 149, 150, 151, 152, 153, 159, 168, 170, 186, 187, 188, 194, 195, 196, 197, 199, 204, 247, 291, 292, 326, 327, 329, 334, 335, 336, 337, and 338

Finding multi-threaded attributes...
Checking input fields and if canals shapefile exists...
Finding streams with mutltiple channels...
Writing project xml...
Traceback (most recent call last):
  File "<string>", line 372, in execute
  File "C:\Users\cat30\Documents\ArcGIS\Projects\BRAT_Project\ModelScripts\BRAT_table.py", line 173, in main
    make_layer(os.path.dirname(DrAr), DrAr, "Flow Accumulation", symbology_layer=flow_accumulation_sym_layer, is_raster=True)
  File "C:\Users\cat30\Documents\ArcGIS\Projects\BRAT_Project\ModelScripts\SupportingFunctions.py", line 118, in make_layer
    new_layer_instance = arcpy.mapping.Layer(new_layer_save)
AttributeError: module 'arcpy' has no attribute 'mapping'

Failed to execute (BRAT_table_tool).
Failed at Wednesday, April 19, 2023 8:22:15 PM (Elapsed Time: 9 minutes 57 seconds)

FIX: arcpy.mapping is now arcpy.mp
The changes introduced with ArcGIS Pro were significant enough to merit a module name space change.
In addition to the change to arcpy.mp. ArcGIS Pro uses a project file (.aprx) not a map document (.mxd).

Start Time: Wednesday, May 3, 2023 3:53:23 PM
Validating inputs...
Building folder structure...
Finding network segment midpoints...
Making buffers...
Adding "iGeo" attributes to network...
Preprocessing DEM...
Calculating values for iGeo_ElMax...
While calculating iGeo_ElMax, the tool ran into an error. The following ReachIDs did not recieve correct values:
1, 2, 37, 38, 39, 40, 41, 42, 43, 66, 67, 73, 74, 75, 97, 98, 106, 107, 108, 109, 110, 140, 141, 145, 151, 152, 159, 168, 170, 186, 187, 188, 194, 195, 196, 197, 198, 199, 204, 207, 246, 247, 248, 279, 280, 286, 291, 292, 326, 327, 329, 332, 334, 335, 336, 337, 338, and 339

Calculating values for iGeo_ElMin...
While calculating iGeo_ElMin, the tool ran into an error. The following ReachIDs did not recieve correct values:
1, 2, 37, 38, 39, 40, 41, 42, 43, 73, 74, 96, 97, 99, 106, 107, 108, 110, 117, 122, 139, 140, 144, 145, 151, 159, 170, 186, 187, 188, 193, 194, 195, 196, 197, 199, 204, 246, 247, 279, 291, 292, 293, 322, 326, 327, 328, 329, 330, 334, 335, 336, 337, and 338

Calculating iGeo_Slope...
Calculating drainage area...
Calculating iGeo_DA...
While calculating iGeo_DA, the tool ran into an error. The following ReachIDs did not recieve correct values:
1, 2, 37, 38, 39, 40, 41, 42, 43, 73, 74, 75, 96, 99, 106, 107, 108, 110, 122, 140, 141, 145, 146, 147, 148, 149, 150, 151, 152, 153, 159, 168, 170, 186, 187, 188, 194, 195, 196, 197, 199, 204, 246, 247, 279, 286, 291, 292, 293, 322, 326, 327, 329, 330, 334, 335, 336, 337, and 338

Adding "iVeg" attributes to network...
Creating current veg lookup raster...

Calculating iVeg100EX...
While calculating iVeg100EX, the tool ran into an error. The following ReachIDs did not recieve correct values:
1, 37, 38, 39, 40, 41, 42, 73, 74, 106, 107, 108, 140, 145, 146, 147, 148, 149, 150, 151, 152, 153, 159, 170, 186, 187, 188, 194, 196, 197, 199, 246, 247, 279, 291, 292, 326, 327, 334, 335, 337, and 195

Calculating iVeg_30EX...
While calculating iVeg_30EX, the tool ran into an error. The following ReachIDs did not recieve correct values:
1, 73, 246, 279, 2, 37, 38, 39, 40, 41, 42, 43, 74, 106, 107, 108, 140, 145, 146, 147, 148, 149, 150, 151, 152, 153, 159, 168, 170, 186, 187, 188, 194, 195, 196, 197, 199, 204, 247, 291, 292, 293, 326, 327, 329, 334, 335, 336, 337, and 338

Creating historic veg lookup raster...
Calculating iVeg100Hpe...
While calculating iVeg100Hpe, the tool ran into an error. The following ReachIDs did not recieve correct values:
1, 37, 38, 39, 40, 41, 42, 73, 74, 106, 107, 108, 140, 145, 146, 147, 148, 149, 150, 151, 152, 153, 159, 170, 186, 187, 188, 194, 196, 197, 199, 246, 247, 279, 291, 292, 326, 327, 334, 335, 337, and 195

Calculating iVeg_30Hpe...
While calculating iVeg_30Hpe, the tool ran into an error. The following ReachIDs did not recieve correct values:
1, 73, 246, 279, 2, 37, 38, 39, 40, 41, 42, 43, 74, 106, 107, 108, 110, 140, 145, 146, 147, 148, 149, 150, 151, 152, 153, 159, 168, 170, 186, 187, 188, 194, 195, 196, 197, 199, 204, 247, 291, 292, 326, 327, 329, 334, 335, 336, 337, and 338

Finding multi-threaded attributes...
Checking input fields and if canals shapefile exists...
Finding streams with mutltiple channels...
Writing project xml...
Traceback (most recent call last):
  File "<string>", line 372, in execute
  File "C:\Users\cat30\Documents\ArcGIS\Projects\BRAT_Project\ModelScripts\BRAT_table.py", line 173, in main
    make_layer(os.path.dirname(DrAr), DrAr, "Flow Accumulation", symbology_layer=flow_accumulation_sym_layer, is_raster=True)
  File "C:\Users\cat30\Documents\ArcGIS\Projects\BRAT_Project\ModelScripts\SupportingFunctions.py", line 122, in make_layer
    new_layer_instance = arcpy.mp.LayerFile(new_layer_save)
  File "C:\Program Files\ArcGIS\Pro\Resources\ArcPy\arcpy_mp.py", line 1304, in __init__

self._arc_object = arcgisscripting._mapping.LayerFile(*gp_fixargs((layer_file_path,), True))
OSError: C:\Users\cat30\Documents\ArcGIS\Projects\BRAT_Project\Flow\FlowAccumulation.lyr

Failed to execute (BRAT_table_tool).
Failed at Wednesday, May 3, 2023 4:03:19 PM (Elapsed Time: 9 minutes 56 seconds)
Start Time: Thursday, May 4, 2023 10:08:35 AM
Validating inputs...
Building folder structure...
Finding network segment midpoints...
Making buffers...
Adding "iGeo" attributes to network...
Preprocessing DEM...
Calculating values for iGeo_ElMax...
While calculating iGeo_ElMax, the tool ran into an error. The following ReachIDs did not recieve correct values:
1, 2, 37, 38, 39, 40, 41, 42, 43, 66, 67, 73, 74, 75, 97, 98, 106, 107, 108, 109, 110, 140, 141, 145, 151, 152, 159, 168, 170, 186, 187, 188, 194, 195, 196, 197, 198, 199, 204, 207, 246, 247, 248, 279, 280, 286, 291, 292, 326, 327, 329, 332, 334, 335, 336, 337, 338, and 339

Calculating values for iGeo_ElMin...
While calculating iGeo_ElMin, the tool ran into an error. The following ReachIDs did not recieve correct values:
1, 2, 37, 38, 39, 40, 41, 42, 43, 73, 74, 96, 97, 99, 106, 107, 108, 110, 117, 122, 139, 140, 144, 145, 151, 159, 170, 186, 187, 188, 193, 194, 195, 196, 197, 199, 204, 246, 247, 279, 291, 292, 293, 322, 326, 327, 328, 329, 330, 334, 335, 336, 337, and 338

Calculating iGeo_Slope...
Calculating drainage area...
Calculating iGeo_DA...
While calculating iGeo_DA, the tool ran into an error. The following ReachIDs did not recieve correct values:
1, 2, 37, 38, 39, 40, 41, 42, 43, 73, 74, 75, 96, 99, 106, 107, 108, 110, 122, 140, 141, 145, 146, 147, 148, 149, 150, 151, 152, 153, 159, 168, 170, 186, 187, 188, 194, 195, 196, 197, 199, 204, 246, 247, 279, 286, 291, 292, 293, 322, 326, 327, 329, 330, 334, 335, 336, 337, and 338

Adding "iVeg" attributes to network...
Creating current veg lookup raster...
Calculating iVeg100EX...
While calculating iVeg100EX, the tool ran into an error. The following ReachIDs did not recieve correct values:
1, 37, 38, 39, 40, 41, 42, 73, 74, 106, 107, 108, 140, 145, 146, 147, 148, 149, 150, 151, 152, 153, 159, 170, 186, 187, 188, 194, 196, 197, 199, 246, 247, 279, 291, 292, 326, 327, 334, 335, 337, and 195

Calculating iVeg_30EX...
While calculating iVeg_30EX, the tool ran into an error. The following ReachIDs did not recieve correct values:
1, 73, 246, 279, 2, 37, 38, 39, 40, 41, 42, 43, 74, 106, 107, 108, 140, 145, 146, 147, 148, 149, 150, 151, 152, 153, 159, 168, 170, 186, 187, 188, 194, 195, 196, 197, 199, 204, 247, 291, 292, 293, 326, 327, 329, 334, 335, 336, 337, and 338

Creating historic veg lookup raster...
Calculating iVeg100Hpe...
While calculating iVeg100Hpe, the tool ran into an error. The following ReachIDs did not recieve correct values:
1, 37, 38, 39, 40, 41, 42, 73, 74, 106, 107, 108, 140, 145, 146, 147, 148, 149, 150, 151, 152, 153, 159, 170, 186, 187, 188, 194, 196, 197, 199, 246, 247, 279, 291, 292, 326, 327, 334, 335, 337, and 195

Calculating iVeg_30Hpe...
While calculating iVeg_30Hpe, the tool ran into an error. The following ReachIDs did not recieve correct values:
1, 73, 246, 279, 2, 37, 38, 39, 40, 41, 42, 43, 74, 106, 107, 108, 110, 140, 145, 146, 147, 148, 149, 150, 151, 152, 153, 159, 168, 170, 186, 187, 188, 194, 195, 196, 197, 199, 204, 247, 291, 292, 326, 327, 329, 334, 335, 336, 337, and 338

Finding multi-threaded attributes...
Checking input fields and if canals shapefile exists...
Finding streams with mutltiple channels...
Writing project xml...
Traceback (most recent call last):
  File "<string>", line 372, in execute
  File "C:\Users\cat30\Documents\ArcGIS\Projects\BRAT_Project\ModelScripts\BRAT_table.py", line 173, in main
    make_layer(os.path.dirname(DrAr), DrAr, "Flow Accumulation", symbology_layer=flow_accumulation_sym_layer, is_raster=True)
  File "C:\Users\cat30\Documents\ArcGIS\Projects\BRAT_Project\ModelScripts\SupportingFunctions.py", line 122, in make_layer
    new_layer_instance = arcpy.SaveToLayerFile_management(new_layer_save)
  File "C:\Program Files\ArcGIS\Pro\Resources\ArcPy\arcpy\management.py", line 11240, in SaveToLayerFile
    raise e
  File "C:\Program Files\ArcGIS\Pro\Resources\ArcPy\arcpy\management.py", line 11237, in SaveToLayerFile
    retval = convertArcObjectToPythonObject(gp.SaveToLayerFile_management(*gp_fixargs((in_layer, out_layer, is_relative_path, version), True)))

File "C:\Program Files\ArcGIS\Pro\Resources\ArcPy\arcpy\geoprocessing_base.py", line 512, in <lambda>
return lambda *args: val(*gp_fixargs(args, True))
arcgisscripting.ExecuteError: Failed to execute. Parameters are not valid.
ERROR 000732: Input Layer: Dataset C:\Users\cat30\Documents\ArcGIS\Projects\BRAT_Project\Flow\FlowAccumulation.lyr does not exist or is not supported
Failed to execute (SaveToLayerFile).

Failed to execute (BRAT_table_tool).
Failed at Thursday, May 4, 2023 10:27:08 AM (Elapsed Time: 18 minutes 32 seconds)
ISSUE: arcpro saves to lyrx, code references lyr

Start Time: Thursday, May 4, 2023 10:52:42 AM
Validating inputs...
Building folder structure...
Finding network segment midpoints...
Making buffers...
Adding "iGeo" attributes to network...
Preprocessing DEM...
Calculating values for iGeo_ElMax...
While calculating iGeo_ElMax, the tool ran into an error. The following ReachIDs did not recieve correct values:
1, 2, 37, 38, 39, 40, 41, 42, 43, 66, 67, 73, 74, 75, 97, 98, 106, 107, 108, 109, 110, 140, 141, 145, 151, 152, 159, 168, 170, 186, 187, 188, 194, 195, 196, 197, 198, 199, 204, 207, 246, 247, 248, 279, 280, 286, 291, 292, 326, 327, 329, 332, 334, 335, 336, 337, 338, and 339

Calculating values for iGeo_ElMin...
While calculating iGeo_ElMin, the tool ran into an error. The following ReachIDs did not recieve correct values:
1, 2, 37, 38, 39, 40, 41, 42, 43, 73, 74, 96, 97, 99, 106, 107, 108, 110, 117, 122, 139, 140, 144, 145, 151, 159, 170, 186, 187, 188, 193, 194, 195, 196, 197, 199, 204, 246, 247, 279, 291, 292, 293, 322, 326, 327, 328, 329, 330, 334, 335, 336, 337, and 338

Calculating iGeo_Slope...
Calculating drainage area...
Calculating iGeo_DA...
While calculating iGeo_DA, the tool ran into an error. The following ReachIDs did not recieve correct values:

1, 2, 37, 38, 39, 40, 41, 42, 43, 73, 74, 75, 96, 99, 106, 107, 108, 110, 122, 140, 141, 145, 146, 147, 148, 149, 150, 151, 152, 153, 159, 168, 170, 186, 187, 188, 194, 195, 196, 197, 199, 204, 246, 247, 279, 286, 291, 292, 293, 322, 326, 327, 329, 330, 334, 335, 336, 337, and 338

Adding "iVeg" attributes to network...
Creating current veg lookup raster...
Calculating iVeg100EX...
While calculating iVeg100EX, the tool ran into an error. The following ReachIDs did not recieve correct values:
1, 37, 38, 39, 40, 41, 42, 73, 74, 106, 107, 108, 140, 145, 146, 147, 148, 149, 150, 151, 152, 153, 159, 170, 186, 187, 188, 194, 196, 197, 199, 246, 247, 279, 291, 292, 326, 327, 334, 335, 337, and 195

Calculating iVeg_30EX...
While calculating iVeg_30EX, the tool ran into an error. The following ReachIDs did not recieve correct values:
1, 73, 246, 279, 2, 37, 38, 39, 40, 41, 42, 43, 74, 106, 107, 108, 140, 145, 146, 147, 148, 149, 150, 151, 152, 153, 159, 168, 170, 186, 187, 188, 194, 195, 196, 197, 199, 204, 247, 291, 292, 293, 326, 327, 329, 334, 335, 336, 337, and 338

Creating historic veg lookup raster...
Calculating iVeg100Hpe...
While calculating iVeg100Hpe, the tool ran into an error. The following ReachIDs did not recieve correct values:
1, 37, 38, 39, 40, 41, 42, 73, 74, 106, 107, 108, 140, 145, 146, 147, 148, 149, 150, 151, 152, 153, 159, 170, 186, 187, 188, 194, 196, 197, 199, 246, 247, 279, 291, 292, 326, 327, 334, 335, 337, and 195

Calculating iVeg_30Hpe...
While calculating iVeg_30Hpe, the tool ran into an error. The following ReachIDs did not recieve correct values:
1, 73, 246, 279, 2, 37, 38, 39, 40, 41, 42, 43, 74, 106, 107, 108, 110, 140, 145, 146, 147, 148, 149, 150, 151, 152, 153, 159, 168, 170, 186, 187, 188, 194, 195, 196, 197, 199, 204, 247, 291, 292, 326, 327, 329, 334, 335, 336, 337, and 338

Finding multi-threaded attributes...
Checking input fields and if canals shapefile exists...
Finding streams with mutltiple channels...
Writing project xml...
Traceback (most recent call last):
  File "<string>", line 372, in execute
  File "C:\Users\cat30\Documents\ArcGIS\Projects\BRAT_Project\ModelScripts\BRAT_table.py", line 173, in main

```
    make_layer(os.path.dirname(DrAr), DrAr, "Flow Accumulation",
symbology_layer=flow_accumulation_sym_layer, is_raster=True)
  File
"C:\Users\cat30\Documents\ArcGIS\Projects\BRAT_Project\ModelScripts\SupportingFunctions.
py", line 118, in make_layer
    arcpy.ApplySymbologyFromLayer_management(new_layer, symbology_layer)
  File "C:\Program Files\ArcGIS\Pro\Resources\ArcPy\arcpy\management.py", line 10020, in
ApplySymbologyFromLayer
    raise e
  File "C:\Program Files\ArcGIS\Pro\Resources\ArcPy\arcpy\management.py", line 10017, in
ApplySymbologyFromLayer
    retval =
convertArcObjectToPythonObject(gp.ApplySymbologyFromLayer_management(*gp_fixargs((in
_layer, in_symbology_layer, symbology_fields, update_symbology), True)))
  File "C:\Program Files\ArcGIS\Pro\Resources\ArcPy\arcpy\geoprocessing\_base.py", line 512,
in <lambda>
    return lambda *args: val(*gp_fixargs(args, True))
arcgisscripting.ExecuteError: Failed to execute. Parameters are not valid.
ERROR 000968: The symbol layer does not match the input layer
Failed to execute (ApplySymbologyFromLayer).
Start Time: Wednesday, May 10, 2023 4:12:10 PM
Validating inputs...
Building folder structure...
Finding network segment midpoints...
Making buffers...
Adding "iGeo" attributes to network...
Preprocessing DEM...
Calculating values for iGeo_ElMax...
While calculating iGeo_ElMax, the tool ran into an error. The following ReachIDs did not recieve
correct values:
1, 2, 37, 38, 39, 40, 41, 42, 43, 66, 67, 73, 74, 75, 97, 98, 106, 107, 108, 109, 110, 140, 141,
145, 151, 152, 159, 168, 170, 186, 187, 188, 194, 195, 196, 197, 198, 199, 204, 207, 246, 247,
248, 279, 280, 286, 291, 292, 326, 327, 329, 332, 334, 335, 336, 337, 338, and 339

Calculating values for iGeo_ElMin...
While calculating iGeo_ElMin, the tool ran into an error. The following ReachIDs did not recieve
correct values:
1, 2, 37, 38, 39, 40, 41, 42, 43, 73, 74, 96, 97, 99, 106, 107, 108, 110, 117, 122, 139, 140, 144,
145, 151, 159, 170, 186, 187, 188, 193, 194, 195, 196, 197, 199, 204, 246, 247, 279, 291, 292,
293, 322, 326, 327, 328, 329, 330, 334, 335, 336, 337, and 338

Calculating iGeo_Slope...
Calculating drainage area...
Calculating iGeo_DA...
```

While calculating iGeo_DA, the tool ran into an error. The following ReachIDs did not recieve correct values:
1, 2, 37, 38, 39, 40, 41, 42, 43, 73, 74, 75, 96, 99, 106, 107, 108, 110, 122, 140, 141, 145, 146, 147, 148, 149, 150, 151, 152, 153, 159, 168, 170, 186, 187, 188, 194, 195, 196, 197, 199, 204, 246, 247, 279, 286, 291, 292, 293, 322, 326, 327, 329, 330, 334, 335, 336, 337, and 338

Adding "iVeg" attributes to network...
Creating current veg lookup raster...
Calculating iVeg100EX...
While calculating iVeg100EX, the tool ran into an error. The following ReachIDs did not recieve correct values:
1, 37, 38, 39, 40, 41, 42, 73, 74, 106, 107, 108, 140, 145, 146, 147, 148, 149, 150, 151, 152, 153, 159, 170, 186, 187, 188, 194, 196, 197, 199, 246, 247, 279, 291, 292, 326, 327, 334, 335, 337, and 195

Calculating iVeg_30EX...
While calculating iVeg_30EX, the tool ran into an error. The following ReachIDs did not recieve correct values:
1, 73, 246, 279, 2, 37, 38, 39, 40, 41, 42, 43, 74, 106, 107, 108, 140, 145, 146, 147, 148, 149, 150, 151, 152, 153, 159, 168, 170, 186, 187, 188, 194, 195, 196, 197, 199, 204, 247, 291, 292, 293, 326, 327, 329, 334, 335, 336, 337, and 338

Creating historic veg lookup raster...
Calculating iVeg100Hpe...
While calculating iVeg100Hpe, the tool ran into an error. The following ReachIDs did not recieve correct values:
1, 37, 38, 39, 40, 41, 42, 73, 74, 106, 107, 108, 140, 145, 146, 147, 148, 149, 150, 151, 152, 153, 159, 170, 186, 187, 188, 194, 196, 197, 199, 246, 247, 279, 291, 292, 326, 327, 334, 335, 337, and 195

Calculating iVeg_30Hpe...
While calculating iVeg_30Hpe, the tool ran into an error. The following ReachIDs did not recieve correct values:
1, 73, 246, 279, 2, 37, 38, 39, 40, 41, 42, 43, 74, 106, 107, 108, 110, 140, 145, 146, 147, 148, 149, 150, 151, 152, 153, 159, 168, 170, 186, 187, 188, 194, 195, 196, 197, 199, 204, 247, 291, 292, 326, 327, 329, 334, 335, 336, 337, and 338

Finding multi-threaded attributes...
Checking input fields and if canals shapefile exists...
Finding streams with mutltiple channels...
Writing project xml...
Traceback (most recent call last):
  File "<string>", line 372, in execute

```
  File "C:\Users\cat30\Documents\ArcGIS\Projects\BRAT_2023\PyCharm\BRAT_table.py", line
173, in main
    make_layer(os.path.dirname(DrAr), DrAr, "Flow Accumulation",
symbology_layer=flow_accumulation_sym_layer, is_raster=True)
  File
"C:\Users\cat30\Documents\ArcGIS\Projects\BRAT_2023\PyCharm\SupportingFunctions.py",
line 114, in make_layer
    arcpy.ApplySymbologyFromLayer_management(new_layer, symbology_layer)
  File "C:\Program Files\ArcGIS\Pro\Resources\ArcPy\arcpy\management.py", line 10020, in
ApplySymbologyFromLayer
    raise e
  File "C:\Program Files\ArcGIS\Pro\Resources\ArcPy\arcpy\management.py", line 10017, in
ApplySymbologyFromLayer
    retval =
convertArcObjectToPythonObject(gp.ApplySymbologyFromLayer_management(*gp_fixargs((in
_layer, in_symbology_layer, symbology_fields, update_symbology), True)))
  File "C:\Program Files\ArcGIS\Pro\Resources\ArcPy\arcpy\geoprocessing\_base.py", line 512,
in <lambda>
    return lambda *args: val(*gp_fixargs(args, True))
arcgisscripting.ExecuteError: Failed to execute. Parameters are not valid.
ERROR 000968: The symbol layer does not match the input layer
Failed to execute (ApplySymbologyFromLayer).


Failed to execute (BRAT_table_tool).
Failed at Wednesday, May 10, 2023 4:20:06 PM (Elapsed Time: 7 minutes 56 seconds)


Created flow dir and flow acc rasters
Start Time: Wednesday, May 10, 2023 4:27:28 PM
Validating inputs...
Building folder structure...
Finding network segment midpoints...
Making buffers...
Adding "iGeo" attributes to network...
Preprocessing DEM...
Calculating values for iGeo_ElMax...
While calculating iGeo_ElMax, the tool ran into an error. The following ReachIDs did not recieve
correct values:
1, 2, 37, 38, 39, 40, 41, 42, 43, 66, 67, 73, 74, 75, 97, 98, 106, 107, 108, 109, 110, 140, 141,
145, 151, 152, 159, 168, 170, 186, 187, 188, 194, 195, 196, 197, 198, 199, 204, 207, 246, 247,
248, 279, 280, 286, 291, 292, 326, 327, 329, 332, 334, 335, 336, 337, 338, and 339

Calculating values for iGeo_ElMin...
```

While calculating iGeo_ElMin, the tool ran into an error. The following ReachIDs did not recieve correct values:
1, 2, 37, 38, 39, 40, 41, 42, 43, 73, 74, 96, 97, 99, 106, 107, 108, 110, 117, 122, 139, 140, 144, 145, 151, 159, 170, 186, 187, 188, 193, 194, 195, 196, 197, 199, 204, 246, 247, 279, 291, 292, 293, 322, 326, 327, 328, 329, 330, 334, 335, 336, 337, and 338

Calculating iGeo_Slope...
Calculating iGeo_DA...
Traceback (most recent call last):
  File "<string>", line 372, in execute
  File "C:\Users\cat30\Documents\ArcGIS\Projects\BRAT_2023\PyCharm\BRAT_table.py", line 144, in main
    igeo_attributes(seg_network_copy, in_DEM, flow_acc, midpoint_buffer, scratch, is_verbose)
  File "C:\Users\cat30\Documents\ArcGIS\Projects\BRAT_2023\PyCharm\BRAT_table.py", line 576, in igeo_attributes
    zonalStatsWithinBuffer(midpoint_buffer, DrArea, "MAXIMUM", 'MAX', out_network, "iGeo_DA", scratch)
  File "C:\Users\cat30\Documents\ArcGIS\Projects\BRAT_2023\PyCharm\BRAT_table.py", line 399, in zonalStatsWithinBuffer
    stat_tbl = arcpy.sa.ZonalStatisticsAsTable(buffer, 'ReachID', ras, os.path.join(scratch, 'statTbl'), 'DATA', stat_type)
  File "C:\Program Files\ArcGIS\Pro\Resources\ArcPy\arcpy\sa\Functions.py", line 10975, in ZonalStatisticsAsTable
    return Wrapper(
  File "C:\Program Files\ArcGIS\Pro\Resources\ArcPy\arcpy\sa\Utils.py", line 55, in swapper
    result = wrapper(*args, **kwargs)
  File "C:\Program Files\ArcGIS\Pro\Resources\ArcPy\arcpy\sa\Functions.py", line 10962, in Wrapper
    result = arcpy.gp.ZonalStatisticsAsTable_sa(
  File "C:\Program Files\ArcGIS\Pro\Resources\ArcPy\arcpy\geoprocessing_base.py", line 512, in <lambda>
    return lambda *args: val(*gp_fixargs(args, True))
arcgisscripting.ExecuteError: Failed to execute. Parameters are not valid.
ERROR 000865: Input Value Raster: C:\Users\cat30\Documents\ArcGIS\Projects\BRAT_Project\Flow\FlowAcc_Flow1 does not exist.
Failed to execute (ZonalStatisticsAsTable).

Failed to execute (BRAT_table_tool).
Failed at Wednesday, May 10, 2023 4:28:37 PM (Elapsed Time: 1 minutes 8 seconds)

For some reason, it’s routing to BRAT_Project

pip install C:\Users\cat30\Downloads/Shapely-1.6.4.post2-cp37-cp37m-win_amd64.whl
pip install C:\Users\cat30\Downloads/GDAL-2.4.1-cp37-cp37m-win_amd64.whl
pip install C:\Users\cat30\Downloads/pyproj-2.4.0-cp37-cp37m-win_amd64.whl
pip install C:\Users\cat30\Downloads/rasterio-1.2.10-pp38-pypy38_pp73-win_amd64.whl

pip install C:\Users\cat30\Downloads/Shapely-1.8.2-pp38-pypy38_pp73-win_amd64.whl

pip install C:\Users\cat30\Downloads/Shapely-1.8.2-cp311-cp311-win_amd64.whl
pip install C:\Users\cat30\Downloads/Shapely-1.8.2-cp39-cp39-win_amd64.whl
Shapely-1.8.2-cp310-cp310-win_amd64.whl
Shapely-1.8.2-cp310-cp310-win32.whl
Shapely-1.8.2-cp39-cp39-win_amd64.whl
Shapely-1.8.2-cp39-cp39-win32.whl
Shapely-1.8.2-cp38-cp38-win_amd64.whl
Shapely-1.8.2-cp38-cp38-win32.whl
Shapely-1.8.1.post1-cp37-cp37m-win_amd64.whl
Shapely-1.8.1.post1-cp37-cp37m-win32.whl
Shapely-1.7.1-cp36-cp36m-win_amd64.whl
Shapely-1.7.1-cp36-cp36m-win32.whl
Shapely-1.6.4.post2-cp35-cp35m-win_amd64.whl
Shapely-1.6.4.post2-cp35-cp35m-win32.whl
Shapely-1.6.4.post2-cp27-cp27m-win_amd64.whl
Shapely-1.6.4.post2-cp27-cp27m-win32.whl
Shapely-1.6.4.post1-cp34-cp34m-win_amd64.whl
Shapely-1.6.4.post1-cp34-cp34m-win32.whl

****
Uninstalled ArcGIS Pro 3.x
Installed 2.7

While calculating iGeo_ElMax, the tool ran into an error. The following ReachIDs did not recieve correct values:
1, 2, 37, 38, 39, 40, 41, 42, 43, 66, 67, 73, 74, 75, 97, 98, 106, 107, 108, 109, 110, 140, 141, 145, 151, 152, 159, 168, 170, 186, 187, 188, 194, 195, 196, 197, 198, 199, 204, 207, 246, 247, 248, 279, 280, 286, 291, 292, 326, 327, 329, 332, 334, 335, 336, 337, 338, and 339

While calculating iGeo_ElMin, the tool ran into an error. The following ReachIDs did not recieve correct values:
1, 2, 37, 38, 39, 40, 41, 42, 43, 73, 74, 96, 97, 99, 106, 107, 108, 110, 117, 122, 139, 140, 144, 145, 151, 159, 170, 186, 187, 188, 193, 194, 195, 196, 197, 199, 204, 246, 247, 279, 291, 292, 293, 322, 326, 327, 328, 329, 330, 334, 335, 336, 337, and 338
While calculating iGeo_DA, the tool ran into an error. The following ReachIDs did not recieve correct values:
1, 2, 37, 38, 39, 40, 41, 42, 43, 73, 74, 75, 96, 99, 106, 107, 108, 110, 122, 140, 145, 146, 147, 148, 149, 150, 151, 152, 153, 159, 168, 170, 186, 187, 188, 194, 195, 196, 197, 199, 204, 246, 247, 279, 286, 291, 292, 293, 322, 326, 327, 329, 330, 334, 335, 336, 337, and 338
While calculating iVeg100EX, the tool ran into an error. The following ReachIDs did not recieve correct values:
1, 37, 38, 39, 40, 41, 42, 73, 74, 106, 107, 108, 140, 145, 146, 147, 148, 149, 150, 151, 152, 153, 159, 170, 186, 187, 188, 194, 196, 197, 199, 246, 247, 279, 291, 292, 326, 327, 334, 335, 337, and 195
While calculating iVeg_30EX, the tool ran into an error. The following ReachIDs did not recieve correct values:
1, 73, 246, 279, 2, 37, 38, 39, 40, 41, 42, 43, 74, 106, 107, 108, 140, 145, 146, 147, 148, 149, 150, 151, 152, 153, 159, 168, 170, 186, 187, 188, 194, 195, 196, 197, 199, 204, 247, 291, 292, 293, 326, 327, 329, 334, 335, 336, 337, and 338
While calculating iVeg100Hpe, the tool ran into an error. The following ReachIDs did not recieve correct values:
1, 37, 38, 39, 40, 41, 42, 73, 74, 106, 107, 108, 140, 145, 146, 147, 148, 149, 150, 151, 152, 153, 159, 170, 186, 187, 188, 194, 196, 197, 199, 246, 247, 279, 291, 292, 326, 327, 334, 335, 337, and 195
While calculating iVeg_30Hpe, the tool ran into an error. The following ReachIDs did not recieve correct values:
1, 73, 246, 279, 2, 37, 38, 39, 40, 41, 42, 43, 74, 106, 107, 108, 110, 140, 145, 146, 147, 148, 149, 150, 151, 152, 153, 159, 168, 170, 186, 187, 188, 194, 195, 196, 197, 199, 204, 247, 291, 292, 326, 327, 329, 334, 335, 336, 337, and 338
Traceback (most recent call last):
  File "<string>", line 390, in execute
  File "C:\Users\cat30\Desktop\BRATedit\SourceCode\BRAT_table.py", line 177, in main
    road, railroad, canal, buf_30m, buf_100m, seg_network_copy, description)
  File "C:\Users\cat30\Desktop\BRATedit\SourceCode\BRAT_table.py", line 1048, in write_xml
    add_drain_area_to_inputs_xml(xml_file, DrAr, proj_path)
  File "C:\Users\cat30\Desktop\BRATedit\SourceCode\BRAT_table.py", line 1157, in add_drain_area_to_inputs_xml
    element = xml_file.find_by_text(find_relative_path(drainage_area, proj_path))
  File "C:\Users\cat30\Desktop\BRATedit\SourceCode\SupportingFunctions.py", line 143, in find_relative_path
    raise Exception("Could not find relative path")
Exception: Could not find relative path
Failed to execute (BRAT_table_tool).