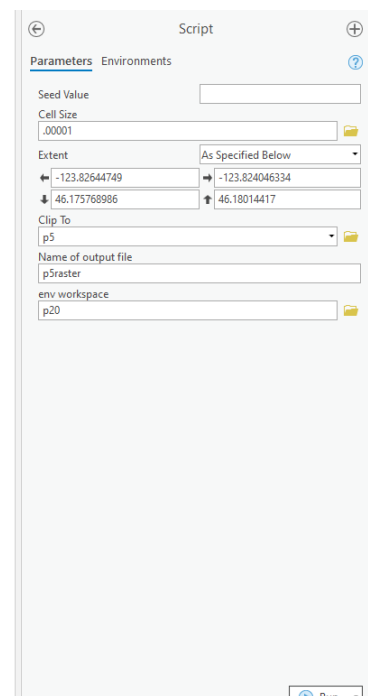
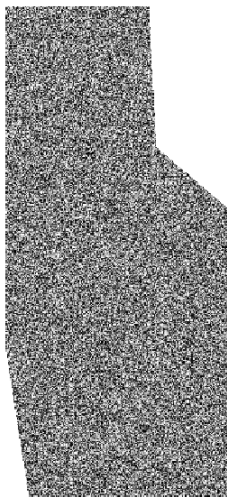


CreateRandomRaster:

Variables:

1. Seed Value: Value to seed the generation of randomness for the raster (optional). This should be an integer or floating-point number.
2. Cell Size: Determines how large each data cell (each square) is inside the raster. Larger values will create larger cells/squares.
3. Extent: The size (coordinate values) of the space to generate the raster inside. An existing polygon or feature can be used or a new one can be drawn. In this case the polygon "p5" was used.
4. Clip To: The shape to clip the resulting raster image to. An existing polygon or feature can be used or a new one can be drawn. In this case the polygon "p5" was used.
5. Name of Output File: The desired name of the output .tif file.
6. Environment (env) Workspace: A folder from the workspace should be used for the environment workspace.

Expected Output: The script creates a raster file that can be used to represent debris spread for use in future scripts. The raster is a file that can be found in the filesystem.

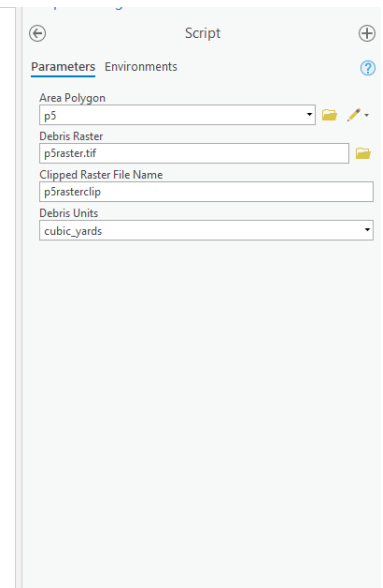
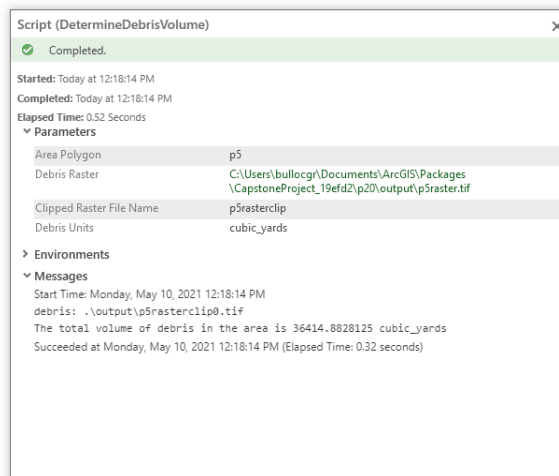
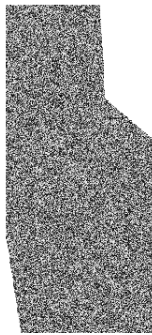


DetermineDebrisVolume:

Variables:

1. **Area Polygon:** The area polygon is the polygon the user drew in ArcGIS Pro. This area should represent the area the user wants to clear of debris.
2. **Debris Raster:** The debris raster is the file generated by the CreateRandomRaster script for this example. It should be a rasterized dataset as a .tif file. The data should represent debris spread.
3. **Clipped Raster File Name:** This is an optional variable. It will be the name of the output file this script creates.
4. **Debris Units:** This is what the units of debris are in. It should line up with the raster file. It is default set to cubic yards.

Expected Output: The script outputs a message that displays the total volume of the debris in the intersection of the “Area Polygon” and the “Debris Raster.”



DetermineClearanceTime:

Variables:

1. Area Polygon to Clear: The area polygon to clear is the polygon the user drew in ArcGIS Pro. This area should represent the area the user wants to clear of debris
2. Debris Raster: The debris raster is the file generated by the CreateRandomRaster script for this example. It should be a rasterized dataset as a .tif file. The data should represent debris spread.
3. Number of Loaders: This is the number of loaders the user will have to clean up the given area.
4. Number of Trucks per Loader: This is how many trucks the user will have assigned to each loader.
5. Distance to Dump Site: This is the distance to the dump site from the main loading point within the polygon.

Expected Output: The script outputs the time it would take to clear debris from the intersection of the “Area Polygon to Clear” and the “Debris Raster.”



Script (DetermineClearanceTime)

Completed.

Started: Today at 12:22:12 PM
Completed: Today at 12:22:12 PM
Elapsed Time: 0.55 Seconds

> Errors and warnings

Parameters

Area Polygon to Clear	p5
Debris Raster	C:\Users\bullocg\Documents\ArcGIS\Packages\CapstoneProject_19efd\p2\output\p5raster.tif
Number of Loaders	5
Number of Trucks per Loader	2
Distance to Dump Site (Miles)	10
Volume Per Truck (Cubic Yards)	30
Weight Per Truck (Tons)	20
Efficiency Factor (Decimal)	.83
Work Day Length (Hours)	8
Truck Speed Loaded (MPH)	25
Truck Speed Empty (MPH)	30
Truck Load Time (Minutes)	10
Truck Dump Time (Minutes)	5
Other/Waiting Time (Minutes)	5

> Environments

Messages

Start Time: Monday, May 10, 2021 12:22:12 PM
debris: .\output\clip0.tif
The total volume of debris in the area is 36414.8928125 Cubic Yards
The total time for cleaning the debris is 97.5 days
Succeeded at Monday, May 10, 2021 12:22:12 PM (Elapsed Time: 0:40 seconds)

Script

Parameters Environments

Area Polygon to Clear
p5

Debris Raster
p5raster.tif

Number of Loaders
5

Number of Trucks per Loader
2

Distance to Dump Site (Miles)
10

> Resource Details

The “Resource Details” are a set of variables used in the calculation of the clearance time. The values shown on screen are the default values, but they can be modified by the user to represent different situations such as a truck with a larger carry volume. Some parameters in the “Resource Details” may need to be calculated by the user.



Script (DetermineClearanceTime)

Completed.

Started: Today at 12:22:12 PM
 Completed: Today at 12:22:12 PM
 Elapsed Time: 0.55 Seconds

> Errors and warnings

> Parameters

Area Polygon to Clear	p5
Debris Raster	C:\Users\bulloqy\Documents\ArcGIS\Packages\CapstoneProject_19efd2\p20\output\p5raster.tif
Number of Loaders	5
Number of Trucks per Loader	2
Distance to Dump Site (Miles)	10
Volume Per Truck (Cubic Yards)	30
Weight Per Truck (Tons)	20
Efficiency Factor (Decimal)	.83
Work Day Length (Hours)	8
Truck Speed Loaded (MPH)	25
Truck Speed Empty (MPH)	30
Truck Load Time (Minutes)	10
Truck Dump Time (Minutes)	5
Other/Waiting Time (Minutes)	5

> Environments

> Messages

Start Time: Monday, May 10, 2021 12:22:12 PM
 debris: .\output\clip0.tif
 The total volume of debris in the area is 36414.8828125 Cubic Yards
 The total time for cleaning the debris is 97.5 days
 Succeeded at Monday, May 10, 2021 12:22:12 PM (Elapsed Time: 0.40 seconds)

Script

Parameters Environments

Area Polygon to Clear
 p5

Debris Raster
 p5raster.tif

Number of Loaders
 5

Number of Trucks per Loader
 2

Distance to Dump Site (Miles)
 10

> Resource Details

Volume Per Truck (Cubic Yards)
 30

Weight Per Truck (Tons)
 20

Efficiency Factor (Decimal)
 .83

Work Day Length (Hours)
 8

Truck Speed Loaded (MPH)
 25

Truck Speed Empty (MPH)
 30

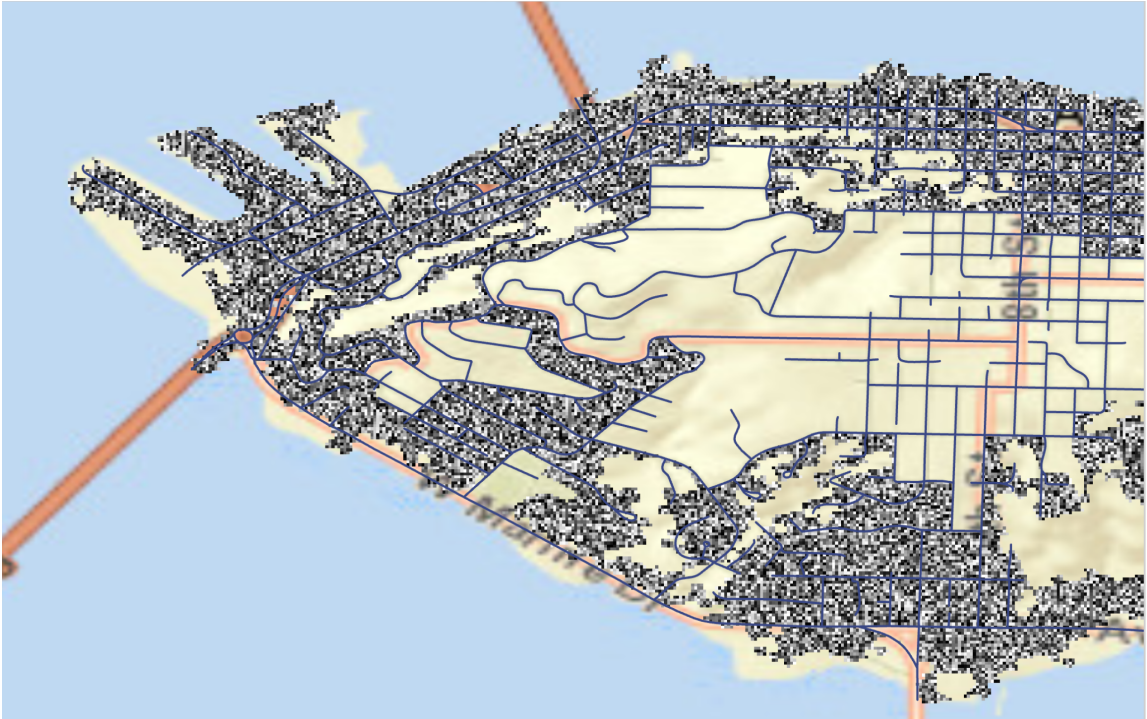
Truck Load Time (Minutes)
 10

Truck Dump Time (Minutes)
 5

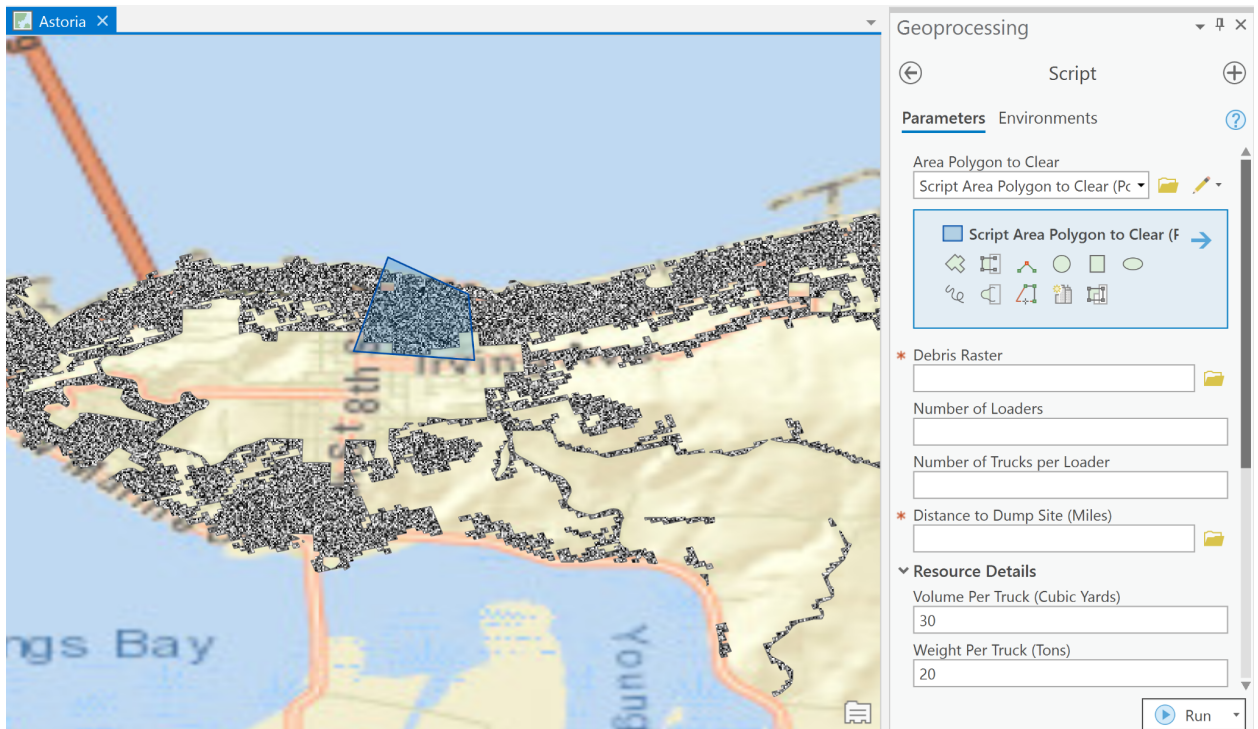
Other/Waiting Time (Minutes)
 5

Example Workflow

1. The user can run the CreateRandomRaster script to randomly estimate debris spread or obtain a raster of debris spread data from elsewhere.



2. The user draws an area to clear using ArcGIS Pro's built in draw tool.



3. The user runs the DetermineDebrisVolume script to get a calculation of the debris inside of the area based on the debris raster file.

And/Or

4. The user runs the DetermineClearanceTime script to get a calculation of the amount of time it would take to clear the area of debris given by the debris raster file.

