HEC-GeoEFM 3.0 March 2025 Release Notes

GeoEFM is a software tool developed to support spatial analyses commonly used during applications of the Ecosystem Functions Model (HEC-EFM).

GeoEFM 3.0 is programmed as a toolbox for ArcGIS Pro. GeoEFM 2.0 and 1.0 are programmed as toolbar extensions for ArcMap. Version 3.0 can be installed concurrently with Version 2.0, which was released in August 2024.

Use of GeoEFM 3.0 requires an advanced level license for ArcGIS Pro 3.0, 3.1, 3.2, or 3.3. Spatial Analyst and 3D Analyst extensions must be installed and activated for any combination of GeoEFM and ArcGIS.

There are two ways to install GeoEFM 3.0.

The first is via a windows installer package (HEC-GeoEFM_3.0.034_Setup.msi). Using the installer requires administrative privileges and installs GeoEFM as a system toolbox.

The second is by extracting GeoEFM from a compressed file (HEC-GeoEFM_3.0.034.zip) and then inserting the extracted GeoEFM toolbox (HEC-GeoEFM.atbx) into the desired Pro project via the Insert - Toolbox - Add Toolbox feature in Pro. Using the compressed file does not require administrative privileges and installs GeoEFM as a project toolbox.

There were 34 beta versions and 50 bug fixes for GeoEFM 3.0 in ArcGIS Pro (Pro).

Revisions

For Version 3.0, GeoEFM was rewritten as a toolbox that contains 4 primary tools and 10 python scripts (Figure 1). Much of the functionality of previous GeoEFM versions is coded in those scripts. Three features in GeoEFM 2.0 were not carried to GeoEFM 3.0 – data management through views, nearest neighbor, and spatial statistics.

In 2.0, data management through views was part of the basic GeoEFM project framework. Standard, combo, and custom views were created by the user as data frames or workspaces for different management alternatives and ecological concerns. This was not carried over to Version 3.0. Organization of layers is now left to the users, which is a simpler approach that leans on already built capabilities of Pro.

Nearest neighbor is one of three habitat functionality methods included in Version 2.0. It was not carried over to Version 3.0 due to funding limitations.

Spatial statistics was not carried over to Version 3.0 because Pro has already built capabilities for plotting point data at different scales.



Figure 1. Construct differences between GeoEFM 2.0 and 3.0.

When a script is initiated, an interface opens in the Geoprocessing frame of Pro. Users enter parameters into the interface fields (Figure 2), which are then used to guide application of the script (Figure 3). Output can be rasters (Figure 4) or feature class information that is stored to geodatabases.

By default, scripts that generate rasters produce geotiffs that are stored to a layers folder in the project directory. Users can adjust this to produce grids or geodatabase rasters that are saved to any location on disk. Typically, outputs from GeoEFM tools are automatically added to map contents.

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	► Run _b *

Catalog Geoprocessing History Label Class Figure 2. The HSI Calculator allows users to apply an HSI to compute a suitability raster.

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Started: Today at 9:53:52 AM	
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Rat for slice: 3 = 0.0	
Rat for slice: 4 = -1.0	
Rat for slice: 5 = 0.0	
Limiting zero suitability	
All input cells with value less than 0 will be set to no data	
Finished at 2024-10-08 09:53:57	
Succeeded at Tuesday, October 08, 2024 9:53:57 AM (Elapsed Time: 5.66 seconds)	

Figure 3. Applying the HSI Calculator to compute a suitability raster.



Figure 4. Spatial layers for <u>Little minnow spawning habitat</u> overlaid on land surface topography. Top image shows a depth raster (blue) generated by a river hydraulics model. Middle and bottom images show suitability rasters generated by applying a HSI to the depth raster with zero suitability areas excluded and included, respectively.

Documentation

The User's Manual was wholly updated to detail the new GeoEFM software and its use in Pro.

HEC-EFM Status

Information is passed from EFM to GeoEFM for use in GeoEFM applications. No changes were made to EFM in support of GeoEFM 3.0. The latest version of EFM (6.0) and corresponding release notes are available via HEC's website.