



United States Department of Agriculture



## Digital Mobile Sketch Mapping (DMSM)

# DMSM ForWarn II

## Mission Planning for Forest Health Surveys using ForWarn II Data in ArcMap



Forest Service

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## Introduction

This document describes how to access an ArcGIS Online map that makes it easier for Digital Mobile Sketch Mapping (DMSM) users to integrate ForWarn II data into forest health surveys. In brief, users can open the map in ArcGIS and from there use ForWarn data to digitize polygons area areas of interest (e.g., watch boxes), or create an ArcGIS Tile Package (TPK). The shapefiles and TPKs can then be loaded onto the tablet for uses with DMSM in the field. For more information on ForWarn II data, please visit: <https://forwarn.forestthreats.org/>.

## Overview of steps

1. **How to Access**-Visit the ArcGIS Online landing page
2. **Download and Open to Desktop** – Open the map for local processing
3. **ArcGIS Tile Packages (TPKs)** – Create TPKs of ForWarn data
  - a. Export map as PNG – Re-save ForWarn data in an ESRI suitable raster format
  - b. Reload PNG into map and export that as TPK
  - c. Load TPK onto tablet
4. **Digitizing shapefiles** – Delineate areas of interest (AOI) from ForWarn data
  - a. Setting the View to Digitize Vectors in ArcMap - Zoom/pan map to include the AOI for digitizing
  - b. Creating the blank polygon feature - Create a blank feature class for digitizing
  - c. Start Digitizing - Create damage polygons in the feature class
  - d. Side-Load the Shapefile to Tablet - Move the shapefile to the tablet for use during survey

## How to Access

Navigate to

<https://usfs.maps.arcgis.com/home/item.html?id=71aa38fd1c6343c48164d3cf6b601575> in ArcGIS online. (You may be prompted to enter your ArcGIS Online user account credentials.)

**OR**

From ArcGIS Online, go to Groups → Digital Mobile Sketch Mapping (DMSM)



### Digital Mobile Sketch Mapping (DMSM)


Owner: USFSForestHealth

Created: Dec 8, 2015   Last Updated: Dec 10, 2019   Viewable by:  Group Members

This group shares DMSM-related services and information to its users.



Once inside the DMSM group, access the DMSM content and you can find the page under DMSM for ForWarn II.



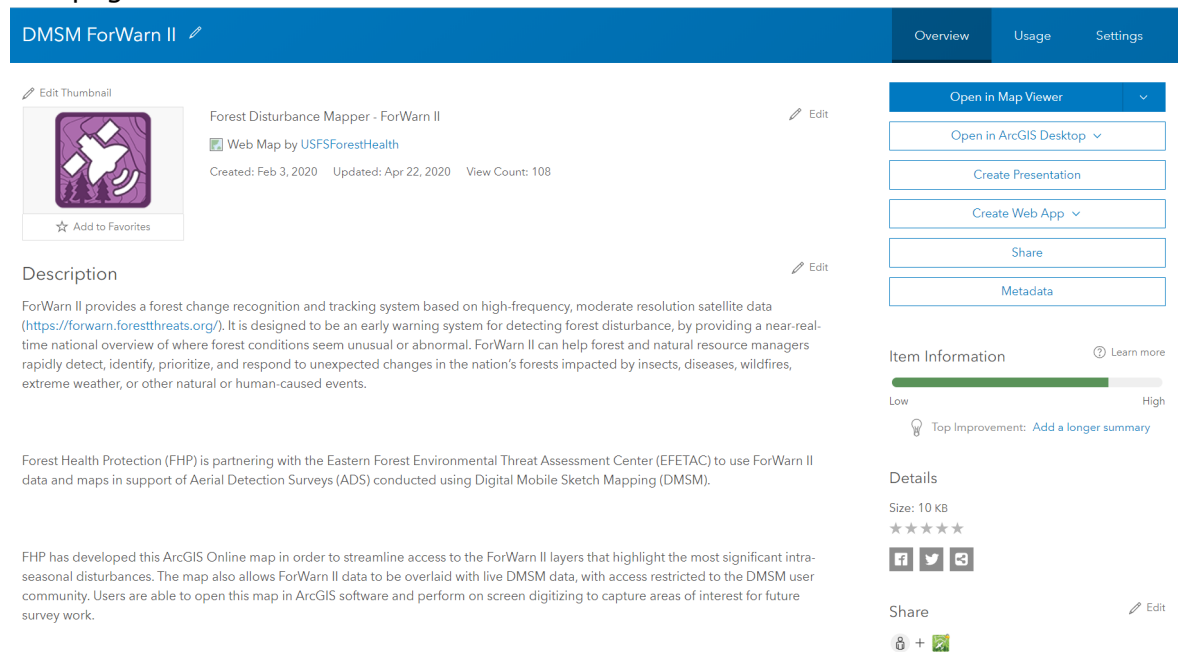
**DMSM ForWarn II**

Web Map by [USFSForestHealth](#)

Forest Disturbance Mapper - ForWarn II

Created: Feb 3, 2020   Updated: Apr 22, 2020   View Count: 113


The page should look like this.



**DMSM ForWarn II**

Overview   Usage   Settings

Edit Thumbnail



Forest Disturbance Mapper - ForWarn II

Web Map by [USFSForestHealth](#)

Created: Feb 3, 2020   Updated: Apr 22, 2020   View Count: 108

☆ Add to Favorites

**Description**

ForWarn II provides a forest change recognition and tracking system based on high-frequency, moderate resolution satellite data (<https://forwarn.forestthreats.org/>). It is designed to be an early warning system for detecting forest disturbance, by providing a near-real-time national overview of where forest conditions seem unusual or abnormal. ForWarn II can help forest and natural resource managers rapidly detect, identify, prioritize, and respond to unexpected changes in the nation's forests impacted by insects, diseases, wildfires, extreme weather, or other natural or human-caused events.

Forest Health Protection (FHP) is partnering with the Eastern Forest Environmental Threat Assessment Center (EFETAC) to use ForWarn II data and maps in support of Aerial Detection Surveys (ADS) conducted using Digital Mobile Sketch Mapping (DMSM).

FHP has developed this ArcGIS Online map in order to streamline access to the ForWarn II layers that highlight the most significant intra-seasonal disturbances. The map also allows ForWarn II data to be overlaid with live DMSM data, with access restricted to the DMSM user community. Users are able to open this map in ArcGIS software and perform on screen digitizing to capture areas of interest for future survey work.

**Open in Map Viewer**

Open in ArcGIS Desktop

Create Presentation

Create Web App

Share

Metadata

**Item Information** Learn more

Low High

Top Improvement: [Add a longer summary](#)

**Details**

Size: 10 KB

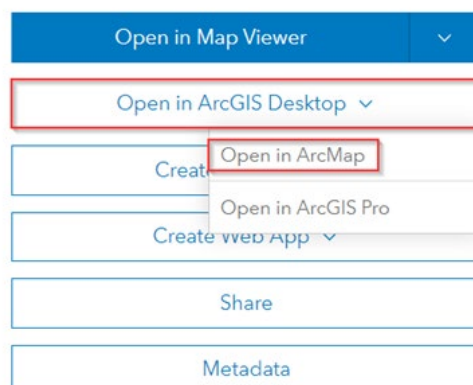
★★★★★

**Share**

+

## Download and Open to Desktop

To open the web map on your ArcMap desktop, click the dropdown in "Open in ArcGIS Desktop" and select "Open in ArcMap"



**Open in Map Viewer**

**Open in ArcGIS Desktop**

Open in ArcMap

Open in ArcGIS Pro

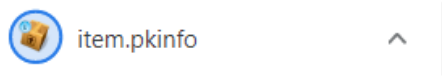
Create web App

Share

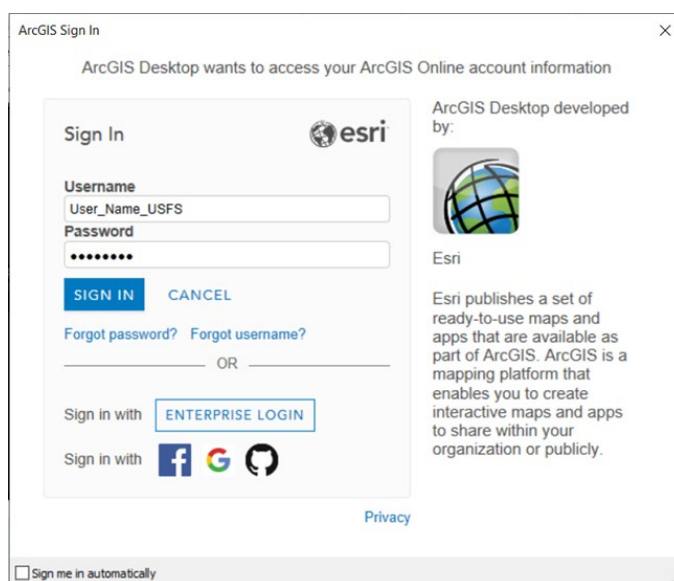
Metadata



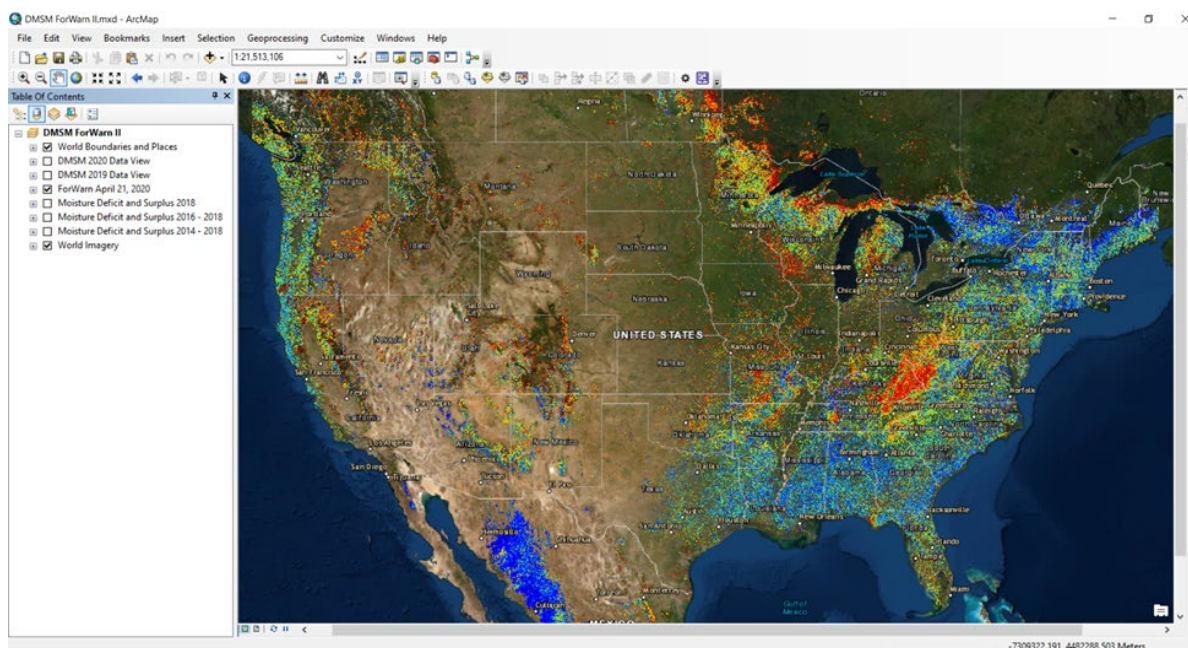
After clicking "Open in ArcMap", a download of an "item.pkinfo" should appear in the bottom-left corner of your screen.



Click on this icon to open in ArcMap. Or find it in your downloads folder and open it from there. A window might popup asking you to enter your ArcGIS Online username and password again.



Enter your username and password and click "SIGN IN". This will open the map in ArcMap.



Keep in mind that there is a lot of data that is being displayed for ForWarn II so load times will increase and drawing speed will be slowed.



## ArcGIS Tile Packages (TPKs) TPK

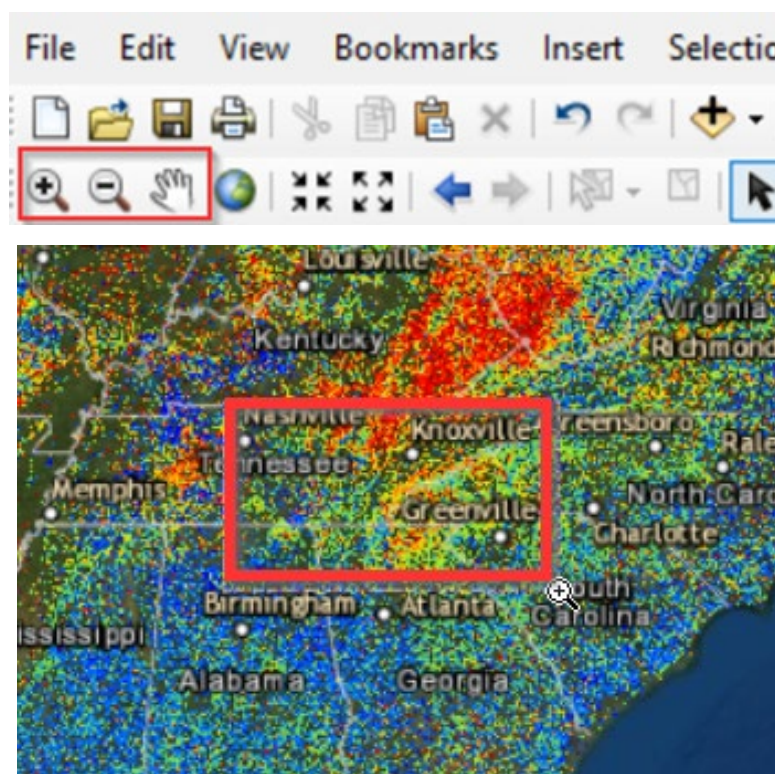
The steps below guide you through how to create a TPK from the ForWarn II data. If you prefer to work with vector shapefiles, please proceed to the next section Digitizing Shapefiles from ForWarn II

(If you are unfamiliar with the basic functionality and interface of ArcMap, please investigate one of Esri's many free training courses o getting started with ArcMap.)

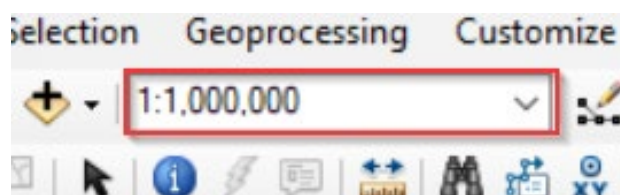
### Export map as PNG

The fastest way to get ForWarn II data onto the tablet is to create a TPK from the raster.

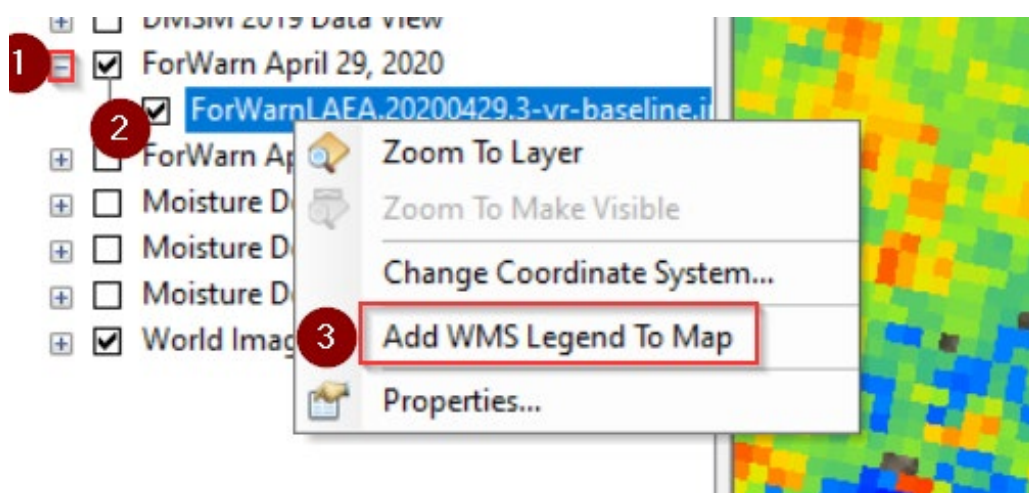
- Start by selecting which vintage of ForWarn II data you wish to see in the table of contents.
- You can pan and zoom to the area of interest using the pan and zoom buttons. Click on the zoom in and draw a box around the area of interest to zoom.



- Repeat the process until you reach the desired zoom level. We recommend a 1:1,000,000 scale.



- When you have reached your desired resolution, expand the ForWarn Layer using the plus symbol next to the layer name in the table of contents. Then, right click the sub-layer inside the nested structure and click "Add WMS Legend To Map".

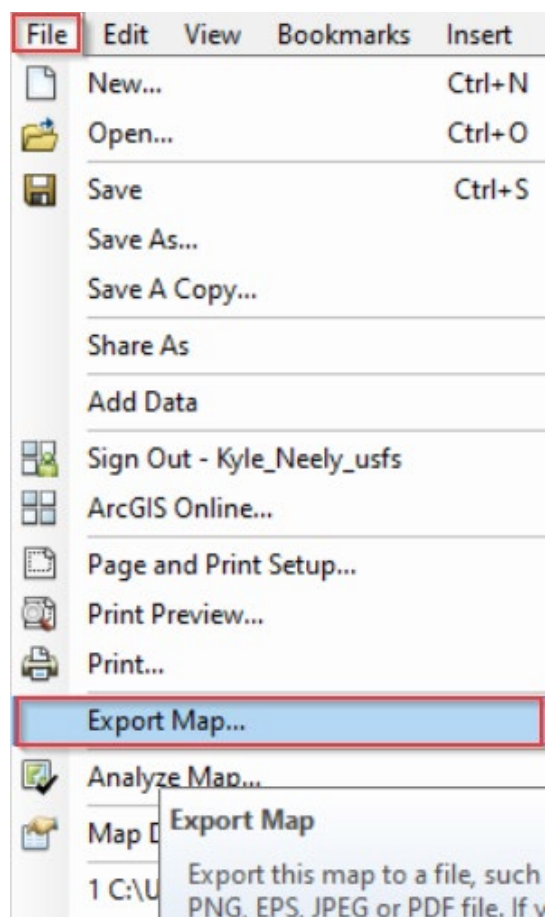


- This will open a small legend that you can use to determine the values based on the color of the raster pixels. Note: DMSM users will need to decide which ranges of "% change" values in ForWarn are most meaningful and informative for surveying the damage events in their areas. Almost certainly these will be negative % change values, but to determine the specific range of values from -1 to -100%, users will need to explore and evaluate the data. For more information on ForWarn II data, please visit: <https://forwarn.forestthreats.org/>.

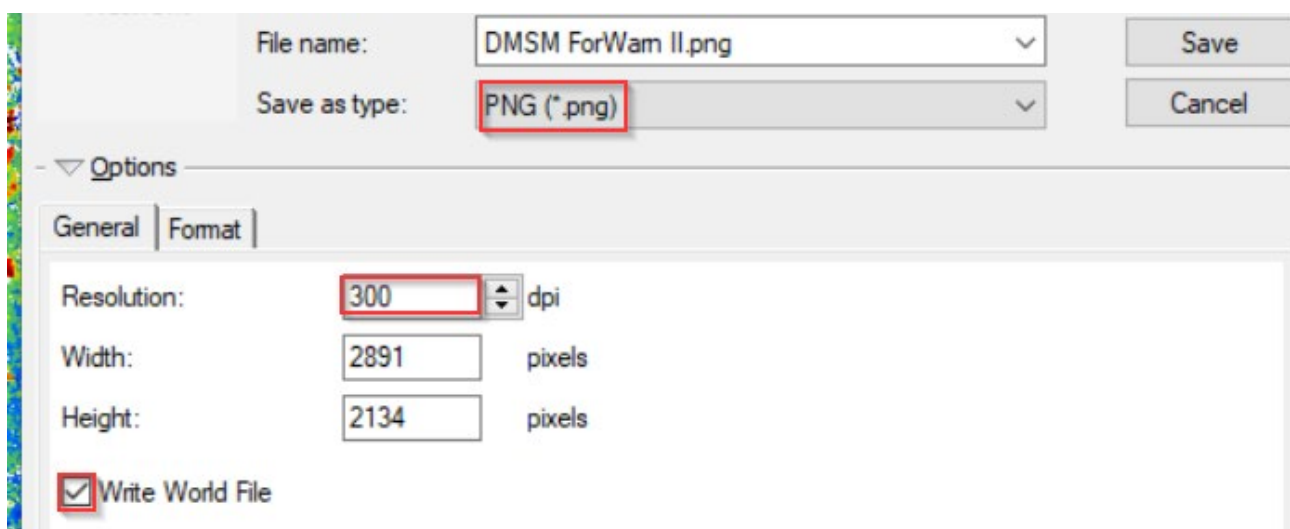


- Turn off ALL layers in the table of contents EXCEPT for the ForWarn layer of the desired vintage.
- Click File → Export Map.






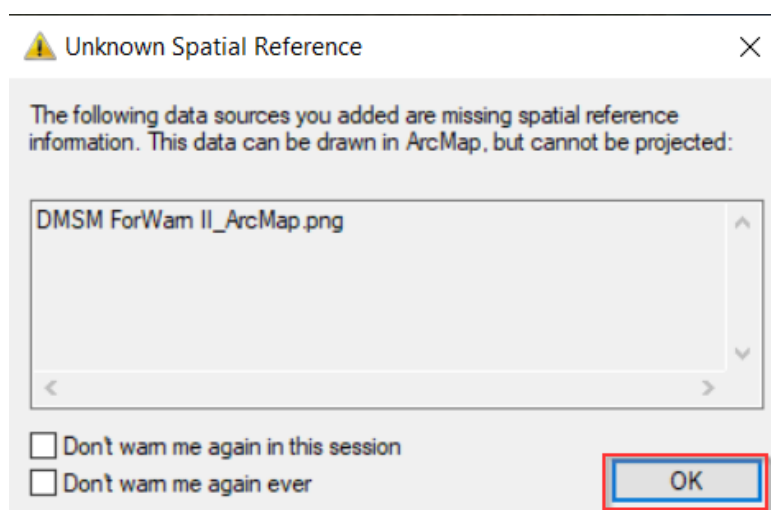
- Select the file location to output the image.
- Save as type: PNG
- Set the resolution to 300 dpi
- Check the "Write World File"
- Press "Save"



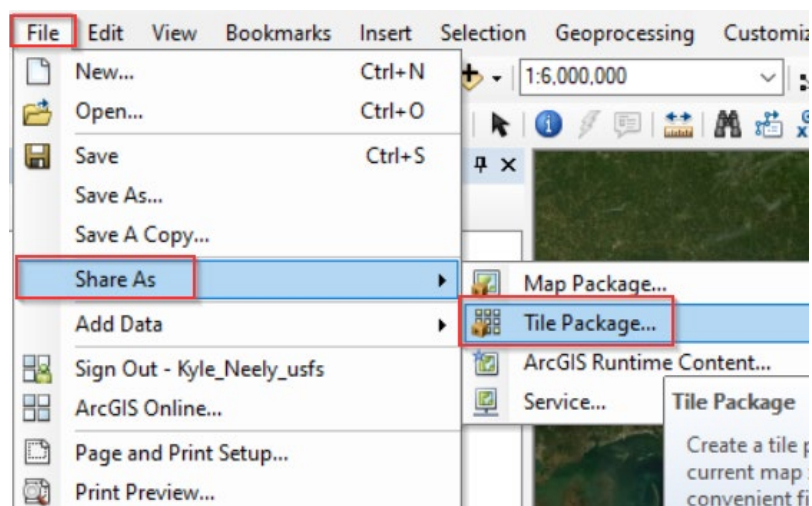


## Reload PNG into map and export as TPK

- In the table of contents, turn off the ForWarn layer so that now ALL layers are turned off.
- Click the add data  button. Navigate to the location you output your PNG file and add the PNG to the map.
- A popup box will appear warning you that the .png is missing a spatial reference and that it can be drawn but not projected. Just press "OK".





- You can test to make sure your .png is drawn in the correct spatial location by turning on the imagery basemap to check the location.
- Remove all the layers from the table of contents except for your PNG by right clicking them and selecting Remove. (Alternatively, you can open a new instance of ArcMap and import your PNG into there to avoid having to remove all the layers individually).
- Press File → Share As → Tile Package



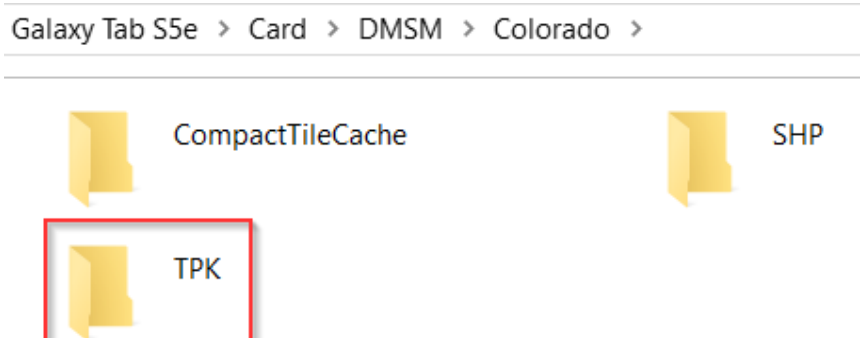
- In the Tile Package tab of the dialogue box choose the location you wish to save your TPK in the "Save package to file" line.



- In the Tile Format tab set the Tile Format as PNG from the dropdown. In the Highest Level of Detail slider, set the slider to 16 of 24.
- In the Item Description tab, fill out the Summary, Tags, and Description boxes with a quick description such "ForWarn\_TPK\_R2" just as an example. The ArcGIS system just requires these fields be filled with something.
- Click Analyze  Analyze at the top right corner to check that everything is ready to be exported. If you have no errors and the analysis reads complete, you can now Press the Share  Share button to proceed with creating your TPK. This will take some time depending on the size of the file and speed of your computer so let the process run to full completion.
- Once the TPK has finished creating, it is ready to be loaded onto the tablet.

## Load TPK onto tablet

- First, ensure your tablet is connected via USB or the SD card has been inserted into your computer's SD card reader. In windows explorer, navigate to the location you saved your TPK. Open another window of file explorer. Navigate to your tablet and drill down the folders to your project directory "Tablet→SD Card→DMSM→Area of Interest (ex: Colorado)
- There should be 3 folders inside your area of interest folder; Compact Tile Cache, SHP and TPK. We are looking for TPK and opening that folder.



- Copy & Paste the TPK you created from your folder into this TPK folder on the tablet.
- You should now have the TPK with ForWarn II data as a layer in your DMSM app.

## Digitizing Shapefiles from ForWarn II

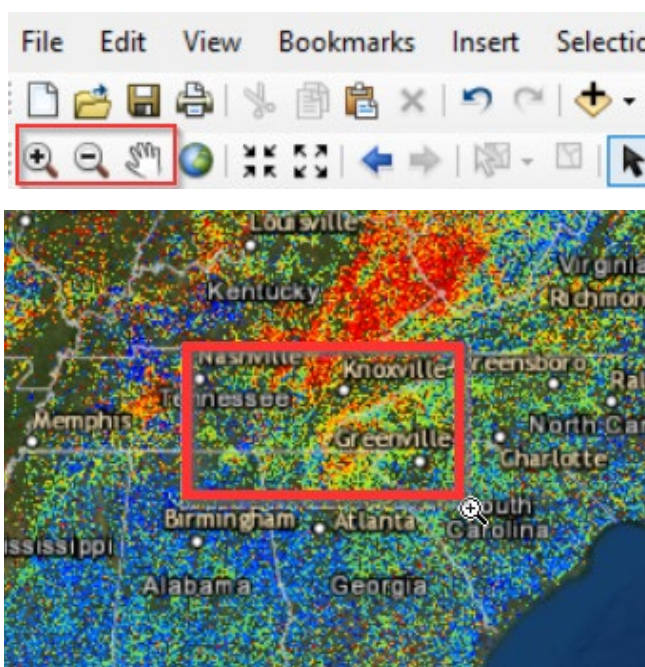
The steps below guide you through how to digitize vector shapefiles from the ForWarn II data.

(If you are unfamiliar with the basic functionality and interface of ArcMap, please investigate one of Esri's many free training courses of getting started with ArcMap.)

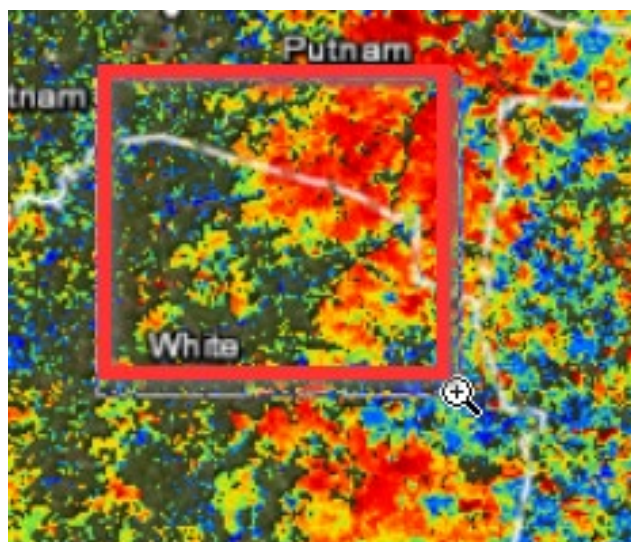


## Setting the View to Digitize Vectors in ArcMap

- Start by selecting which vintage of ForWarn II data you wish to see in the table of contents.
- You can pan and zoom to the area of interest using the pan and zoom buttons. Click on the zoom in and draw a box around the area of interest to zoom. Repeat the process until you reach the desired zoom level.

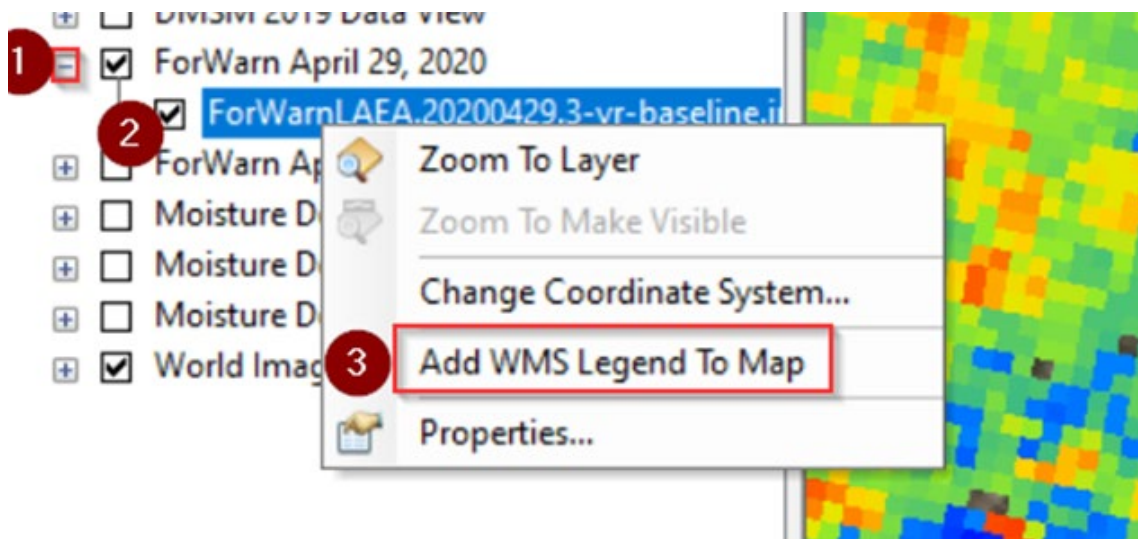


- You want to be zoomed in enough to visibly distinguish general areas of different ForWarn values so you can select your area of interest to digitize.



- When you have reached your desired resolution, expand the ForWarn Layer using the plus symbol next to the layer name in the table of contents. Then, right click the sub-layer inside the nested structure and click "Add WMS Legend To Map".



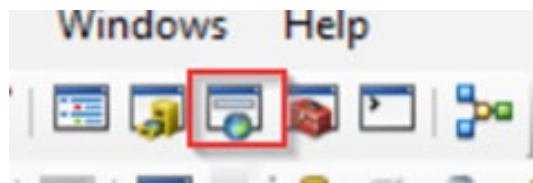


- This will open a small legend that you can use to determine the values based on the color of the raster pixels. Note: DMSM users will need to decide which ranges of “% change” values in ForWarn are most meaningful and informative for surveying the damage events in their areas. Almost certainly these will be negative % change values, but to determine the specific range of values from -1 to -100%, users will need to explore and evaluate the data. For more information on ForWarn II data, please visit: <https://forwarn.forestthreats.org/>.



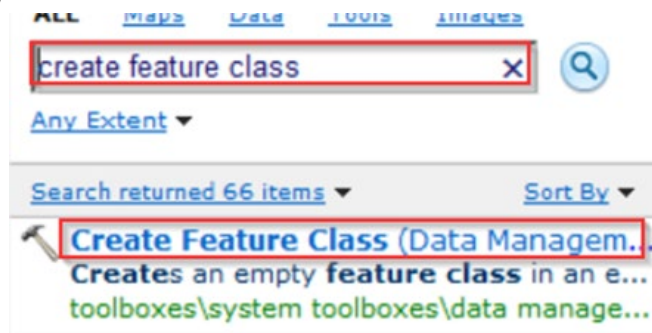
## Creating the blank polygon feature

- Next click the search tools button to open a geoprocessing tool.

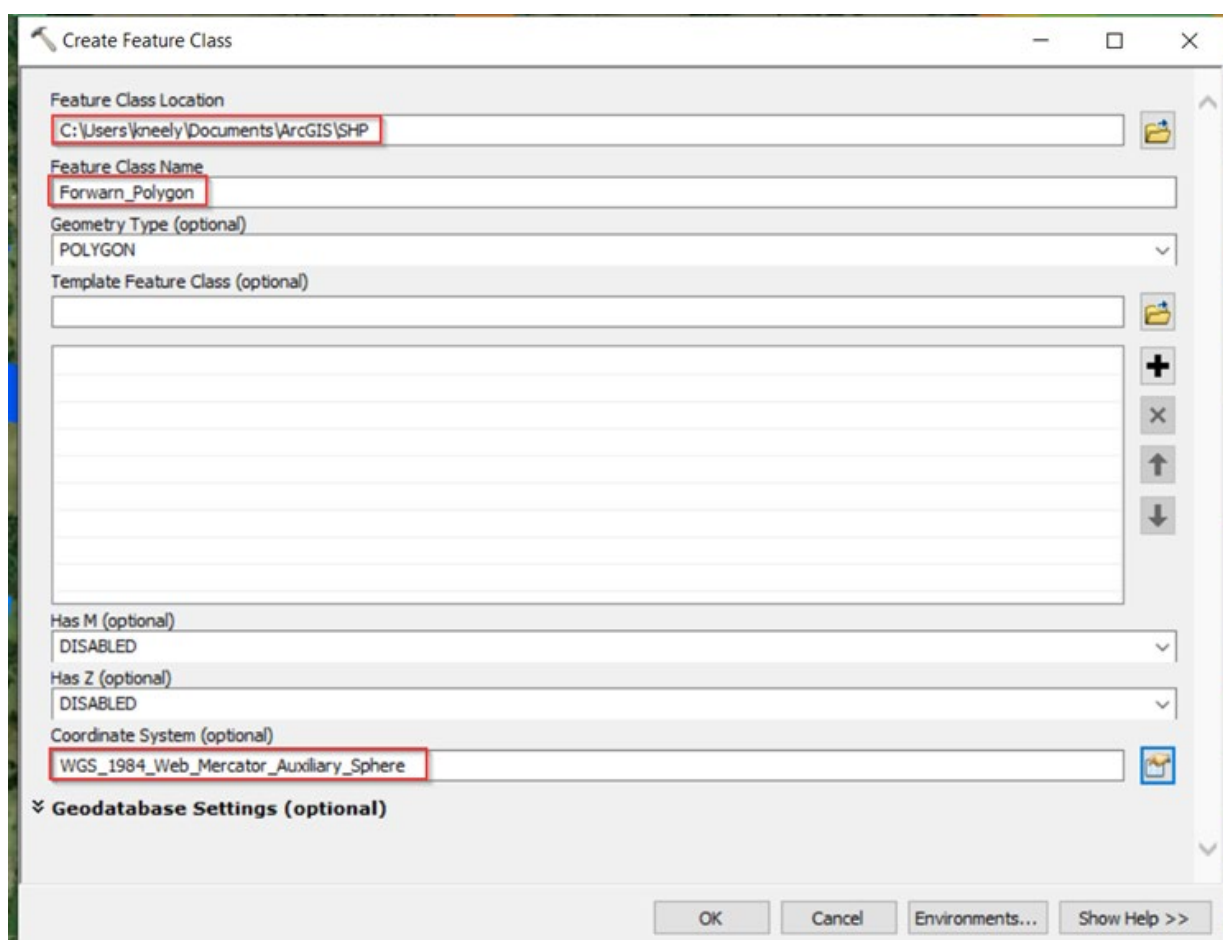





- Type "create feature class" in the search bar and hit enter. The tool we are looking for should be the first returned tool in the list called "Create Feature Class". Left click that tool name to open it. (\*\*If you click on any of the other lines such as "Creates an empty feature...." Or "toolboxes\system\data....." it will open the help section for that tool and not the tool itself\*\*)

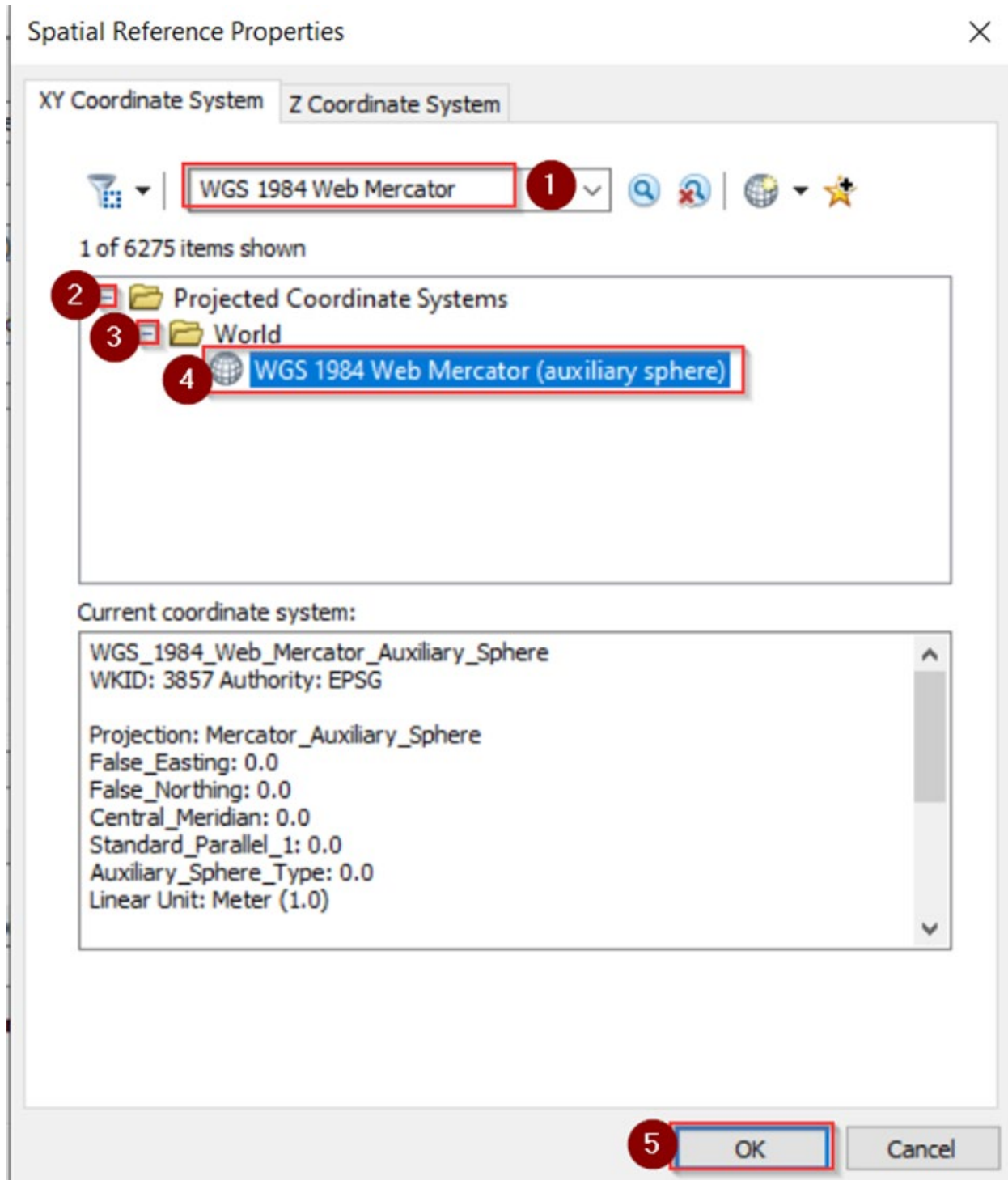


- A dialogue box will pop up for the tool. In the "Feature Class Location" field, click on the folder icon and navigate to where you want to store this new shapefile. In the "Feature Class Name", enter a name for the shapefile that makes sense to you. Leave the Geometry Type as polygon and Template Feature Class blank. It is important to also set the Coordinate System to WGS 1984 Web Mercator (Auxiliary Sphere). Follow specific instructions below to set Coordinate System."

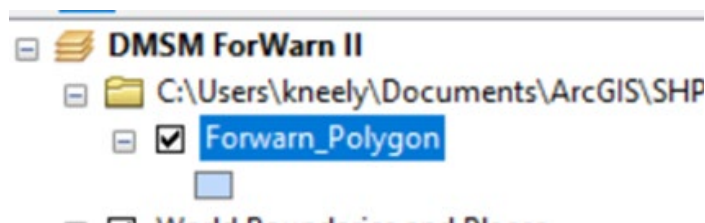




- For the Coordinate System, click the  icon to set the coordinate reference system. In the search bar at the top, type "WGS 1984 Web Mercator" and hit Enter. Then open the folders to navigate to the WGS 1984 Web Mercator (auxiliary sphere). Left click that coordinate system and then press "OK".

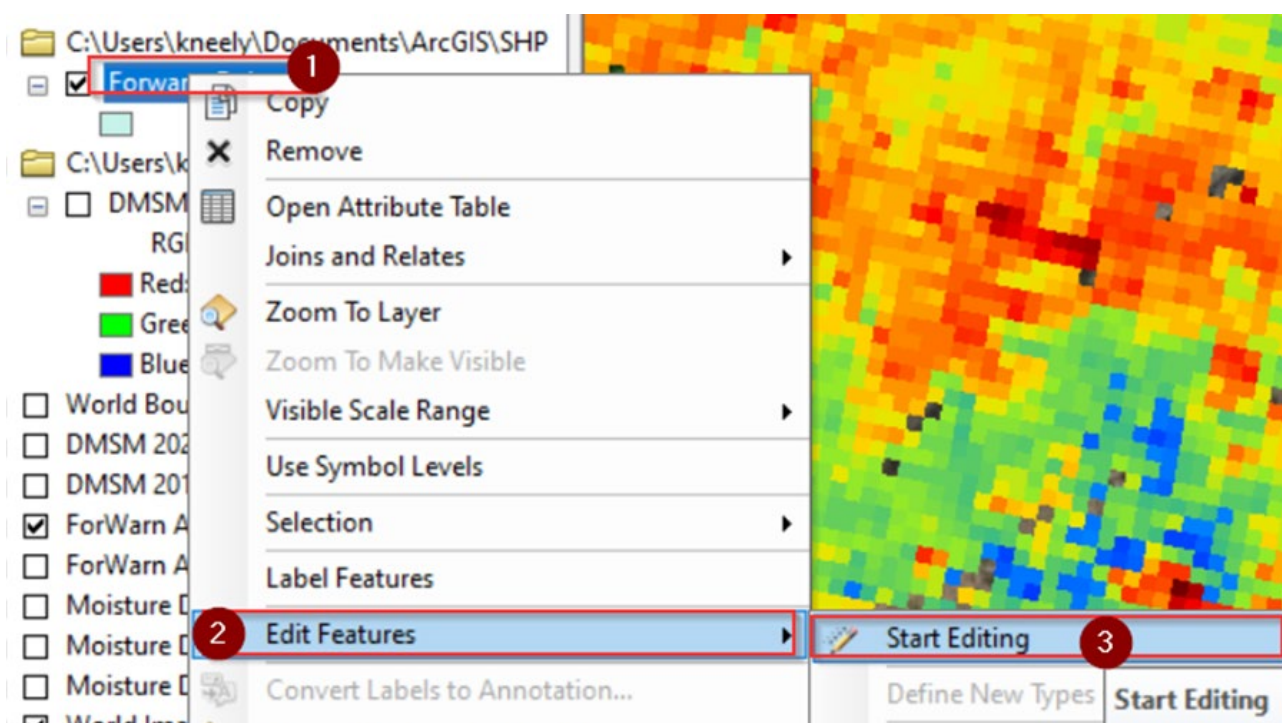


- After pressing OK, the tool will process and generate a new feature class and add it to the Table of Contents.




## Start Digitizing

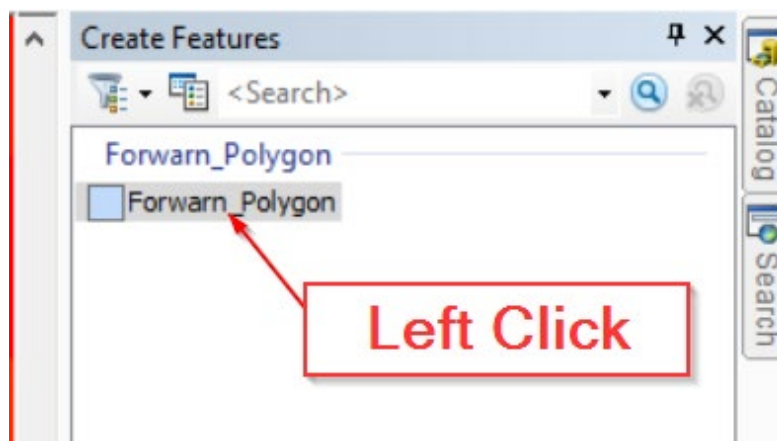
- To start digitizing, right click your new feature in the Table of Contents→Edit Features→Start Editing.



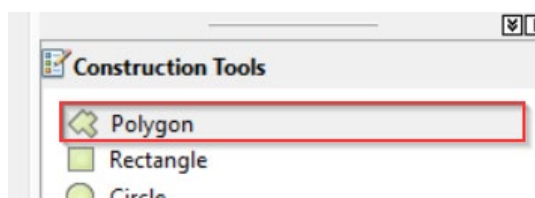
- This will open an Editor toolbar




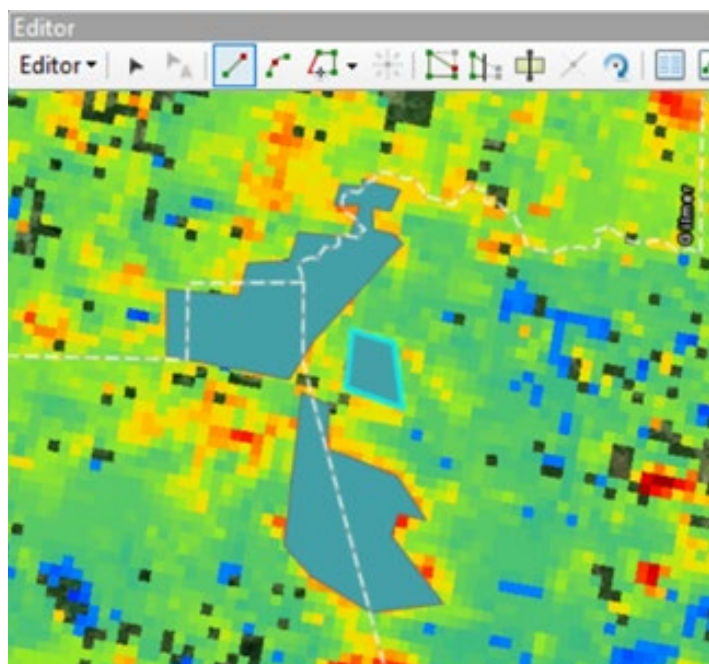
- Click the Create Features  icon. This will open up a panel in either the right or center of your page. Left click the shapefile name (whatever you named it) within the create features window.



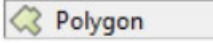



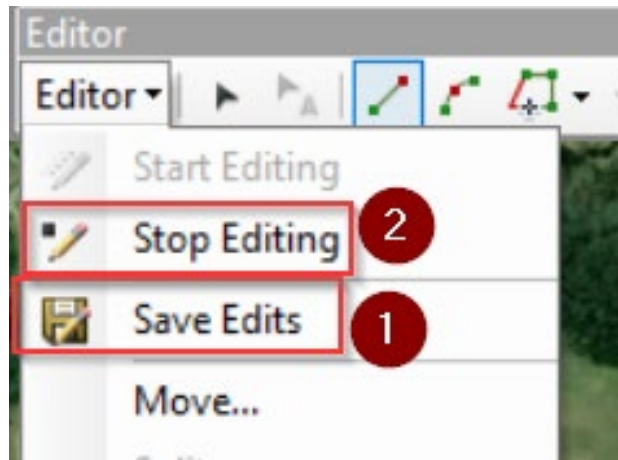
- After clicking on the layer, the "Construction Tools" will populate for the construction options for the feature. Just make sure that "Polygon" is selected.




- After that, your cursor should now change to a  cross icon. This means you can start creating features. Simply click on the map to create a polygon around the raster values of interest. After you have selected everything in the polygon you need, either press F2 or right click within the polygon and press "Finish Sketch" to complete drawing for that specific shape in your feature. This will highlight your square in blue when it is done.











- In the map, your cursor should still be a  icon. If not Click  and  again to resume drawing. Repeat the previous steps as many times as necessary to create the desired amount of digitized raster tiles. When you are done, return to the Editor Toolbar and press the editor  dropdown.
- Press "Save Edits" to save your edits, then "Stop Editing" to complete your edit session.



## Side-Load the Shapefile to Tablet

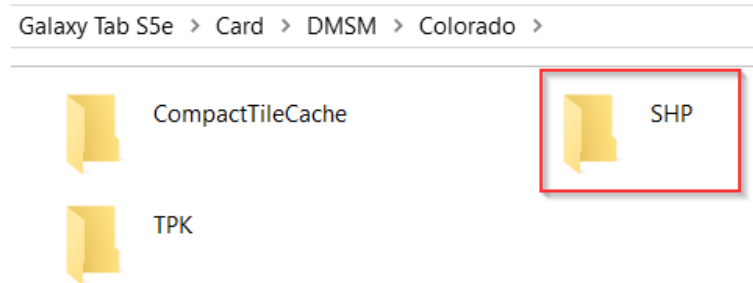
- Close ArcMap with the  icon and save the map document (.mxd) if you wish to use it again. Once it has been closed, open windows explorer and navigate to the location of your shapefile. Copy ALL of the files that combine into a shapefile (.shp, .cpg, .dbf, .prj, .sbn, .sbx, .shp.xml, and .shx)

Documents > ArcGIS > SHP			Search SHP
Name	Date modified	Type	
 Forwarn_Polygon.cpg	4/23/2020 4:37 PM	CPG File	
 Forwarn_Polygon.dbf	4/23/2020 4:37 PM	DBF File	
 Forwarn_Polygon.prj	4/23/2020 3:53 PM	PRJ File	
 Forwarn_Polygon.sbn	4/23/2020 4:37 PM	SBN File	
 Forwarn_Polygon.sbx	4/23/2020 4:37 PM	SBX File	
 Forwarn_Polygon.shp	4/23/2020 4:37 PM	SHP File	
 Forwarn_Polygon.shp.xml	4/23/2020 3:53 PM	XML Document	
 Forwarn_Polygon.shx	4/23/2020 4:37 PM	SHX File	

- First, ensure your tablet is connected via USB or the SD card has been inserted into your computer's SD card reader. Open another window of file explorer. Navigate to your tablet and drill down the folders to your project directory "Tablet→SD Card→DMSM→Area of Interest (ex: Colorado)



- There should be 3 folders inside your area of interest folder; Compact Tile Cache, SHP and TPK. We are looking for SHP and opening that folder.



- Paste the shapefile you created from your folder into this SHP folder on the tablet.

Galaxy Tab S5e > Card > DMSM > Colorado > SHP		▼ ↺	Sea
Name	Type		
Forwarn_Polygon.cpg	CPG File		
Forwarn_Polygon.dbf	DBF File		
Forwarn_Polygon.prj	PRJ File		
Forwarn_Polygon.sbn	SBN File		
Forwarn_Polygon.sbx	SBX File		
Forwarn_Polygon.shp	SHP File		
Forwarn_Polygon.shp.xml	XML Document		
Forwarn_Polygon.shx	SHX File		

- Now when you open the tablet, your shapefile should be visible in the area in which you drew the polygons. They will not have any style applied and will appear as red outlined polygons.

