



United States Department of Agriculture



Digital Mobile Sketch Mapping (DMSM)

DMSM ForWarn II

Mission Planning for Forest Health Surveys using ForWarn II Data in ArcPro



Forest Service

Table of Contents

Introduction..... 1

Overview of steps..... 1

How to Access 1

Download and Open to Desktop..... 2

ArcGIS Tile Packages (TPKs) TPK 4

Export map as PNG..... 4

Reload PNG into map and export as TPK 6

Load TPK onto tablet 7

Digitizing Shapefiles from ForWarn II..... 8

Setting the View to Digitize Vectors in ArcPro 8

Creating the blank polygon feature..... 9

Start Digitizing 11

Side-Load the Shapefile to Tablet..... 13

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 ArcPro - 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)

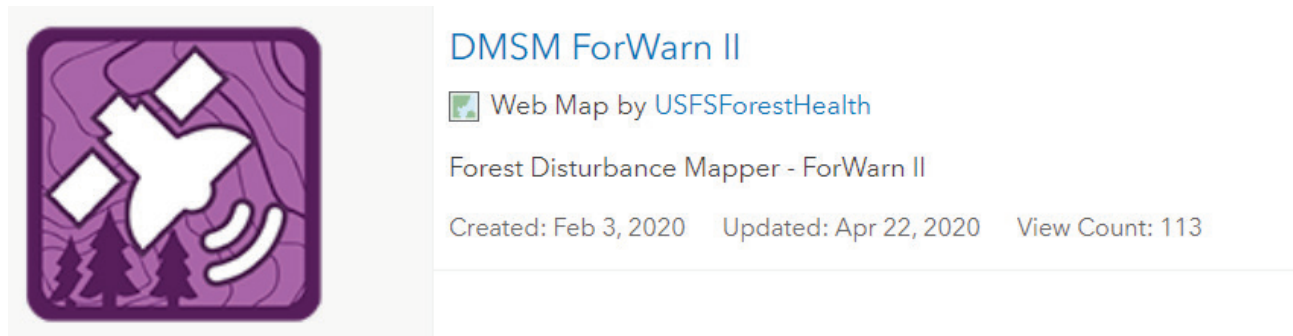
Owner: USFSForestHealth

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.



The page should look like this.

DMSM ForWarn II

Overview Usage Settings

Edit Thumbnail

Forest Disturbance Mapper - ForWarn II Edit

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

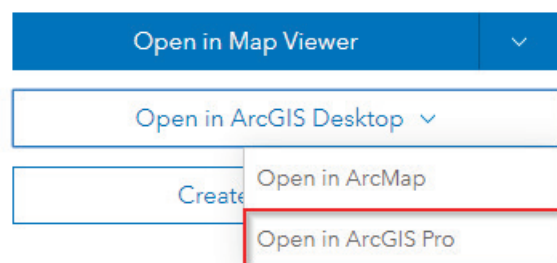
★★★★★

Share

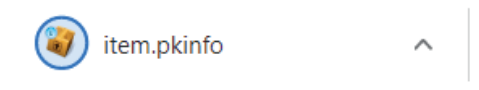
+

Download and Open to Desktop

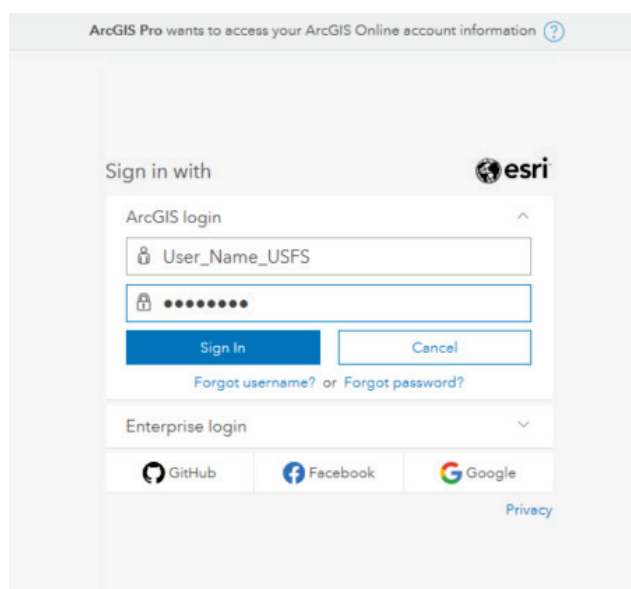
To open the web map on your ArcPro desktop, click the dropdown in "Open in ArcGIS Desktop" and select "Open in ArcGIS Pro"



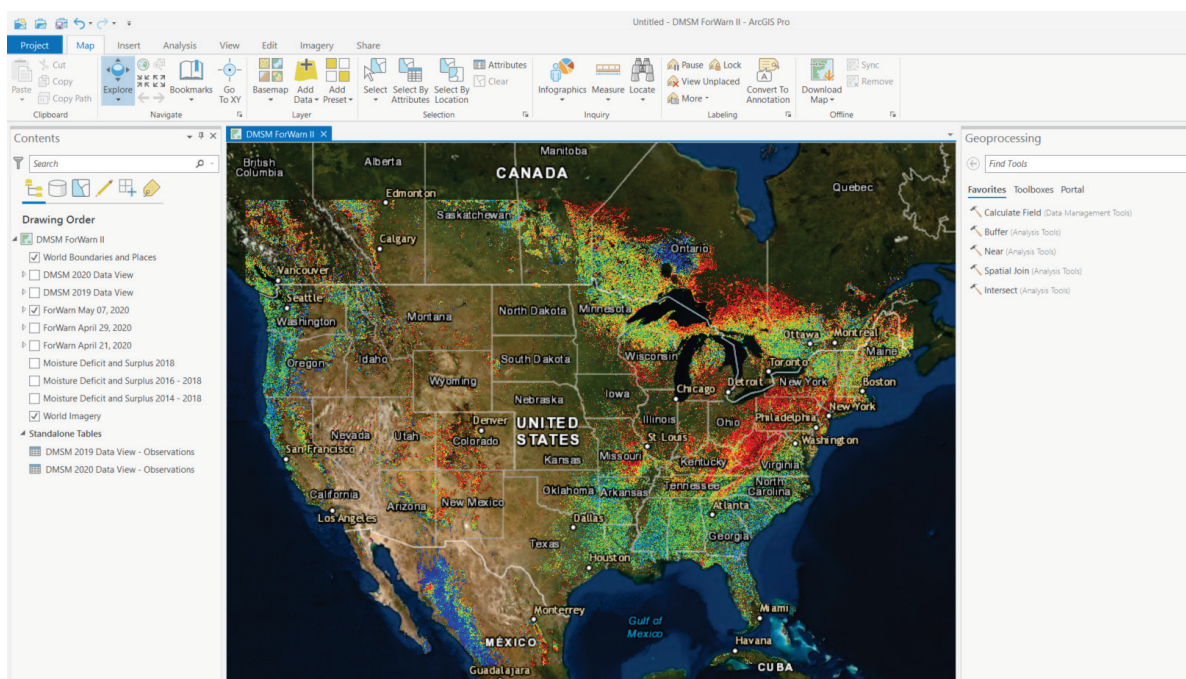
After clicking “Open in ArcGIS Pro”, a download of an “item.pkinfo” should appear in the bottom-left corner of your screen.



Click on this icon to open in ArcPro. 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 ArcPro.



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

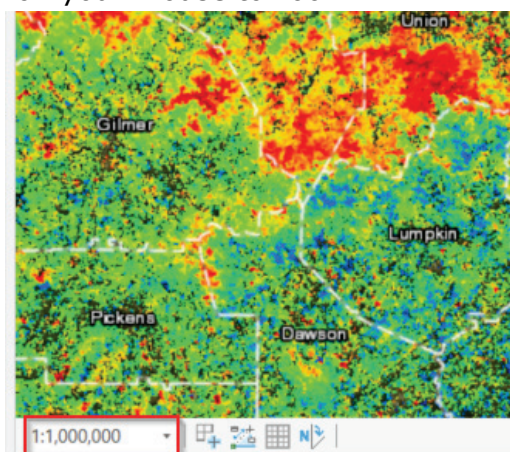
The steps below guide you through how to create a TPK from the ForWarn II data. If you prefer to work with vector shapefiles, please proceed to the next section Digitizing Shapefiles from ForWarn II

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

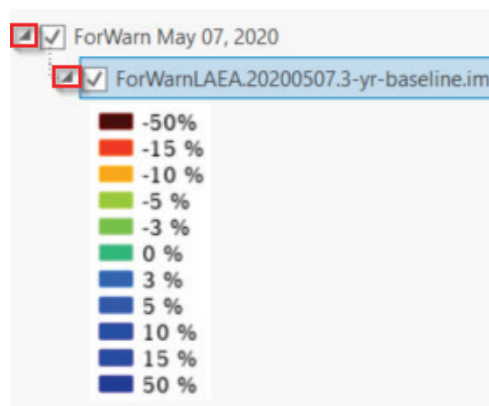
Export map as PNG

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

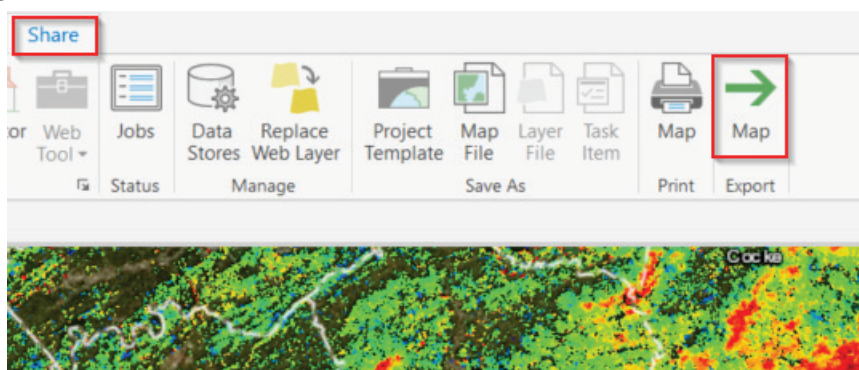
- Start by selecting which vintage of ForWarn II data you wish to see in the table of contents.
- You can pan and zoom to the area of interest by clicking and dragging the mouse to pan and using the scroll wheel on your mouse to zoom.



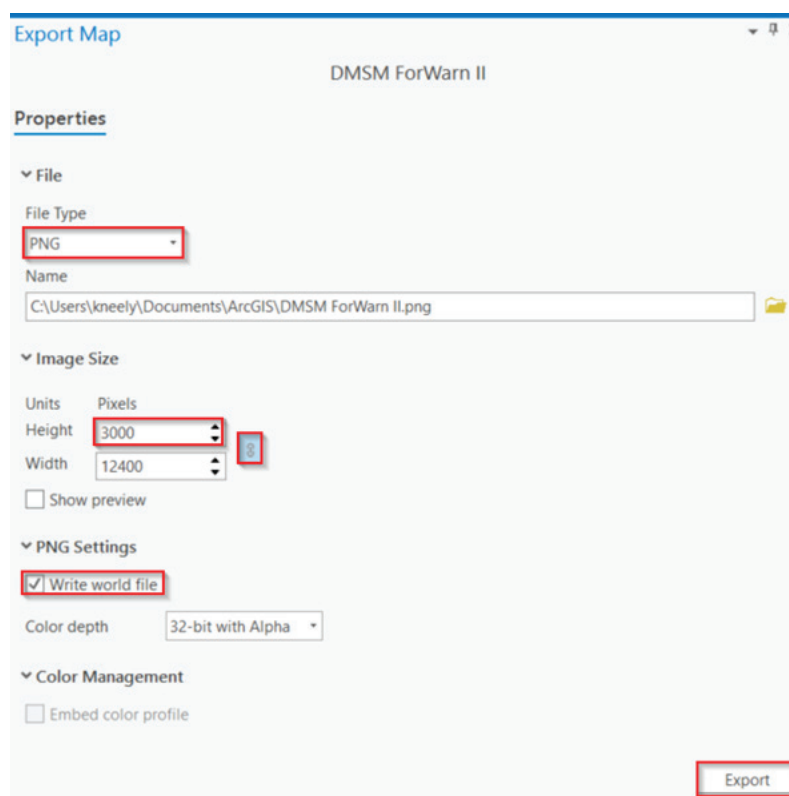
- Repeat the process until you reach the desired zoom level. We recommend a 1:1,000,000 scale. You can view and change the scale using the toolbar at the bottom left corner of the map interface.
- When you have reached your desired resolution, expand the ForWarn Layer using the arrow symbol next to the layer name in the table of contents. Then, expand the sub-layer inside the nested structure with another of the same type of arrow and the WMS legend should appear.



- 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/>.
- Go to the “share” ribbon and click export at the far right (green arrow) then select .png as the output.



- At about a 1 to 2mil scale zoom select 3000 rows for the image height (depending on zoom this could be less or more; this resolution ensures one can zoom to a pixel). Make sure to lock the aspect ratio and to change the height first (changing the width will not work). Lastly, turn on the world file in the export.
- Check the “Write World File”
- Press “Export”

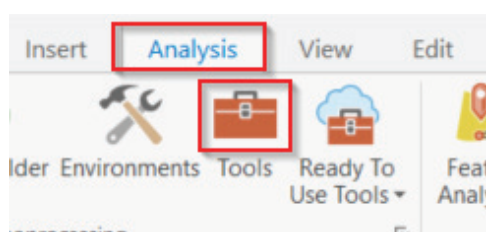


Reload PNG into map and export as TPK

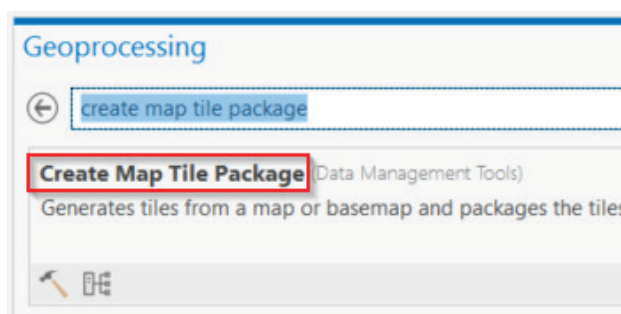
- Insert a new map in Pro and add in the .png created in previous step. The PNG can be added to the original map but the ForWarn layer must be off or removed for the TPK export to work.
- In the Map ribbon, click the add data button. Navigate to the location you output your PNG file and add the PNG to the map.



- In the Analysis Ribbon, click the Tools icon to open the geoprocessing search window.



- In the geoprocessing search bar, type "Create Map Tile Package"
- Click on the first tool that comes up called Create Map Tile Package.



- In the Tile Package tab of the dialogue box choose the location you wish to save your TPK in the "Output File" line.
- In the Tiling Format line, set the Tile Format as PNG from the dropdown.
- Set the minimum level of detail to 0 and the maximum to 16.
- Fill out the Summary and Tags boxes with a quick description (e.g. "ForWarn_TPK_R2"). The ArcGIS system requires these fields be filled with something.
- Set the package type to TPK.
- Click Export



Geoprocessing

Create Map Tile Package

Parameters Environments

Input Map
Map

☒ Package for ArcGIS Online | Bing Maps | Google Maps

Output File
C:\Users\kneely\Documents\ArcGIS\ArcPro_TPK_Test.tpk

Tiling Format
PNG

Minimum Level Of Detail
0

Maximum Level Of Detail
16

Summary
ForWarn Data TPK

Tags
ForWarn

Extent
Default

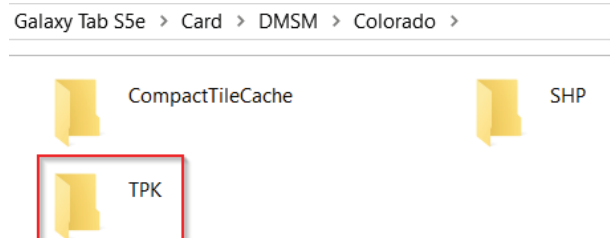
Package type
tpk

Run

- 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.



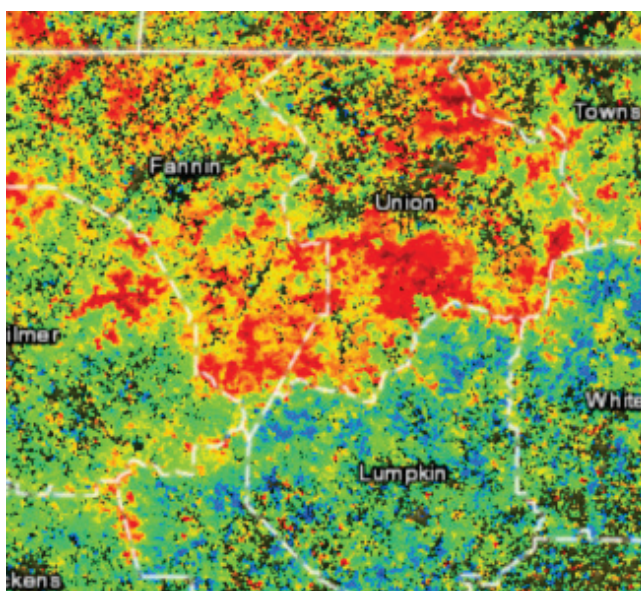
Digitizing Shapefiles from ForWarn II

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

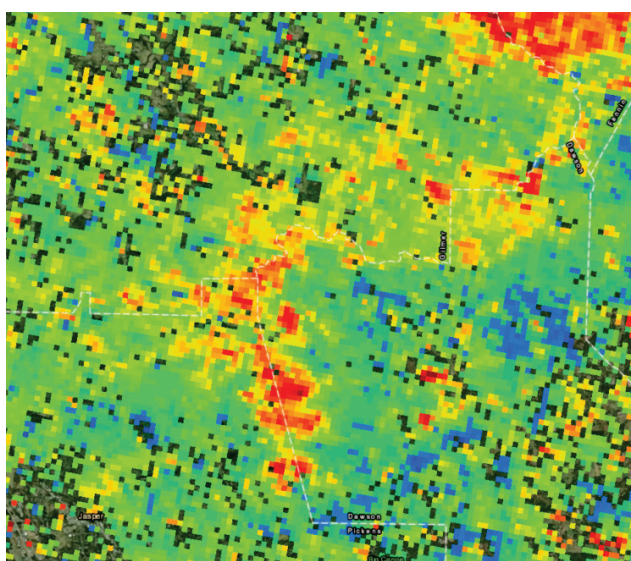
(If you are unfamiliar with the basic functionality and interface of ArcPro, please investigate one of Esri's many free training courses of getting started with ArcPro.)

Setting the View to Digitize Vectors in ArcPro

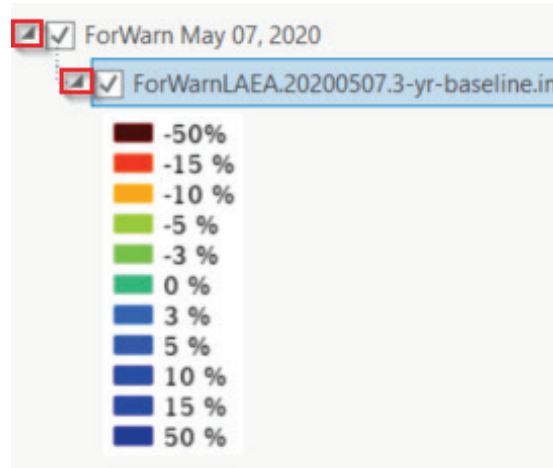
- Start by selecting which vintage of ForWarn II data you wish to see in the table of contents.
- You can pan and zoom to the area of interest by clicking and dragging the mouse to pan and using the scroll wheel on your mouse to zoom.



- 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.



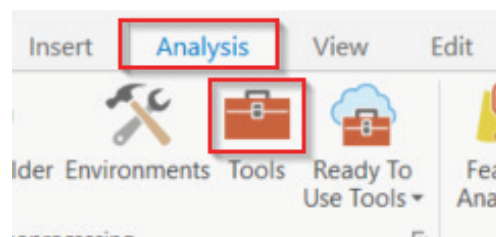
- When you have reached your desired resolution, expand the ForWarn Layer using the arrow symbol next to the layer name in the table of contents. Then, expand the sub-layer inside the nested structure with another of the same type of arrow and the WMS legend should appear.



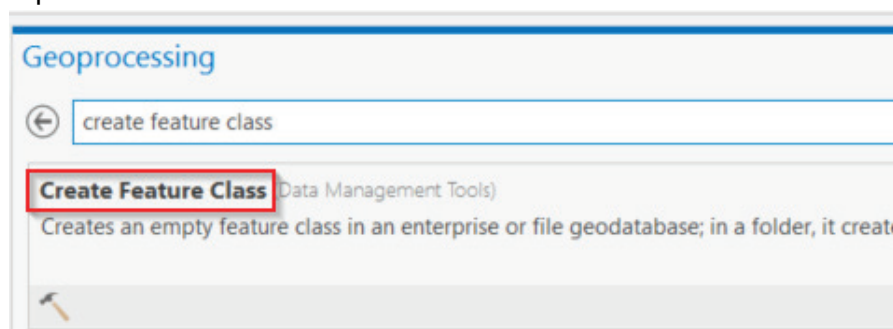
- This will open a small legend that you can use to determine the values based on the color of the raster pixels. Note: DMSM users will need to decide which ranges of “% change” values in ForWarn are most meaningful and informative for surveying the damage events in their areas. Almost certainly these 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

- In the Analysis Ribbon, click the Tools icon to open the geoprocessing search window.



- 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.



- 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. It is important this goes into a folder and not a geodatabase because we are creating a 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."

Create Feature Class

Parameters Environments

Feature Class Location
SHP

Feature Class Name
Forwarn Polygon

Geometry Type
Polygon

Template Feature Class


Has M
No

Has Z
No

Coordinate System
WGS_1984_Web_Mercator_Auxiliary_Sphere

Feature Class Alias

Geodatabase Settings (optional)

- 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".

Coordinate System

Select the Coordinate System to view the available options.

Current XY

Current Z
<None>

XY Coordinate Systems Available
WGS 1984 Web Mercator

Favorites

Layers

Geographic Coordinate System

Projected Coordinate System

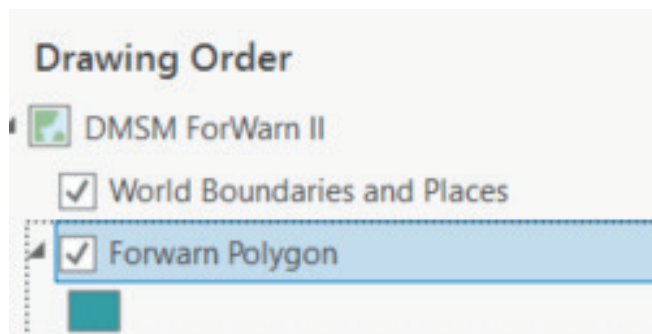
World

WGS 1984 Web Mercator (auxiliary sphere)

OK Cancel

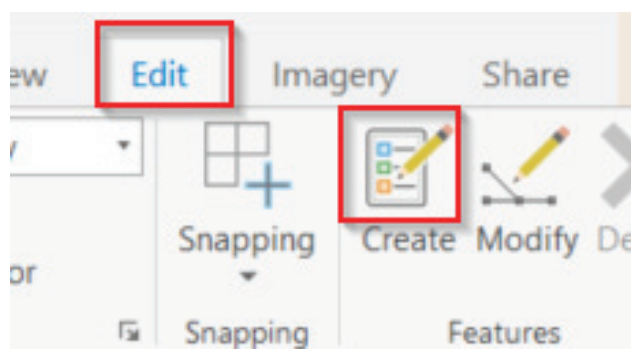


- After pressing OK, the tool will process and generate a new feature class and add it to the Table of Contents.

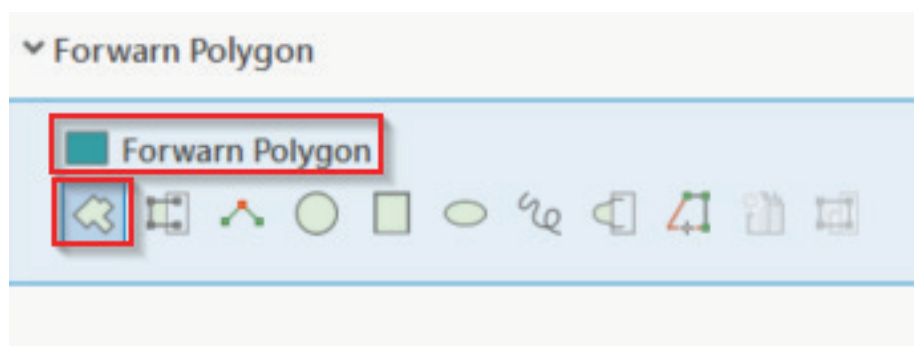



Start Digitizing

- To start digitizing, go to the Edit Ribbon and select "Create Features".

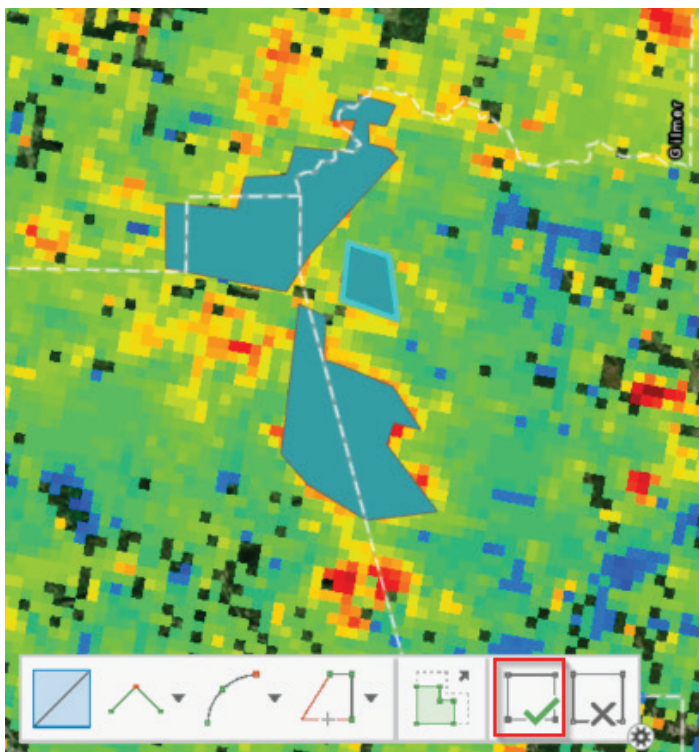





- This will open a panel in either the right or center of your page. Left click the shapefile name (whatever you named it) within the create features window.

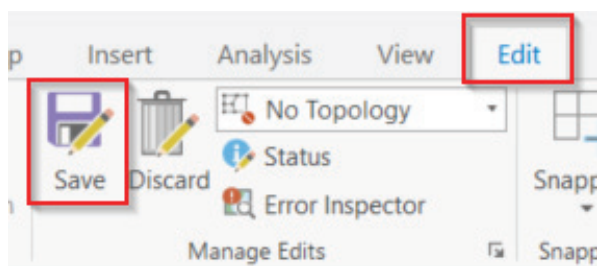


- After clicking on the layer, the "Construction Tools" will populate for the construction options for the feature. Just make sure that "Polygon" is selected.
- After that, your cursor should now change to a  cross icon. This means you can start creating features. Simply click on the map to create a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

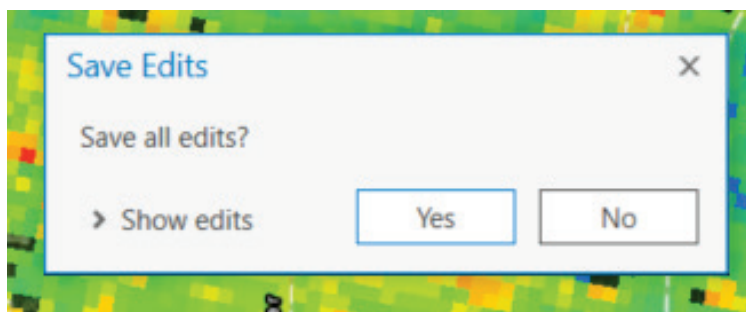





- In the map, your cursor should still be a  icon. If not return to the create features window and select the polygon  again to resume drawing. Repeat the previous steps as many times as necessary to create the desired amount of digitized raster tiles. When you are done, return to the Edit ribbon and press the save  icon to save your edits.











- A prompt will popup asking you to confirm your edits to be saved. Click yes to resume.

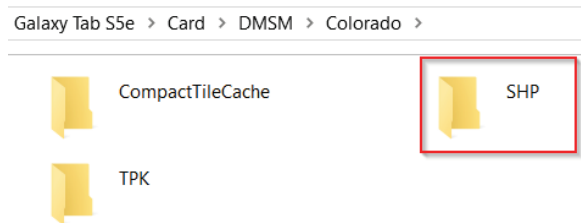


Side-Load the Shapefile to Tablet









- Close ArcPro with the  icon and save the project 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.

