



Procedures to Download *ForWarn* Change Imagery using the Web Coverage Service (WCS)

NOTE: *ArcGIS Desktop* is currently not supported for WCS connecting and saving

I Connect and save using *QGIS* (<https://www.qgis.org/en/site/forusers/download.html>)

- a. Add a WCS layer using one of the forest change product URL's below:
 - i. **From Prior Year**, <http://wms.forwarn.forestthreats.org/ewswcs1year?SERVICE=WCS&REQUEST=GetCapabilities>
 - ii. **From All-Year Max**, <http://wms.forwarn.forestthreats.org/ewswcs?SERVICE=WCS&REQUEST=GetCapabilities>
 - iii. **From Prior 3-Year Max**, <http://wms.forwarn.forestthreats.org/ewswcs3year?SERVICE=WCS&REQUEST=GetCapabilities>
 - iv. **From Prior 5-Year Max**, <http://wms.forwarn.forestthreats.org/ewswcs5year?SERVICE=WCS&REQUEST=GetCapabilities>
 - v. **Early Detect (From Prior Year)**, <http://wms.forwarn.forestthreats.org/ewswcs?SERVICE=WCS&REQUEST=GetCapabilities>
 - vi. **From All-Year Phenotype Max**, <http://wms.forwarn.forestthreats.org/ewswcs?SERVICE=WCS&REQUEST=GetCapabilities>
 - vii. **From All-Year Mean (of Maxes)**, <http://wms.forwarn.forestthreats.org/ewswcs?SERVICE=WCS&REQUEST=GetCapabilities>
- b. Zoom to your area of interest, right-click on the WCS layer and choose "Save As"
- c. For 'Output mode', select "Rendered image"
- d. Name the file in "Save as"
- e. For 'Extent', select "Map View Extent", and select "OK"

II Join attribute table to view percent NDVI change information using *ArcGIS Desktop*

- a. Go to "Data Management – Projections – Define Projection", and select the raster saved above
- b. In the 'Define Projection' window, for 'Coordinate System', choose "Projected – Continental – North America – US National Atlas Equal Area", OK, and OK
- c. Re-add only 1-band from the multi-band raster in 1a. to a data frame (double-click, drilling down into the change image)
- d. Right-click on the raster and select "Data – Export Data", select workspace and image format, select "Save", "No" (to promote) and "Yes" (to add to the Table of Contents)
- e. Add this Excel lookup table (and respective Sheet) to the Table of Contents: [Percent NDVI change LUT ESRI.xlsx](#)
- f. In 'Data Management', choose 'Raster', 'Raster Properties' and "Build Raster Attribute Table" (for the exported image)
- g. Right click on the forest change image and open the attribute table
- h. With the attribute table of the change image displayed, open the "Table Options" dropdown
- i. Choose 'Joins and Relates', and select "Join"
- j. For #1 choose "Value"; #2 choose the Excel lookup table sheet; #3 choose "DN"; and "Keep all records", select "OK"
- k. At this point, raster DN values from the change image are associated with Percent NDVI Change values in the lookup table; sorting the percent NDVI change column can allow you to threshold a range of departure values

III Assign color map using *ArcGIS Desktop* (optional)

- a. Copy this color map file to a location on your hard drive: [ForWarn 2011 colormap ESRI.clr](#)
- b. Open the 'Properties – Symbology' tab for the change image, under 'Show', choose "unique values"
- c. Under the 'Value Field' dropdown, select "DN"
- d. Select the 'Colormap' dropdown and choose "Import a Color Map"
- e. Navigate to the location of the saved color map, and double-click the filename
- f. Change "0" to 'no color', and "OK" to apply the changes

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Decoding *ForWarn*'s WMS/WCS Forest Change Image Filenames

- **From Prior Year - From Prior 3-Year - From Prior 5-Year Max** change images

Example: "20150727_24_2014_max_lc.tif"

1 2 3 4 5

1. YYYYMMDD
2. *ForWarn* uses a 24-day compositing period, RSAC-FHTET change imagery uses a 16-day compositing period
3. start year used in calculating the baseline comparison
4. type of value used in calculating percent change, "max" denotes maximum NDVI value
5. denotes 'land cover', meaning change information is calculated for all land cover types and uses, not masked

"MaskFor..." Mask-only filenames - do not use, for use inside the Forest Change Assessment Viewer

- **From All-Year Max - Early Detect - From All-Year Phenotype Max - From All-Year Mean** change images

Example: "RSAC-FHTET_3YrBaseline_current" (includes "_previous1", "_previous2") and "...BD..." (or "...bd...")

1 2 3 4 5 6

1. Source for the change image
2. Baseline product
3. The most recent forest change image
4. 8-days previous to the most recent date of change imagery
5. 16-days previous to the most recent date of change imagery
6. Denotes an RSAC-FHTET-specific product, does not work with *ForWarn* 'percent NDVI change' join table or the *ForWarn* ESRI color table (.clr file)

Example: "EFETAC-NASA_X_LC_MUC_ALL_YEAR_previous2 (and "...MaskFor...")

1 2 3 4 5 6

1. Source for the change image
2. Denotes 'land cover', meaning change information is calculated for all land cover types and uses, not masked
3. *ForWarn* product ([descriptions](#)):
 - ALC – "Early Detect" (aka 'Adaptive Length Compositing' method used)
 - X_LC – Maximum NDVI method used
 - AllYrBaseline – as of 2015, 15 year baseline comparison from year 2000
 - MUC – "Seasonally-Adjusted" 1 of 2, calculated change based on "Maximum-area Under the Curve", or topmost phenoregion type, an all-year baseline product
 - MoM, MMAX – "Seasonally-Adjusted" 2 of 2, calculated change based on "Mean of the MAXimum" NDVI value, an all-year baseline product
4. Baseline length
5. 16-days previous to the most recent, or "current", change image
6. NLCD-based mask-applied to the *ForWarn* forest change image, and available for download

"MaskFor..." Mask-only filenames - do not use, for use inside the Forest Change Assessment Viewer