



Using the Forest Change Assessment Viewer

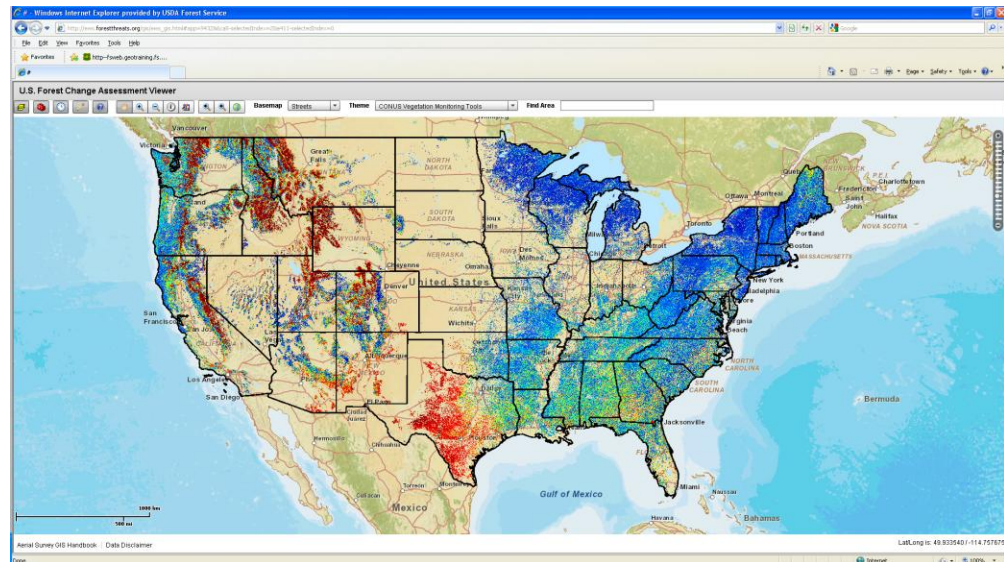
*from the Forest Services' Eastern Forest Environmental Threat Assessment Center (EFETAC)
and the Western Wildlands Environmental Threat Assessment Center (WWETAC)*



A Help document for basic navigation, data layers and uses

(click heading to jump to section)

1. [Map Navigation](#)
2. [Obtaining Data Layer Information](#)
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5. [The 'Current' Forest Change Layer:
MODIS Near Real Time \(NRT\) Products](#)
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9. [Quick Start Guide \(for familiarized users\)](#)
10. [Tips and Hints](#)
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12. [Phenology-related Internet Websites](#)
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Forest Change Assessment Viewer Website:

<http://ews.forestthreats.org/>

Threat Assessment Center Websites:

<http://forestthreats.org/>
<http://www.fs.fed.us/wwetac/>





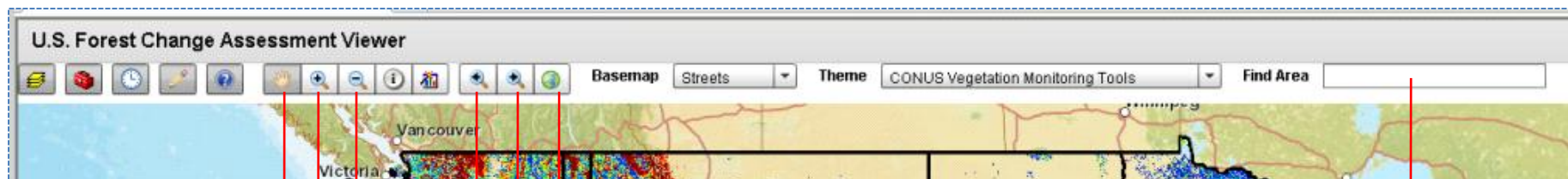
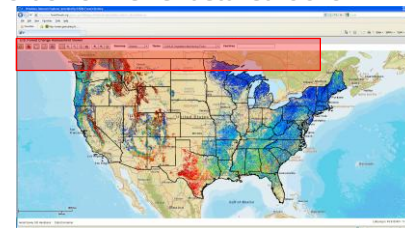
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Portion of Viewer detailed is shown in red

Basic Navigation: Moving around the map



Type in a U.S. county by name to zoom-to

"Full Extent," resets the view to the conterminous United States (CONUS)

"Next Extent," click to jump ahead to a viewing area previously visited

"Previous Extent," click to jump back you your previous viewing area

"Zoom-out" control, drag a box over the area of interest to zoom-out

"Zoom-in" control, drag a box over the area of interest to zoom-in

"Pan" around the image by clicking and dragging the image

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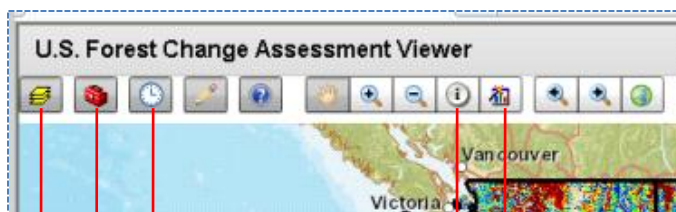
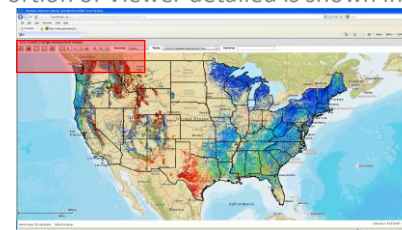
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Basic Navigation: **Obtaining Information**



“Graph NDVI” shows change in NDVI value (forest productivity) through time for the point chosen

“Identify” control, displays database information for layers that are clicked ‘on’ ([to remove highlight](#))

Opens a time-line control that can display the 8-day images in a time series

Toggles on and off the Legend box for each layer that are ‘on’

Toggles on and off the ‘Table of Contents,’ the data layers

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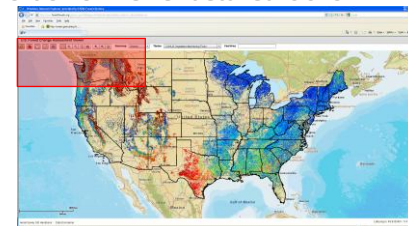
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Data Layers: Choosing a Basemap

Portion of Viewer detailed is shown in red



Click the “Basemap” dropdown to choose among the types below

...this may become more important when viewing forest disturbance image products later, keep the default “Streets” to begin with

Streets



Relief



Terrain



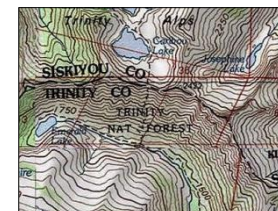
Imagery



Topo Map



USA Topo*



Notes – all basemap layers exhibit increased detail when zoomed

(*) USGS quads 1:24k, 1:100k and 1:250k

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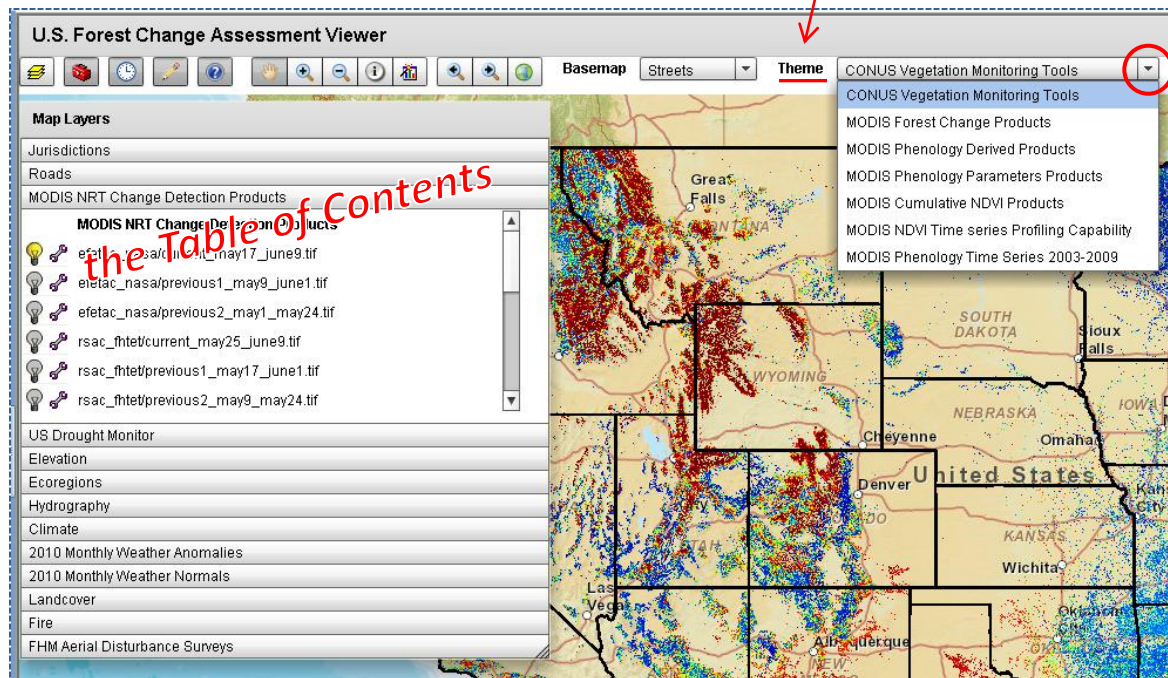
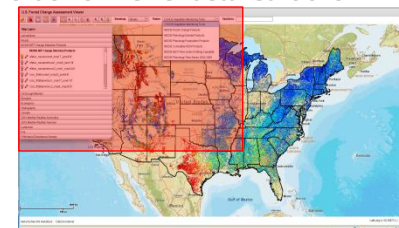
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Data Layers: Choosing a Data Theme

Portion of Viewer detailed is shown in red



— The “Theme” dropdown adds specific data layers to the Table of Contents, only one “Theme” can chosen at a time.

Beginning users should leave the theme choice set to the default “CONUS Vegetation Monitoring Tools.”

More detail will follow regarding the other thematic collections, the specific data layers that are added to the Table of Contents and to which purpose(s) the other themes and data layers are appropriate.

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Data Layers: Viewing the most recent forest change image product

1. In the Table of Contents window, click on the tab heading "MODIS NRT Change Detection Products" to expand and view the data layers (NRT – near real time)
2. Click the 'lightbulb' to the left of the top data layer, this turns-on the most recent forest change detection image
3. Use the 'wrench' icon adjust the transparency of any layer to better view the basemap, or other layers
4. The top three layers are the (3) most recent eight-day forest change products from EFETAC
5. Uses: toggle the three most recent products to view a time-based progression of a disturbance (shades of yellow to red), or "green-up" (shades of green to blue)

Map Layers

Jurisdictions	
Roads	
MODIS NRT Change Detection Products	
MODIS NRT Change Detection Product	
Lightbulb	efetac_nasa/current_may17_june9.tif
Lightbulb	efetac_nasa/previous1_may9_june1.tif
Lightbulb	efetac_nasa/previous2_may1_may24.tif
Lightbulb	rsac_fhtet/current_may25_june9.tif
Lightbulb	rsac_fhtet/previous1_may17_june1.tif
Lightbulb	rsac_fhtet/previous2_may9_may24.tif
Lightbulb	efetac_nasa-retro/1YrBaseline/current_
US Drought Monitor	
Elevation	
Ecoregions	
Hydrography	
Climate	
2010 Monthly Weather Anomalies	
2010 Monthly Weather Normals	
Landcover	
Fire	
FHM Aerial Disturbance Surveys	

What do the colors mean?

-100 % change 100

Less More

Forest Productivity

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Data Layers: Forest Change image products from the RSAC (the Remote Sensing Application Center, USDAFS)

1. In the Table of Contents window, click on the tab heading "MODIS NRT Change Detection Products" to expand and view the data layers (NRT – near real time)
2. Click the 'light bulb' to the left of the top "RSAC" data layer, this turns-on the most recent forest change detection image from the RSAC Forest Health Technology Enterprise Team of the USDA Forest Service (*)
3. Uses: toggle the three most recent RSAC image products to view a time-based progression of a disturbance (shades of yellow to red), or "green-up" (shades of green to blue)

Map Layers

Jurisdictions

Roads

MODIS NRT Change Detection Products

MODIS NRT Change Detection Products

- efetac_nasa/current_may17_june9.tif
- efetac_nasa/previous1_may9_june1.tif
- efetac_nasa/previous2_may1_may24.tif
- rsac_fhtet/current_may25_june9.tif**
- rsac_fhtet/previous1_may17_june1.tif
- rsac_fhtet/previous2_may9_may24.tif
- efetac_nasa-retro/1YrBaseline/current_december3_december26.tif
- efetac_nasa-retro/1YrBaseline/previous1_november25_december18.tif
- efetac_nasa-retro/1YrBaseline/previous2_november17_december10.tif
- efetac_nasa-retro/3YrBaseline/current_december3_december26.tif
- efetac_nasa-retro/3YrBaseline/previous1_november25_december18.tif
- efetac_nasa-retro/3YrBaseline/previous2_november17_december10.tif
- efetac_nasa-retro/AllYrBaseline/current_february18_march13.tif
- efetac_nasa-retro/AllYrBaseline/previous1_february10_march5.tif
- efetac_nasa-retro/AllYrBaseline/previous2_december3_december26.tif

What do the colors mean?

-100 % change 100

RSAC-FHTET_current

(*) Different methodologies are employed by EFETAC and RSAC to produce forest change image products

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Data Layers: The (3) most recent “BASELINE” forest change image products

1. In the Table of Contents window, click on the tab heading “MODIS NRT Change Detection Products,” this expands the tab and presents the data layers (NRT – near real time)
2. The “Baseline” products are identified by three time periods: (a) a 1-year, (b) a 3-year and (c) an “All-year” baseline
3. The 1-year baseline image presents the degree of forest change for a specific date compared to the maximum greenness value of for all the images of the previous 1-year (2009)
4. The 3-year baseline image presents the degree of forest change for a specific date compared to the maximum greenness value of for all the images of the previous 3-years (2006-2009)
5. The All-year baseline image presents the degree of forest change for a specific date compared to the maximum greenness value of for all the images of the previous 9-years (2003-2009)
6. Use the ‘wrench’ icon adjust the transparency of any layer to better view the basemap , or other layers
7. The top three layers are the (3) most recent eight-day forest change products from EFETAC based on the All-year
8. Uses: toggle the three most recent products to view a time-based progression of a forest disturbance (shades of yellow to red), or forest productivity , and/or “green-up” (shades of green to blue)

Map Layers

Jurisdictions

Roads

MODIS NRT Change Detection Products

MODIS NRT Change Detection Products

- efetac_nasa/current_may25_june17.tif
- efetac_nasa/previous1_may17_june9.tif
- efetac_nasa/previous2_may9_june1.tif
- rsac_fhtet/current_june2_june17.tif
- rsac_fhtet/previous1_may25_june9.tif
- rsac_fhtet/previous2_may17_june1.tif
- efetac_nasa-retro/1YrBaseline/current_may25_june17.tif
- efetac_nasa-retro/1YrBaseline/previous1_december3_december26.tif
- efetac_nasa-retro/1YrBaseline/previous2_november25_december18.tif
- efetac_nasa-retro/3YrBaseline/current_may25_june17.tif
- efetac_nasa-retro/3YrBaseline/previous1_december3_december26.tif
- efetac_nasa-retro/3YrBaseline/previous2_november25_december18.tif
- efetac_nasa-retro/AllYrBaseline/current_may25_june17.tif
- efetac_nasa-retro/AllYrBaseline/previous1_february18_march13.tif
- efetac_nasa-retro/AllYrBaseline/previous2_february10_march5.tif

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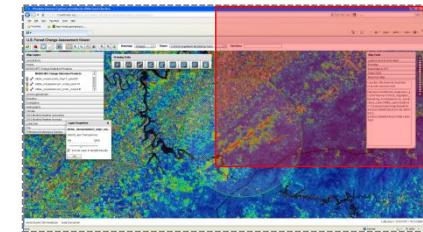
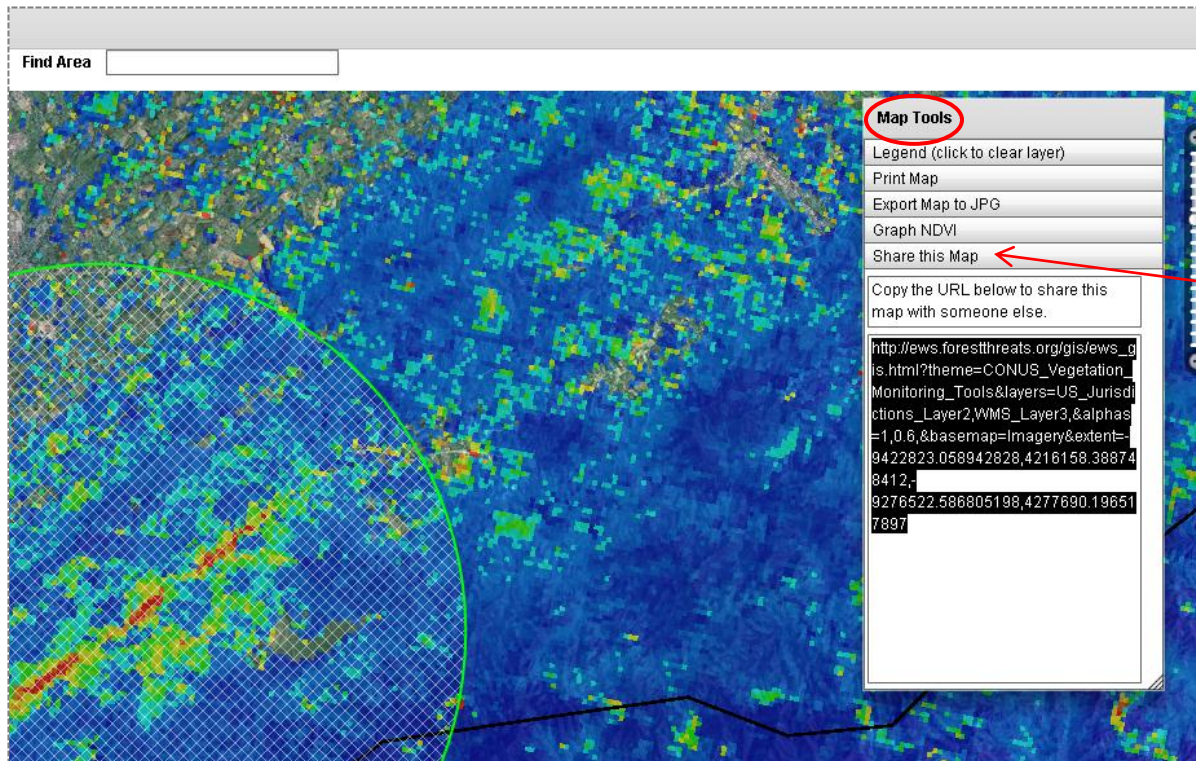
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How to: Share Disturbance Events with Colleagues



The “Map Tools” box in the upper right portion of the Viewer offers the capability to send a URL of a view via your email client to a colleague.

Click the “Share this Map” tab, then highlight and copy the URL, and paste the link into your email program. Your colleague can open the Viewer to the same extent and data layers you were using to explore a disturbance event.

Printing, graphing and the ability to save a JPEG of the view is also available here.

Shown: Forest damage by an EF4 tornado in the Great Smoky Mountains National Park (April 27, 2011).

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2011 Forest Disturbance 'NEWS' Events

viewable at this URL - <http://www.geobabble.org/~hnw/first/EWSNews/>




Threat Assessment Centers' National Early Warning System NEWS

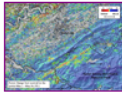
Examples of 2011 Forest Disturbance Detections

[William W. Hargrove](#), [Joseph P. Spruce](#), [Steven P. Norman](#), and [William M. Christie](#)

Last Modified: Thu Jun 16 11:43:25 EDT 2011

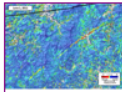
Click on any image or headline below to read additional details





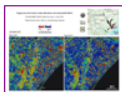
[EF-4 Tornado, April 27, 2011 in the Great Smoky Mountains National Park](#)

EWS disturbance maps from May 24 show the probable path of an EF-4 tornado that ripped through forests in the GSMNP. The tornado swept across the northwestern corner of the park, causing extensive damage to seven trails, including Abrams Falls Trail.



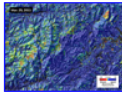
[Tornado Damage in Chattahoochee National Forest and Black Rock Mountain State Park, GA, April, 2011](#)

A tornado swept across four counties in northeast Georgia on April 27, 2011. After setting down in northeastern Lumpkin County, it caused severe damage for 11km, then passed with relatively minor damage for 41km, only to regain strength for 41km more. Aerial sketchmaps of damage polygons and severity are compared with a time series of images every 8 days from the Early Warning System.




[Forest Tent Caterpillar Defoliation in northeastern South Carolina, Observed May 13, 2011](#)

On May 20, 2011, EFETAC personnel notified the South Carolina Forestry Commission via the FHM Coordinator regarding forest disturbances showing in northeastern South Carolina, and suggested that these disturbances might be due to Forest Tent Caterpillars. They had flown this area shortly before, and here we compare the EWS disturbance maps from May 8 and May 16 to the polygons produced by aerial sketch mappers on May 13, 2011. Sketchmappers found that there was three times more area defoliated than in 2010. In 2010, defoliation was mostly concentrated along the Waccamaw River and old Oxbows of the little PD and Great PD within Marion and Horry Counties. New affected areas included Bull Island between Great Pee Dee and Waccamaw Rivers, Santee River, and Black River.



[Unusually Slow Greenup at High Elevations in the Southern Appalachians during Spring, 2011](#)

During spring 2011, greenup was slower than normal at high elevations, while greenup was ahead of normal at lower elevations, presumably due to unusually warm conditions in early spring, followed by a cooler mid-spring. This same late high-elevation pattern was seen during spring 2010. Spring in the Southern Appalachians was generally much earlier than normal in 2011.



[Heavy Snowpack and Retarded Greenup across the Northeastern US during Spring, 2011](#)

By early February 2011, nearly the entire northeast was blanketed by snow. Once greenup commenced, most locations went from being anomalously late to ahead of normal development. By late May, nearly the entire Northeast was ahead of normal. Eastern Pennsylvania started to show early signs of insect defoliation.

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Eastern Forest Environmental Threat Assessment Center
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Points of Contact

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Principal Investigator: [William \(Bill\) W. Hargrove](#), Research Ecologist, 865.235.4753, whargrove@fs.fed.us

Outreach: [Perdita Spriggs](#), Communications Director, 828.259.0542, pspriggs@fs.fed.us

Technical Assistance: [Bill Christie](#), Biological Scientist (GIS/RS), 828.257.4370, wchristie@fs.fed.us



National Environmental Modeling and
Analysis Center (NEMAC)
University of North Carolina - Asheville

- Partners -

NASA
Stennis Space Center
Bay St. Louis, MS





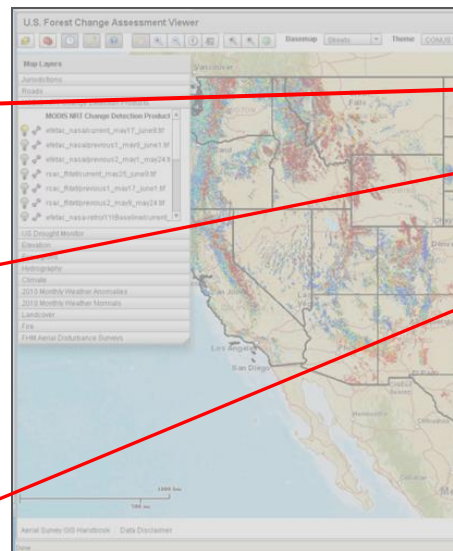
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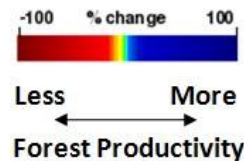


Quick Start Guide (for returning users, and those familiar with web-based map viewers)

1. Open this URL in a web browser
http://ews.forestthreats.org/gis/ews_gis.html#app=9432&6ca8-selectedIndex=2&e411-selectedIndex=0
2. In the Table of Contents window, click on the tab heading "MODIS NRT Change Detection Products" to expand and view the data layers (NRT – near real time)
3. Click the 'light bulb' to the left of the top data layer, this turns-on the most recent forest change detection image
4. Use the map controls to zoom and pan, or type the name of a county in the "Find Area" box in the top-right area of the FCAV viewer window
5. Use the 'wrench' icon adjust the transparency of any layer to better view the basemap, or other layers
6. Return to this Help documents' first page to learn more of the Forest Change Assessment Viewer (FCAV)



[What do the colors mean?](#)



Map Layers	
Jurisdictions	
Roads	
MODIS NRT Change Detection Products	
MODIS NRT Change Detection Product	
	efetac_nasa/current_may17_june9.tif
	efetac_nasa/previous1_may9_june1.tif
	efetac_nasa/previous2_may1_may24.tif
	rsac_fhtet/current_may25_june9.tif
	rsac_fhtet/previous1_may17_june1.tif
	rsac_fhtet/previous2_may9_may24.tif
	efetac_nasa-retro/1YrBaseline/current_
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Tips and Hints

- If a URL hangs up during load, try changing the backdrop
- The "imagery" basemap works very well to locate general disturbances, since it has dark colors
- To see if a potential disturbance is drought related, try turning on the Drought Monitor Data Layer
- To see if a potential disturbance is wildfire related, turn on the "Monitoring Trends in Burn Severity" (MTBS) fire layers, this layer is associated with the default "Theme" located under the "Fire" tab
- To see if a potential disturbance is insect or disease related, try turning on the sketchmapper polygons from past years. If there has been insect or disease activity nearby in the past, it is likely to have happened again
- To view a past disturbance to a forested area, access the Archived imagery and choose imagery before and after the incident:
 - to view previous 8-day imagery, change the "Theme" to "MODIS Forest Change Products," in the Table of Contents open the tab named "Archived NRT EFETAC-NASA," scroll to dated pre- and post-incident to view the extent of forest change, or disturbance
- The EWS provides an extraordinary mechanism for mapping fuel-producing events and fuel moisture. Blow-downs, ice storms and beetle kill areas can be targeted for fuels management (Norman, EFETAC)
- The 1-year Baseline product can present less 'noise' when interpreting the severity of a forest disturbance
- Other standard data layers can assist in the interpretation of a forest disturbance event, following are some examples:
 - under the Elevation tab, "SRTM" (Shuttle Radar Topography Mission) "DEM" (Digital Elevation Model) may suggest affects from a gradient of altitude
 - under the Elevation tab, use of the "Aspect" and "Hillshade" layers can assist in the interpretation of the effects of topographic position
- To view the "MODIS NRT Change Detection Products" on a desktop GIS via a Web Map Service (WMS) connection, use the URL below to define the WMS location (in ESRI's ArcGIS Desktop 9.3.1, choose version 1.0.0 in the GIS Server properties dialog box):

<http://fswms.nemac.org/ewswgs84?SERVICE=WMS&REQUEST=GetCapabilities&>
- Using the MODIS NRT WMS connection will allow desktop users to integrate their own local data layers for comparison, analysis and quantification of the spatial extent, content and severity of forest disturbance events
- Use the MODIS NRT WMS connection to screen digitize polygons of forest disturbance

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Frequently Asked Questions (pg 1 of 2)

What is the best image to display to see if there is any forest disturbance in my area of interest?

The most recent forest disturbance image is located in the Table of Contents, under the tab named "MODIS NRT Change Detection Product." Click this tab and look at the top of the listing for the most recently-dated file called "[efetac_nasa/current_may25_june17.tif](#)" (replace the "monthday" reference with the most current date range), click the 'light-bulb' to display the image.

MODIS NRT Change Detection Products

[efetac_nasa/current_may25_june17.tif](#)

[efetac_nasa/previous1_may17_june9.tif](#)

[efetac_nasa/previous2_may9_june1.tif](#)

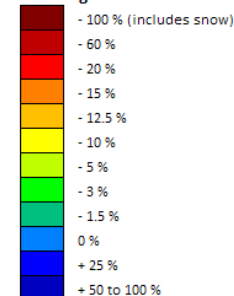
Also, look down in the data layer listing under this heading for the most recently dated "Baseline" product from EFETAC. For descriptions of the "Baseline" products, [click here](#) (MODIS = Moderate Resolution Imaging Spectrometer, 231 meter pixel)(NRT = Near-Real-Time)

What do the colors mean?

Generally, the colors relate to forest productivity as compared to a previous baseline (8-year: the default, 3-year or 1-year baseline). Shades of blue-to-green denote a healthy forest condition and similar in development to previous year(s). Shades of red-to-yellow denote a forest condition where the greenness at that time period differs greatly-to-moderately when compared to the forest productivity, or greenness values of the previous year(s).

Specifically, the colors denote the percent change difference when comparing the current images NDVI (Normalized Difference Vegetation Index) value with the maximum NDVI pixel value over the past 8-, 3- or 1-year baseline NDVI image set. NDVI values are calculated via a band ratio of red to infrared (of the electromagnetic spectrum) and range from +1.0 to -1.0 in value.

% Change in NDVI



Baseline products: Located under the same tab named "MODIS NRT Change Detection Product," the first three forest change images (the three most recent) are a result of comparing the observed "greenness" for that date range with the maximum "greenness" observed over the past 8-years (2003-2010). Try looking at the "current" 1-year baseline for the most current date to display the forest change image for the current period compared to ONLY last year (be sure to unclick the most recent 8-year baseline image to see the 1-year baseline image).

The forest disturbance image is covering up the basemap and I can't see where I am viewing?

Located in the Table of Contents beside each data layer is a "wrench"-looking icon, clicking this icon will open a control that one can use to apply a transparency for any data layer. Set the slider at a position where you can see both the basemap and the colors of the forest disturbance image.



The transparency tool
is located in the Table of Contents

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Using the Forest Change Assessment Viewer

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Frequently Asked Questions (pg 2 of 2)

What are the "Baseline" products?

Baseline products: Located under the same tab named "MODIS NRT Change Detection Product," the first three forest change images (the three most recent) are a result of comparing the observed "greenness" for that date range with the maximum "greenness" observed over the past 8-years (2003-2010). Try looking at the "current" 1-year baseline for the most current date to display the forest change image for the current period compared to ONLY last year (be sure to unclick the most recent 8-year baseline image to see the 1-year baseline image).

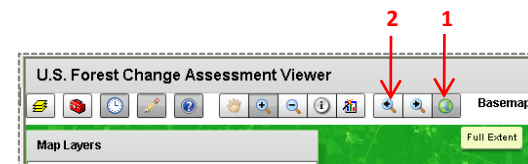
The image to the right is a zoomed portion of the Table of Contents tab "MODIS NRT Change Detection Products"

Note: at the time of this printing only the most currently dated change image is available in the three baseline products, eventually, the three most current forest change products will be available in the Table of Contents for the three baseline periods.



How do I remove the highlight color after an "Identify" operation is performed?

At this stage, the only way to remove the highlight of a data layer from the Viewer is to click an area in the ocean (try clicking the "Full Extent" icon-1, then click an area of the ocean, then the "Previous Extent" icon-2, to return)



What is the quickest way to see if a forest disturbance is taking place in my area?

Reference the "Quick Start Guide" of this help document ([click here](#)).

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Eastern Forest Environmental Threat Assessment Center
Southern Research Station
200 W.T. Weaver Blvd.
Asheville, NC 28804

<http://www.forestthreats.org>

Phenology-related Websites

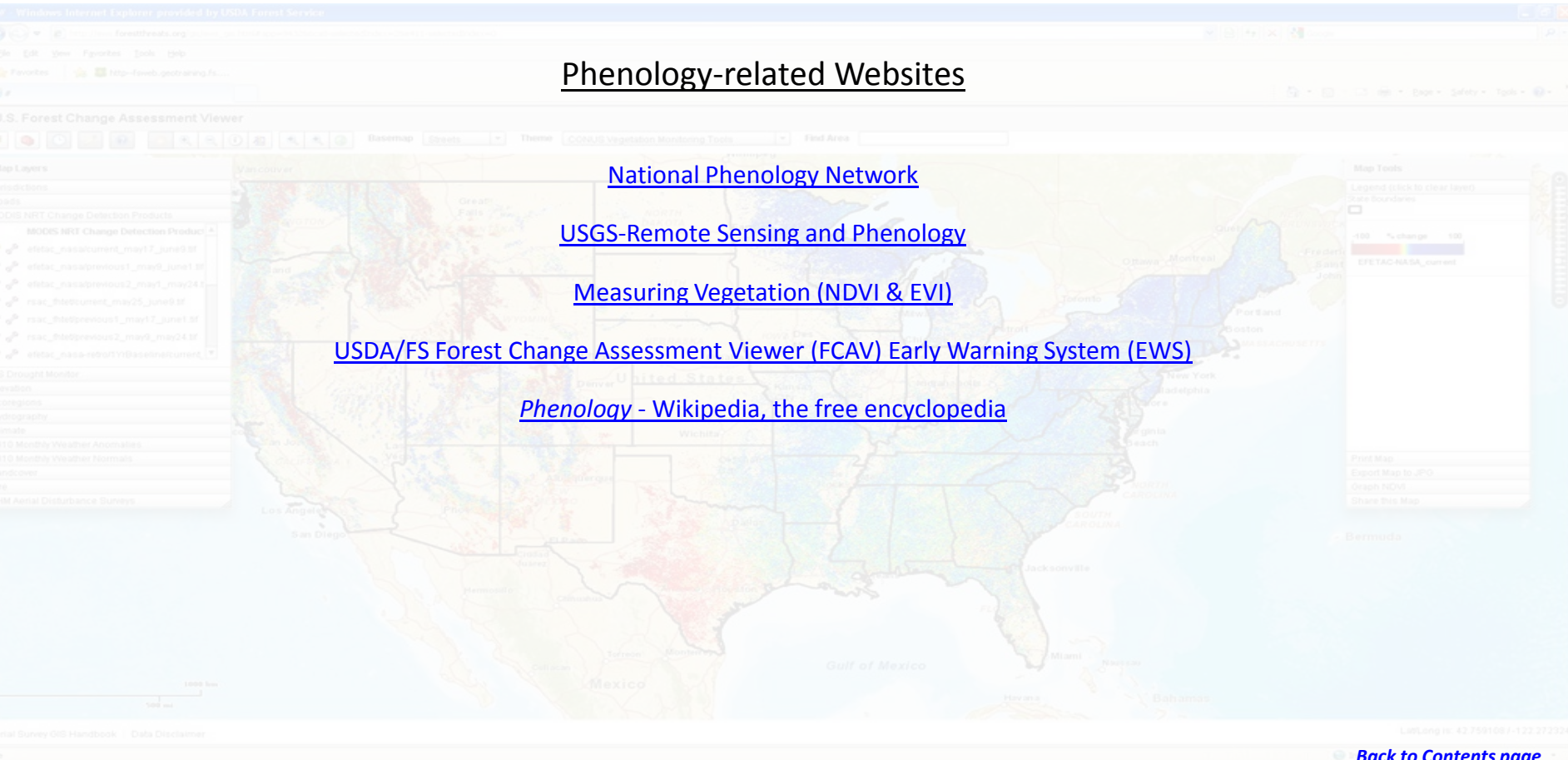
[National Phenology Network](#)

[USGS-Remote Sensing and Phenology](#)

[Measuring Vegetation \(NDVI & EVI\)](#)

[USDA/FS Forest Change Assessment Viewer \(FCAV\) Early Warning System \(EWS\)](#)

[Phenology - Wikipedia, the free encyclopedia](#)





Using the Forest Change Assessment Viewer

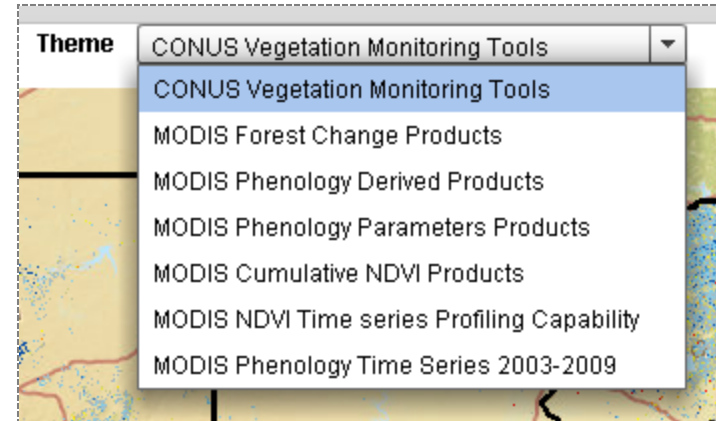
*from the Forest Services' Eastern Forest Environmental Threat Assessment Center (EFETAC)
and the Western Wildlands Environmental Threat Assessment Center (WWETAC)*



Appendices: Theme-based Data Layers

(click heading to jump to section)

1. [CONUS Vegetation Monitoring Tools](#)
2. [MODIS Forest Change Products](#)
3. [MODIS Phenology Derived Products](#)
4. [MODIS Phenology Parameters Products](#)
5. [MODIS Cumulative NDVI Products](#)
6. [MODIS NDVI Time Series Profiling Capability](#)
7. [MODIS Phenology Time Series 2003 – 2009](#)



For a description of the following products, go to:

<http://www3.nemac.unca.edu/wpfstest/ews/datasets/national-phenology-data-set-npds/>

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from the Forest Services' Eastern Forest Environmental Threat Assessment Center (EFETAC)
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Appendix 1: CONUS Vegetation Monitoring Tools (Thematic Group Data Layers)

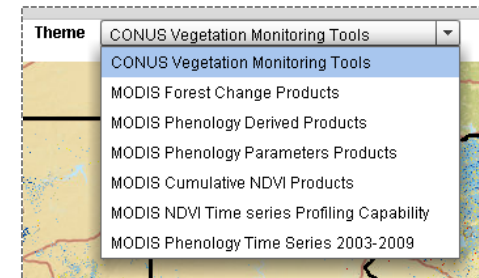
MODIS NRT Change Detection Products

-   efetac_nasa/current_may17_june9.tif
-   efetac_nasa/previous1_may9_june1.tif
-   efetac_nasa/previous2_may1_may24.tif
-   rsac_fhtet/current_may25_june9.tif
-   rsac_fhtet/previous1_may17_june1.tif
-   rsac_fhtet/previous2_may9_may24.tif
-   efetac_nasa-retro/1YrBaseline/current_december3_december26.tif
-   efetac_nasa-retro/1YrBaseline/previous1_november25_december18.tif
-   efetac_nasa-retro/1YrBaseline/previous2_november17_december10.tif
-   efetac_nasa-retro/3YrBaseline/current_december3_december26.tif
-   efetac_nasa-retro/3YrBaseline/previous1_november25_december18.tif
-   efetac_nasa-retro/3YrBaseline/previous2_november17_december10.tif
-   efetac_nasa-retro/AllYrBaseline/current_february18_march13.tif
-   efetac_nasa-retro/AllYrBaseline/previous1_february10_march5.tif
-   efetac_nasa-retro/AllYrBaseline/previous2_december3_december26.tif

The (3) most recent 8-day forest change image products, look for a new forest change image every 8-days from EFETAC

The (3) most recent 8-day forest change image products, look for a new forest change image every 8-days from RSAC

In preparing current MODIS forest change images, a new NDVI image is compared to one of three baselines to establish percent change. As of 06/2011, change products are created via looking at the maximum NDVI value for a pixel against the longest baseline, specifically, the 2003 – 2009 baseline. Future plans are to create the (3) most recent forest change products based on each baseline length, namely, the current NDVI value compared to the maximum NDVI value during baseline 2001 – 2010, during baseline 2005-2010, and during baseline 2010.



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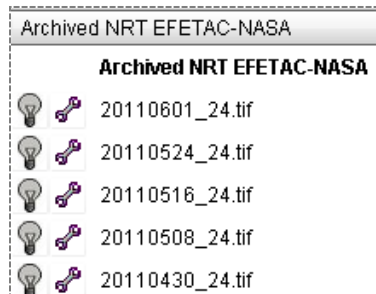


Using the Forest Change Assessment Viewer

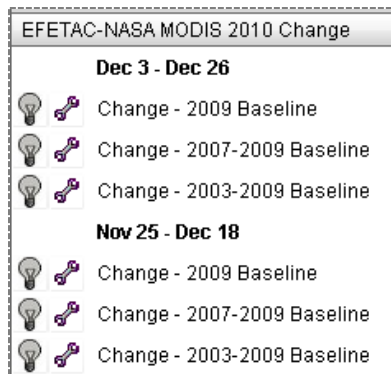
from the Forest Services' Eastern Forest Environmental Threat Assessment Center (EFETAC)
and the Western Wildlands Environmental Threat Assessment Center (WWETAC)



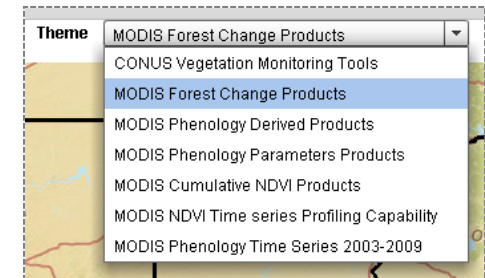
Appendix 2: MODIS Forest Change Products (Thematic Group Data Layers)



Individual 8-day images of forest change produced throughout the year from EFETAC. Look for a similar archive in the Table of Contents that presents forest change products from USDAFS Remote Sensing Application Center (RSAC)



Composite forest change images given the current 3-baseline time periods from EFETAC. Look for a similar data layer set in the Table of Contents that presents forest change products from USDAFS Remote Sensing Application Center (RSAC) for 2010.



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Appendix 3: MODIS Phenology Derived Products (Thematic Group Data Layers)

2003 – 2009 Phenology-based image products

MODIS Phenology Derived Products	
Phenology- Derived Products 2009	
	2009 Fall Brown Down Length
	2009 Spring Leaf Out Length
	2009 Growing Season Length
	2009 Growing Season Midpoint
	2009 Max NDVI Midpoint
	2009 Peakyness
	2009 Fall Spring Ratio
	2009 Skewness
	2009 Slope Fall
	2009 Slope Spring
	2009 Mean Position
	2009 Mean Value
	2009 Mean XY
Phenology- Derived Products 2008	
	2008 Fall Brown Down Length

listing repeats for next year...

Contrasts vegetation that keeps a small amount of leaf area over a long period of time versus vegetation that explosively produces a large amount of leaf area, but only holds it for a short time

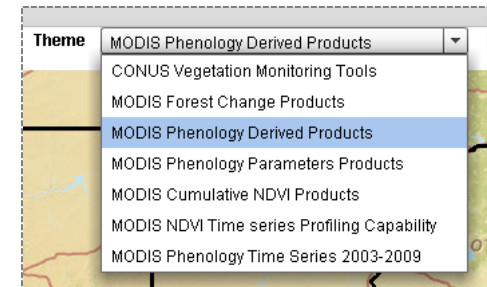
2003 – 2009 Phenology Standard Deviations and Means

Phenology- Standard Deviations	
	2003-2009 Fall Standard Deviation
	2003-2009 GS Standard Deviation
	2003-2009 Spring Standard Deviation
Phenology- Means	
	2002-2008 Fall Length Mean
	2003-2009 GS Length Mean
	2002-2008 Spring Length Mean
	MaxMean 2003-2009
	MinMean 2003-2008
	MaxMean-MinMean 2003-2009

Shows places that are particularly predictable versus places that are particularly unpredictable (GS – Growing Season)

For a description of these products, go to:

<http://www3.nemac.unca.edu/wpfstest/ews/datasets/national-phenology-data-set-npds/>



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Appendix 4: MODIS Phenology Parameter Products (Thematic Group Data Layers)

2003 – 2009 Phenology parameter products

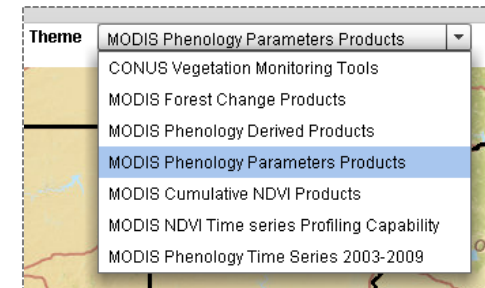
MODIS Phenology Parameters Products	
Phenology- Parameters 2009	
	2009 Large Integral
	2009 Maximum NDVI Position
	2009 Maximum NDVI Value
	2009 QC Flags
	2009 Left 20% Position
	2009 Right 20% Position
	2009 Left 20% Value
	2009 Right 20% Value
	2009 Left 80% Position
	2009 Right 80% Position
	2009 Left 80% Value
	2009 Right 80% Value
	2009 Left Minimum Position
	2009 Right Minimum Position
	2009 Left Minimum Value
	2009 Right Minimum Value
	2009 Small Integral
Phenology- Parameters 2008	

listing continues...

Phenological Parameters do not represent the percentage of the year, but rather the percentage of the maximum NDVI values over the course of the year

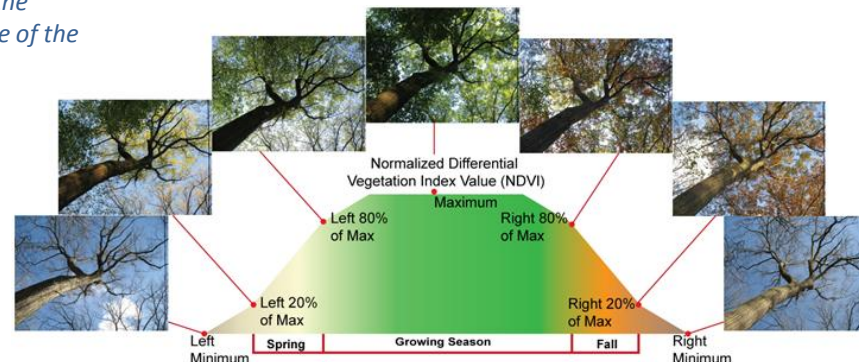
Phenology Parameter Means

Parameter Means	
	2003-2009 Left 20% Position Mean
	2003-2009 Right 20% Position Mean
	2003-2009 Left 80% Position Mean
	2003-2009 Right 80% Position Mean
	2003-2009 Max NDVI Position Mean
	2003-2009 Min Position Left Mean
	2003-2009 Min Position Right Mean
	2003-2009 Small Integral Mean



For a description of these products, go to:

<http://www3.nemac.unca.edu/wpfstest/ews/datasets/national-phenology-data-set-npds/>



*The Phenological Curve
(red dots indicate measurement points)*

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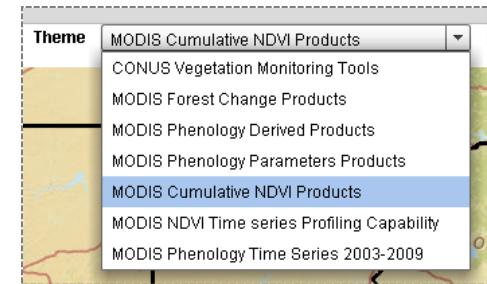
Appendix 5: MODIS Cumulative NDVI Products (Thematic Group Data Layers)

2003 – 2009 Cumulative NDVI products

MODIS Cumulative NDVI Products 2003-2006		
MODIS Cumulative NDVI Products 2007-2009		
		2009 Cumulative Integral 2
		2009 Cumulative Integral 1
2008 Cumulative NDVI		
		2008 Cumulative Integral 22
		2008 Cumulative Integral 21
		2008 Cumulative Integral 20
		2008 Cumulative Integral 19
		2008 Cumulative Integral 18
		2008 Cumulative Integral 17
		2008 Cumulative Integral 16

Treating yearly NDVI in a cumulative way causes differences to become more pronounced throughout the year (Hargrove, EFETAC).

The MODIS satellite takes a complete picture of the continental United States every day, although cloud cover, smoke, and other interference often blocks the view of the landscape. To get a complete picture, a 16-day composite is made by taking the highest value for each pixel recorded over the 16-day period. For the Cumulative Phenology data set, the NDVI values in each successive 16-day interval are then summed to form an accumulating total, starting over at the beginning of each year. The first national 16-day interval map, or Interval #1, is usually excluded from products because it covers the December-January transition from one year to the next. Therefore, there are usually 22 intervals that make up one year (#2–23).



For a description of these products, go to:

<http://www3.nemac.unca.edu/wpfstest/ews/datasets/national-phenology-data-set-npds/>

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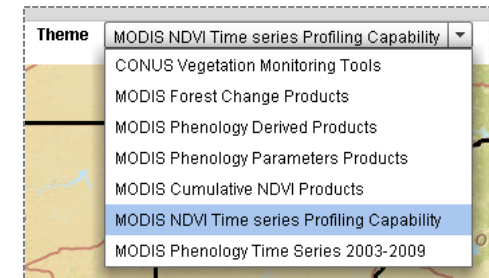


Appendix 6: MODIS NDVI Time Series Profiling Capability (Thematic Group Data Layers)

2003 – 2009 NDVI Time Series Products (DOY – Day of Year)

MODIS NDVI 2003-2006	
MODIS NDVI 2007-2009	
	2008 DOY 65
	2008 DOY 49
	2008 DOY 33
	2008 DOY 1
NDVI 2007	
	2007 DOY 353
	2007 DOY 337
	2007 DOY 321
	2007 DOY 305
	2007 DOY 289

The DOY products can tell one what day in the year a threshold is attained



For a description of these products, go to:

<http://www3.nemac.unca.edu/wpfstest/ews/datasets/national-phenology-data-set-npds/>

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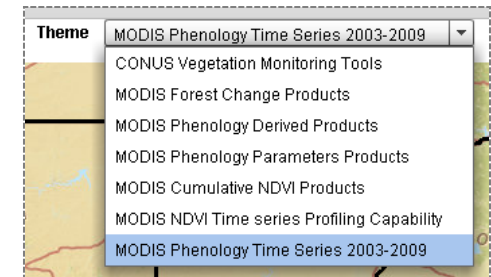


Appendix 7: MODIS Phenology Time Series 2003 - 2009 (Thematic Group Data Layers)

2003 – 2009 Phenology Time Series Products DOY – Day of Year

MODIS NDVI 2003-2006	
MODIS NDVI 2007-2009	
	2009 DOY 49
	2009 DOY 33
	2009 DOY 1
NDVI 2008	
	2008 DOY 353
	2008 DOY 337
	2008 DOY 321
	2008 DOY 305
	2008 DOY 289

*The DOY NDVI value product can tell one what day
in the year a threshold is attained*



For a description of these products, go to:

<http://www3.nemac.unca.edu/wpfstest/ews/datasets/national-phenology-data-set-npds/>

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