

Global Forest Watch, Liberia Forest and GLAD Alerts - Manual



The purpose of this training manual is to help GIS and forest cover monitoring experts to access and use GLAD alerts. The manual includes wording of the GLAD alert methodology, its limitations and appropriate uses, as well as several ways to access and analyse alerts.

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Part 1: Introduction to real-time forest monitoring systems and protocols Introduction to Global Forest Watch

Introduction to Global Forest Watch

Global Forest Watch (GFW) is an interactive online forest warning and monitoring system designed to empower users around the world with the information they need for better landscape management and conservation. Global Forest Watch uses cutting-edge technology and scientific processes to deliver the most accurate and timely information on the state of the world's forest landscapes, including near real-time alerts indicating locations where the recent tree cover losses are suspected. You can access Global Forest Watch at www.globalforestwatch.org.

GFW is free and easy to use, allowing anyone to create personalized maps, analyze forest trends, subscribe to alerts or download data for their local region or for the world. GFW serves many types of users, including governments, the private sector, NGOs, journalists, academia and the general public. You can read the terms of service for using GFW online. GFW is a growing partnership of organizations bringing together their data, technology, funding and expertise. The GFW partnership is organized by the World Resources Institute.

Liberia Forest Atlas

The data and tools developed for the Global Forest Watch platform are available in the Forest Atlases which concern the different countries of Africa. The interactive Liberia Atlas combines GFW deforestation data with local information on the distribution of land (logging concessions, protected areas, mining permits, etc.) in national forest estates. The goal of this Forest Atlas is to improve the quality and availability information from the forest sector to support transparent and participatory decision-making. This Atlas is the product of a partnership between World Resources Institute and national governments, in collaboration with the private sector, international donor agencies and civil society organizations. Forest Atlases are also available for Gabon, Equatorial Guinea, Central African Republic, Democratic Republic of Congo and Congo.

Monitoring systems within Global Forest Watch

All "forest change data" available on Global Forest Watch comes from satellite images (other data like "forest use" and "concessions" types can come from other sources such as government studies, field measurements and models). Satellite images are a suitable means of detecting forest changes, because they cover large areas, are consistent over time and space, and can serve as a source of information about the past. Our data comes mainly from two NASA satellite sensors: Landsat and MODIS, because all images from these two systems are free. Scientists use a variety of techniques to detect forest

change from these images, including manual identification of changes, statistical modeling, and machine learning (samples of forest change images are fed into computers that capture them. develop pattern recognition). The techniques used in each dataset are too complicated to be explored in depth here, but you can get details on the methods used for the creation of each dataset in its information window on the GFW platform (including access is made by clicking on the icon).

Satellite images, like all photographs, are made up of pixels. The resolution of an image is the size of the area captured by each pixel. For example, a 30-meter-resolution image has pixels that each capture an area of 30 by 30 meters on the ground, about the size of a baseball diamond. The high-resolution images allow us to see the changes on a much smaller scale. Most of the data available on GFW has a resolution of 30 or 250 meters, because these are the maximum resolutions of Landsat and MODIS images respectively. In general, satellites with higher resolution images cover a smaller area of land each day. Landsat sensors currently take 8 days to scan the entire Earth, while MODIS sensors pass over each point on Earth twice a day. Due to the difference in resolutions and frequencies, there is a trade-off in our data sets. Many of our lower resolution datasets can be updated very often, but don't have as much detail as some of the higher resolution datasets.

What is GLAD Alerts?

This guide focuses on GLAD alerts, as this is the most accurate forest loss monitoring system available to the public through GFW.

Source and citation

This dataset, created by the University of Maryland's Global Land Analysis & Discovery (GLAD) lab and supported by Global Forest Watch, is the first Landsat-based warning system for loss of tree cover. While most loss alert products use MODIS images of 250 meters in resolution, these alerts have a resolution of 30 meters and can therefore detect loss at a smaller spatial scale. The alerts are currently operational for some countries in the Amazon, Congo Basin and Southeast Asia and will eventually be extended to the rest of the humid tropics. You can access the alerts through www.globalforestwatch.org

The alert methodology is published in the following journal:

Hansen, M.C., A. Krylov, A. Tyukavina, P.V. Potapov, S. Turubanova, B. Zutta, S. Ifo, B. Margono, F. Stolle, and R. Moore. 2016. Humid tropical forest disturbance alerts using Landsat data. *Environmental Research Letters*, 11 (3).

Methodology

New Landsat 7 and 8 images are uploaded as they are posted online to USGS EROS, assessed for cloud cover or poor data quality, and compared to the previous three years of Landsat-derived parameters (including the grades, means, and regressions of the red, infrared and shortwave bands, and grades of NDVI, NBR, and NDWI). The parameters and the latest Landsat image are traversed through seven decision abers to calculate an average probability of forest disturbance. Pixels with a probability > 50%

are logged as tree cover loss alerts. For more information on the methodology, see: paper in Environmental Research Letters.

The algorithm takes into account pixels with tree cover greater than 5 meters in height and greater than 60% of the canopy density.

Alerts remain unconfirmed until two or more out of four consecutive observations are marked as loss of tree cover. Alerts that remain unconfirmed after successive observations are removed from the dataset.

Alertes GLAD	
Function	Identifies areas of probable loss of tree cover in near real time
Resolution	30 x 30 mètres
Geographic coverage	South America: Brazil, Peru Africa: Liberia, Burundi, Cameroon, Central African Republic, Democratic Republic of the Congo, Equatorial Guinea, Gabon, Republic of the Congo, Rwanda, Uganda Southeast Asia: Brunei, Indonesia, Malaysia, Papua New Guinea, Timor Leste
Frequency of Updates	Updated weekly
Date	January 2015 – present
Satellite	Landsat 7 et Landsat 8

How accurate are GLAD alerts?

The GLAD alerts in Peru were assessed to have 13.5 percent false positives. Most of these false positives (9.5%) occurred on the edges of clearings. The mixture of forest and other land cover at the edges makes them vulnerable to error in the system. The false positive rate drops to 1 percent when only confirmed alerts are taken into account.

The data has 33 percent false negatives, although most of these occur in secondary forests. The higher rate of false negatives compared to false positives also indicates that the alerts are a conservative estimate of the loss of tree cover that actually occurs. This helps to minimize the possibility of the user spending resources reviewing or acting on an alert that does not represent real change. Here are the limits of GLAD alerts:

- **Alerts do not distinguish human action from disturbances, nor deforestation from the dynamics of forest land use.** Users may need to combine ancillary spatial information (such as clipping or permit information) to uncover the immediate cause of the deforestation alert.
- **Cloud cover can limit the availability of imagery, especially during the rainy season. Landsat satellites are optical.** This means they are using passive sensors that cannot "see" through clouds.

This can cause GLAD alerts to surge for regions that experience a cloudless image as a result of extensive undetected deforestation under the clouds.

Thus, the alert dates represent the case of detection, although the loss of tree cover could have occurred sooner, possibly weeks earlier, due to persistent cloud cover.

How GLAD Alerts Can Support the *illegal Logging Investigation*

GLAD alerts can provide an early indication of areas where forest loss may be occurring, showing areas where additional resources are needed to investigate and document change. GLAD alerts are advantageous in that they can:

1. Alert quickly to new areas of change at low cost, particularly in remote areas that are difficult to access via patrols;
2. Indicate how to allocate resources in space, including the prioritization of verifications and field surveys;
3. Provide additional evidence to corroborate the information on illegal logging.

What is the process for receiving and using GLAD Alerts?

We encourage you to use GLAD Alerts according to your existing protocols and workflow. However, we generally provide the following procedure as a means of receiving, prioritizing, verifying and communicating evidence using GLAD Alerts.



Step 1: Automatic detection of forest loss (see detailed labels below on how to access GLAD alerts in various formats)

GLAD alerts show recent deforestation each week at a resolution of 30 meters. Agencies can receive this information by accessing the GFW platform, viewing the data in ArcGIS online, or downloading alerts (as described in detail below). You can also subscribe to alerts for an area of interest and receive an email notification whenever there are new alerts in your chosen area.

Step 2: Prioritization of alerts

Especially for large areas, alerts can carry thousands of raw pieces of data which can become annoying very quickly. Prioritizing alerts on the basis of additional spatial data models can help focus research efforts. For example, incorporating geographic boundaries such as protected areas, pristine forest

landscapes or high priority areas can help focus efforts and not consider alerts that occur outside of your jurisdiction or area of interest. You can combine these datasets using Forest Atlases, GFW, or by overlaying the datasets in ArcGIS. Advanced computer techniques such as cluster analysis can help identify major points of change.

Step 3a: Verification

When a potentially critical alert is detected, it is important to a) verify the alert, b) identify its immediate cause, and c) understand the larger context. Alerts alone are colored pixels on a screen and not actionable information.

- ❖ **Filter for Confirmed Alerts:** The easiest way to increase the accuracy of GLAD Alerts is to view only confirmed alerts. Confirmed alerts represent pixels where, of the previous four regular cloudless satellite passes, two or more led to the change detection algorithm. However, be aware that using confirmed alerts alone will miss the most recent detections of tree cover loss. Thus, confirmed alerts may be older, but they will be more secure.
- ❖ **View of the underlying satellite imagery:** The second way is to view the underlying satellite imagery. You can access imagery from a range of sensors (Landsat, Sentinel) on the GFW map and filter for image date and cloudiness. Select an image with a date just before the detection date and the most recent image to visually check if the change has occurred.
- ❖ **Conducting a Field Visit:** Visiting alerts in the field is the most reliable way to verify and validate changes detected by GLAD alerts. We recommend the use of a GPS device and mobile data collection software (such as ODK) to browse through alerts and gather evidence on changes occurring from the ground

Step 3b: Evaluate vectors and context

Overlay of ancillary spatial information: GLAD alerts do not differentiate between harvest and permanent land conversion, nor do they indicate the drivers of deforestation. Thus, it is necessary to overlay other spatial information (such as logging limits and other concessions) to glean the possible vector and assess the potential legality of deforestation.

- ❖ **Confirmation of the change using auxiliary documents:** You can also enter the GPS elements indicated by the permit documents into the GFW.
- ❖ **Caution:** Keep in mind that the cloud cover problem makes it difficult to determine whether a company or entity is practicing deforestation for a permitted period, since deforestation that has occurred under persistent cloud cover will appear suddenly with the first cloudless image.
- ❖ **Warning:** GLAD alerts should not be used to determine the deforested area. Thus, it is not recommended to compare "allowable cuts" with GLAD alerts, since alerts do not indicate the percentage of pixels that were cleared beyond 50%.

Other techniques include: analyzing medium and large scale deforestation to identify major events, looking for linear features that indicate new roads or other man-made deforestation, adding rivers and land layers to eliminate common natural forest loss related to meanders and landslides and incorporate land cover data to identify deforestation of primary forest versus secondary forest.

Step 4: Gather the evidence

The fourth step is to effectively communicate the main results from steps one to three to key players in a timely manner. This may include inserting GLAD Alert maps together with ancillary data from steps two and three into reports, presentations or bulletins. If this is the easiest possibility, you can insert GFW's screenshot into these reports, or produce more custom maps in ArcGIS or QGIS, as described below.

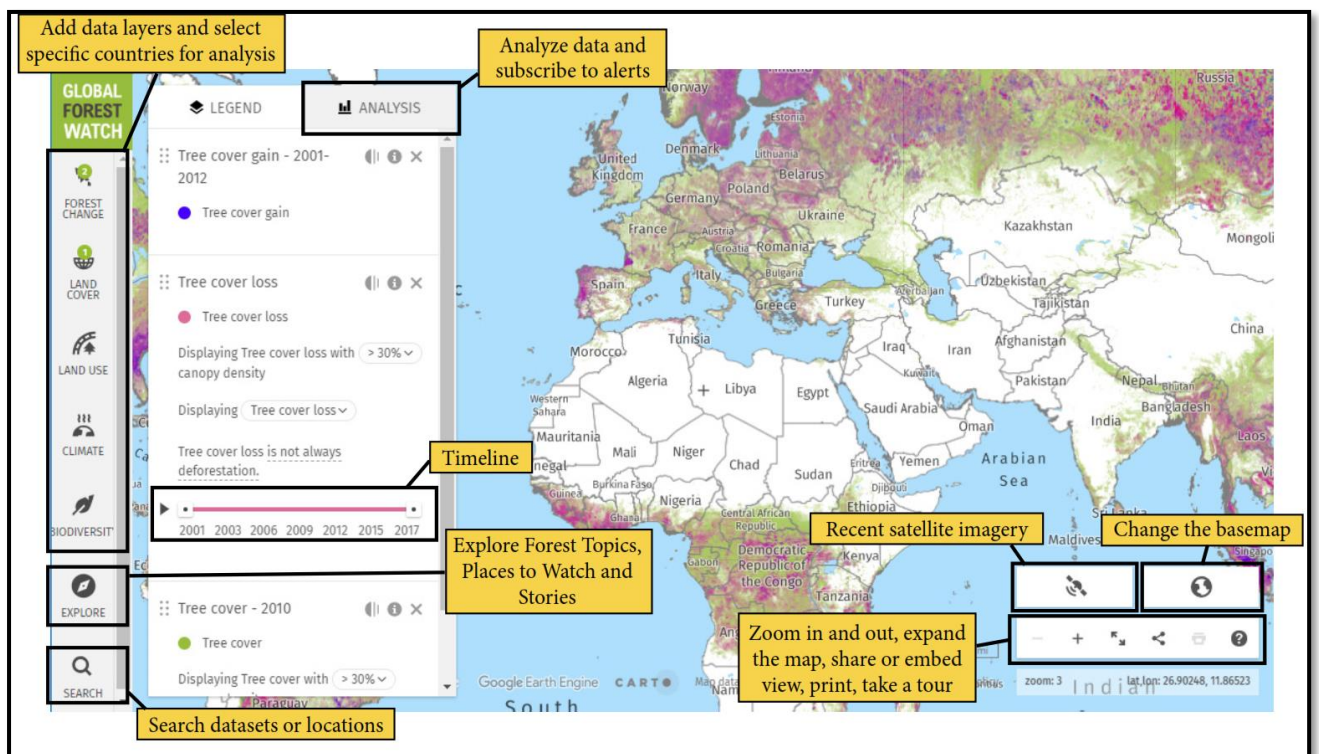
Presentation of Global Forest Watch

On the GFW map, you can jointly view conservation or land use data, view high-resolution satellite imagery, run analyzes to determine the area in terms of forest cover loss that has occurred in a region, subscribe to email notifications when there are new alerts detected in a location you are monitoring

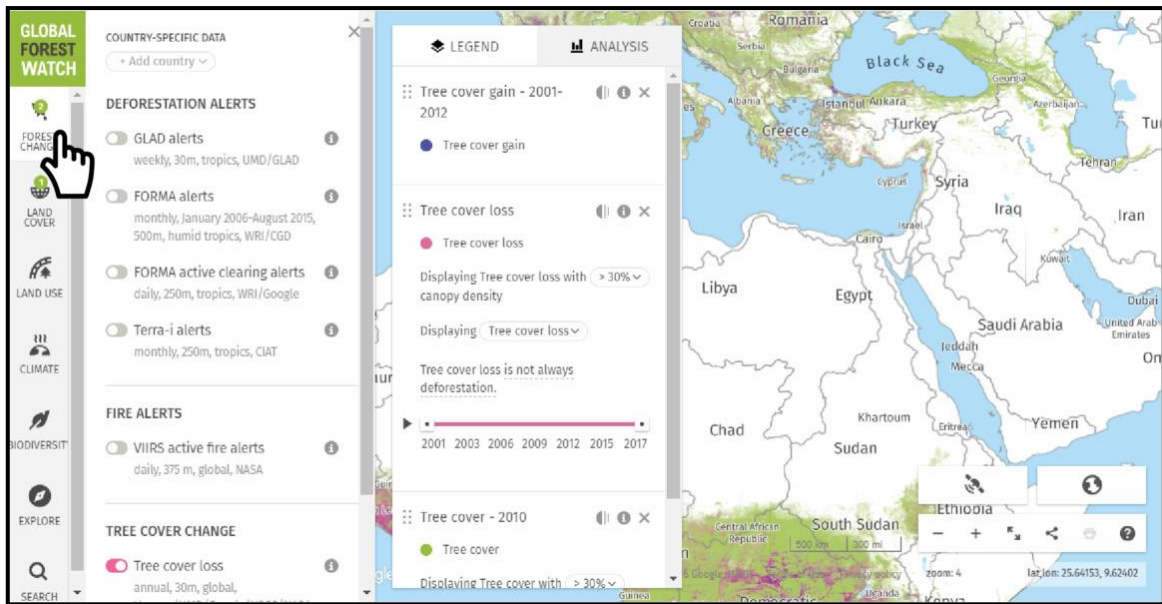
La carte sur GFW

Voir les alertes GLAD de janvier 2015 à nos jours et les superposer avec les concessions, aires protégées et autres données.

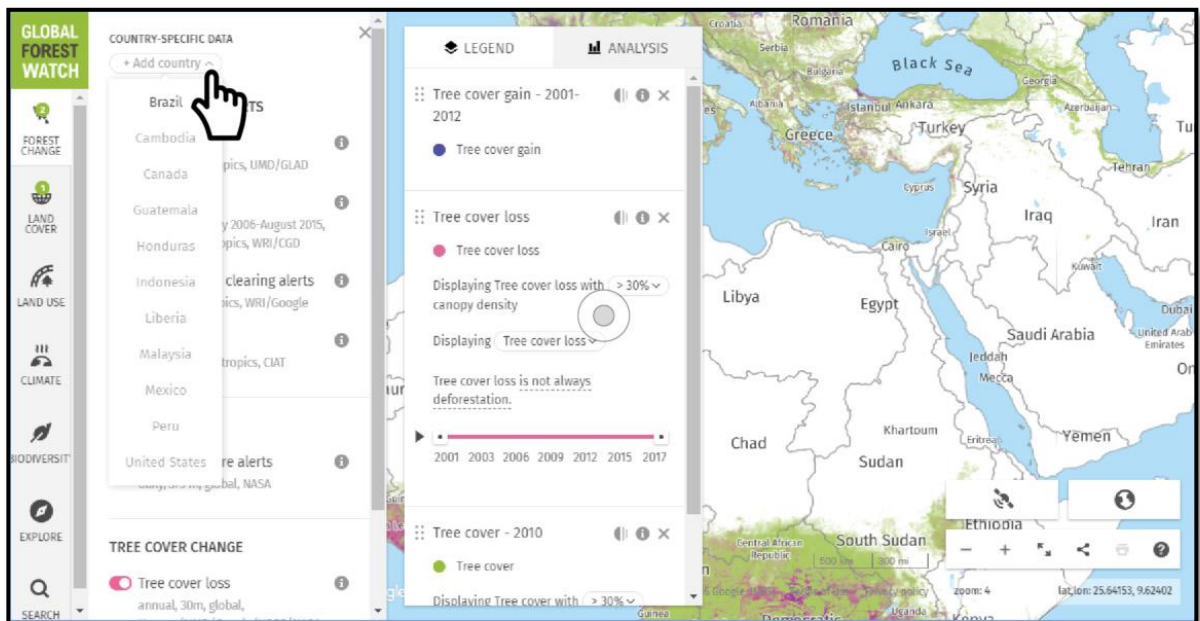
1. Go to the map <http://www.globalforestwatch.org/map>



2. Available data layers are organized by category on the left of the map. Click through the tabs to select the data layer(s) you want to display. Tree cover loss and gain are displayed by default. To access alerts data, such as GLAD or fire alerts, go to the "FOREST CHANGE" menu.



3. To select a country, click into one of the tabs and locate "+Add country." Once you select a country, the rest of the tabs will auto-populate. You may select multiple countries.

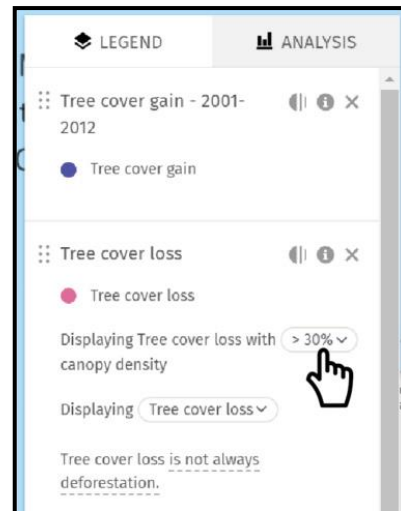


4. Click the "i" icon to learn more about each data layer. This includes information such as data resolution, frequency, cautions, and a link to learn more or download the dataset on the Open Data Portal.

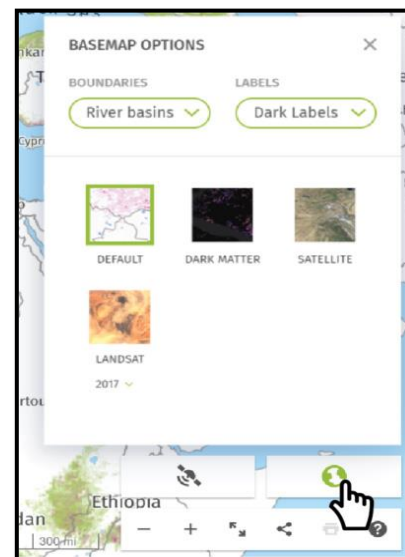


5. View activated layers in the data legend on the left-hand side of the map.

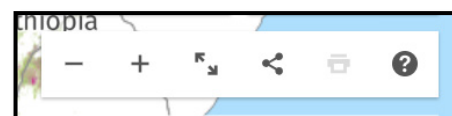
For tree cover and tree cover loss data layers, you can adjust the tree canopy density of your data display and analysis by clicking on the percent canopy density within the legend



6. Change the basemap to view data with a different map background.



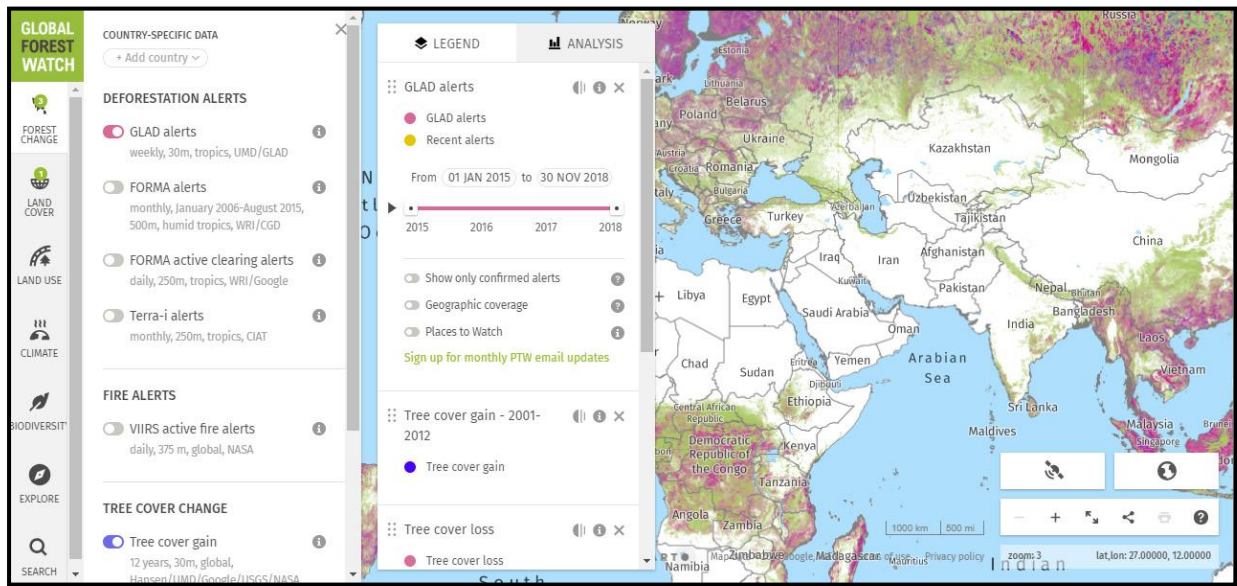
7. Zoom in and out, expand the map, share or embed your map view, print, and take a tour of the map by using the buttons located on the bottom right-hand side of the map.



Analyze data on the GFW map

There are three ways to analyze data in GFW: analyze a country or subnational jurisdiction, analyze a shape from a dataset or analyze a custom area.

1. Navigate to the GFW Map: <https://globalforestwatch.org/map>.
2. Turn on the Forest Change data layer you wish to analyze (e.g., tree cover loss).



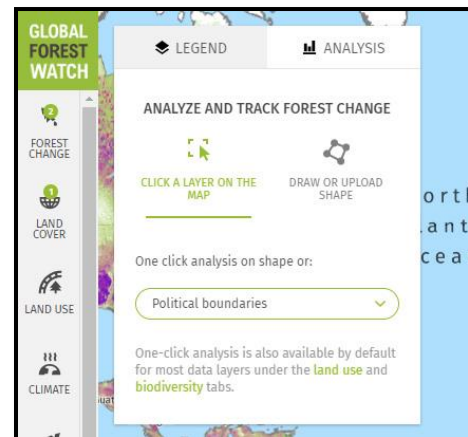
3. Define the time period you wish to analyze tree cover loss by dragging the handles of the timeline or by selecting a time interval.



Analyze a country or subnational jurisdiction

a. Select the "ANALYSIS" icon on the left-hand side of the map, and choose "CLICK A LAYER ON THE MAP."

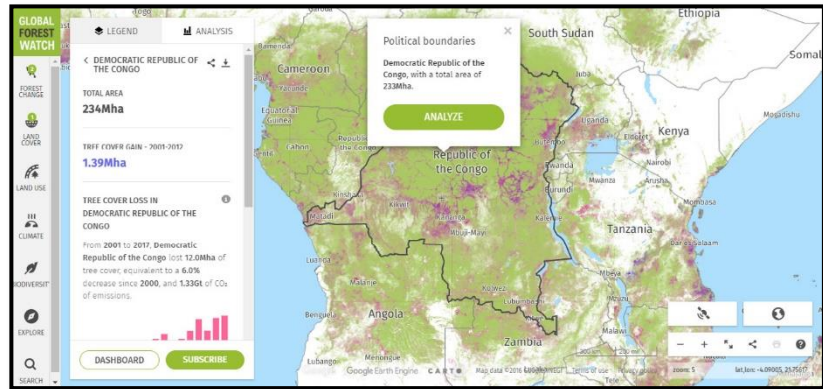
b. Select how you would like to organize the map boundaries for analysis by using the drop-down.



c. Locate the country and/or region you are interested in on the map and click it.

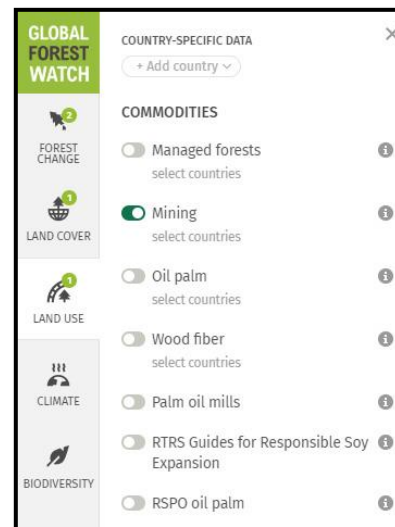
d. The analysis will appear on the left-hand side of the map.

Analyze a shape from a dataset on the map

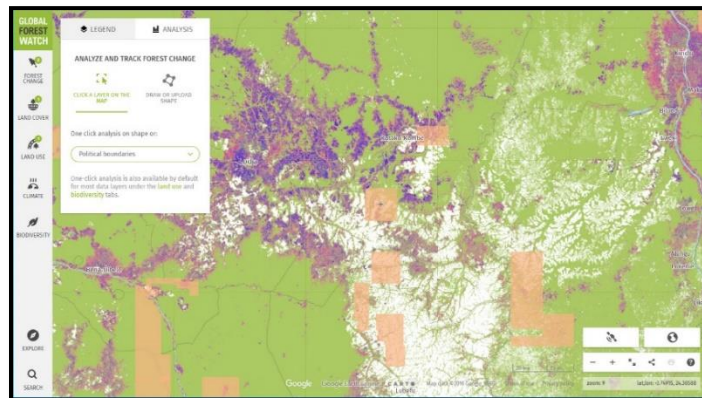


a. Turn on the dataset with the area of interest you want to analyze.

NOTE: You can analyze a shape within any dataset that's made up of individual polygons – e.g. tree plantations, mining concessions, protected areas, country datasets, etc.



b. Click on the shape you want to analyze.

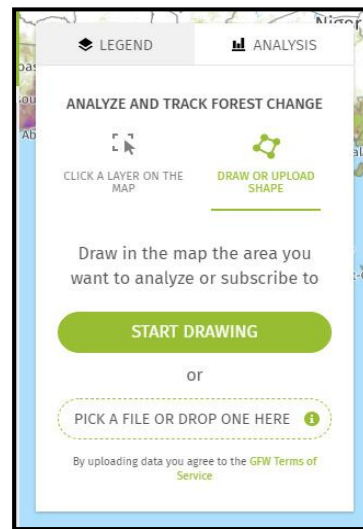


c. Click "ANALYZE" in the pop up window and the results will appear in the left-hand side of the map.



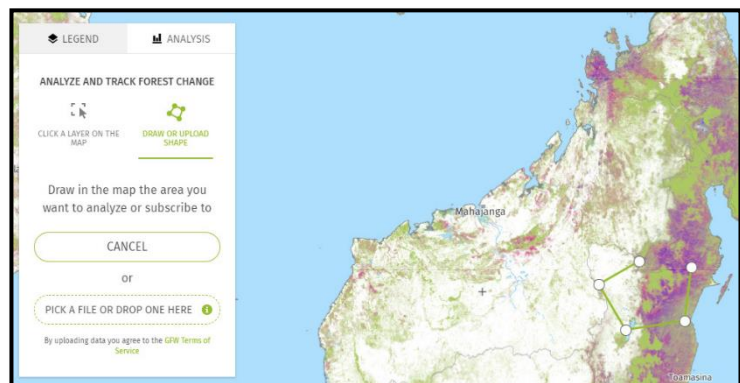
Analyze a user-defined area

a. Select the "ANALYSIS" icon on the left-hand side of the map, and choose "DRAW OR UPLOAD SHAPE."



b. To analyze a user-drawn shape, select "START DRAWING" and click with your mouse to draw a shape on the map.

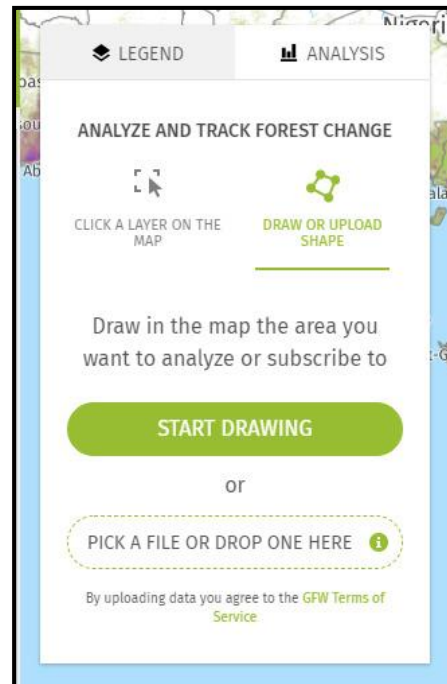
NOTE: You can drag the points to edit your shape after you're finished drawing.



c. To analyze uploaded data, click the button that says "PICK A FILE OR DROP ONE HERE" to select a dataset from your computer to upload. You can also drag a dataset directly from your computer's file explorer or finder.

Your shape(s) will then show up on the map and the analysis results will appear in the left-hand window.

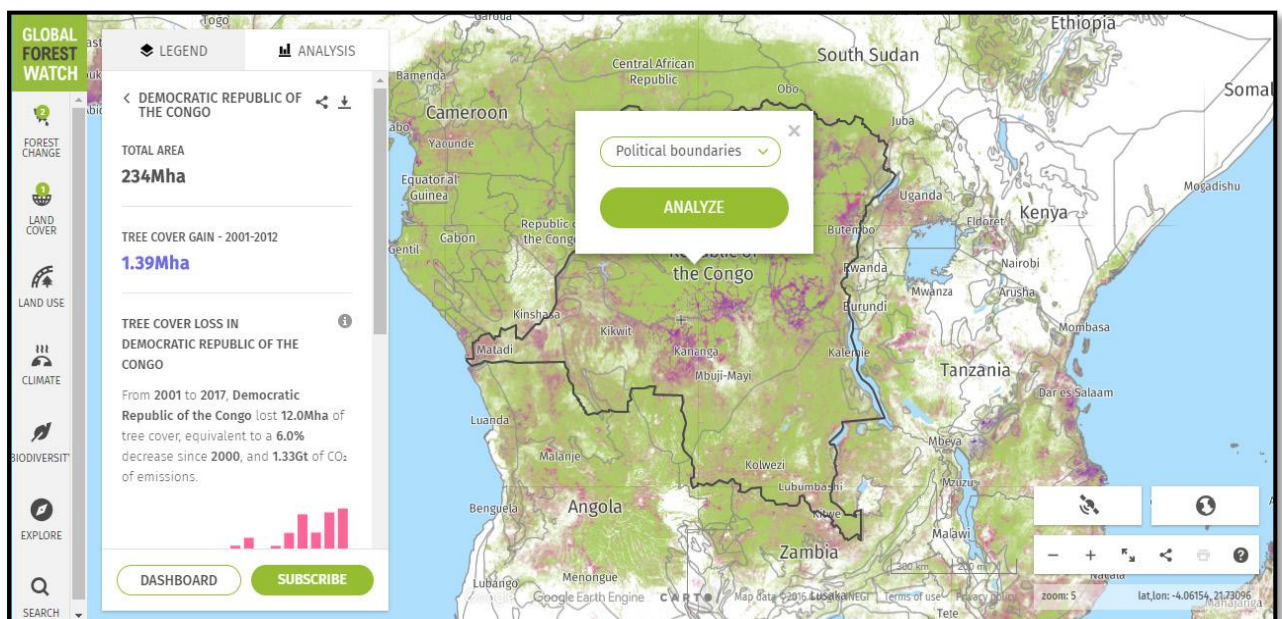
NOTE: If you upload more than one shape at a time, the analysis tool will sum up the area of your shapes in the forest change calculation.



4. If you want to adjust the tree cover loss time period you are analyzing, simply drag the handles on the timeline or select a different time interval.

5. If you want to change the type of data, you can also choose a different dataset under the Forest Change menu on the map. Your results will update immediately based on your selection.

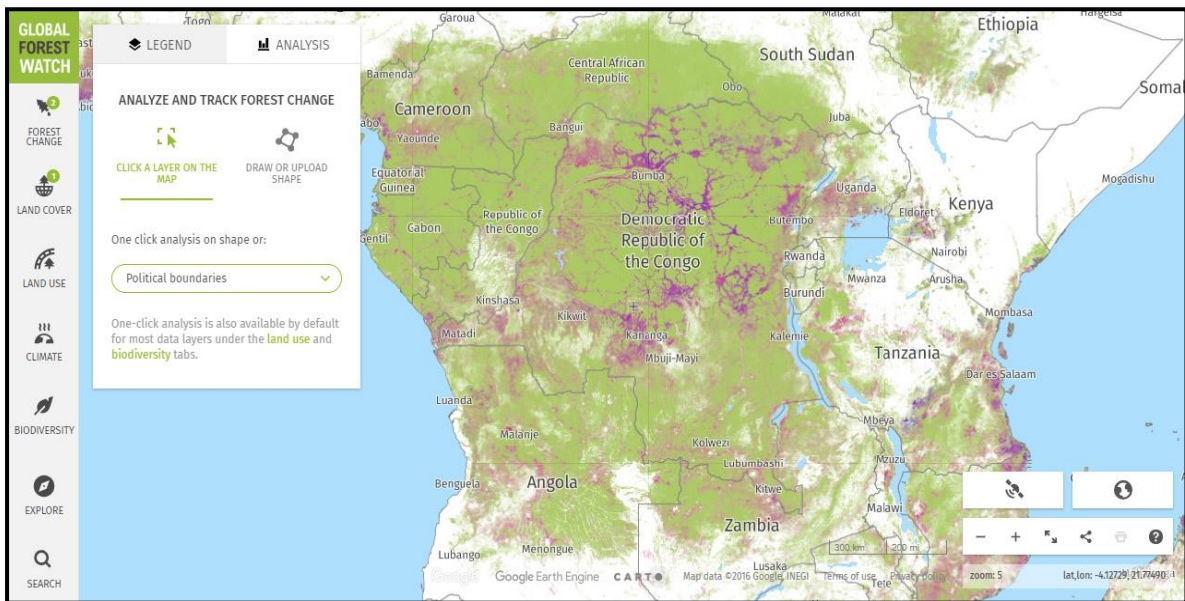
6. You can then subscribe to the activated forest change alerts for the area by clicking the "SUBSCRIBE" button, view an in-depth analysis of the data on a dashboard by clicking the



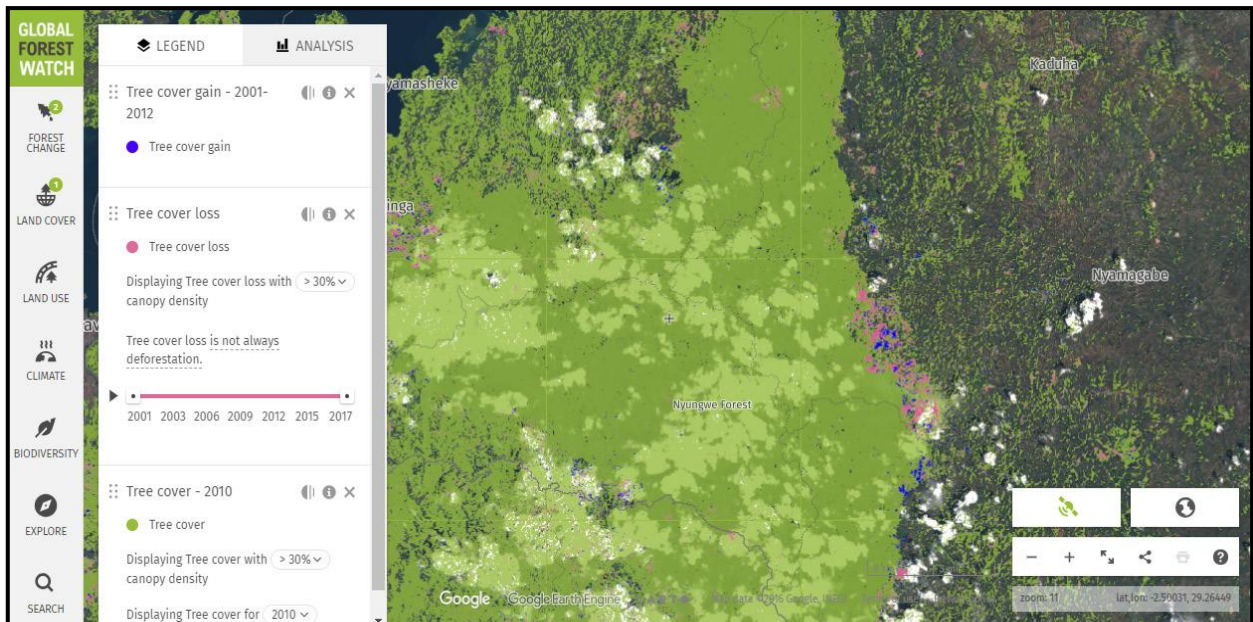
“DASHBOARD” button, download the data for your area of interest directly from the map (not available for all Forest Change data), or discard your analysis.

View satellite images satellite images

1. Navigate to the GFW Map: <https://globalforestwatch.org/map>.
2. Click on the “Activate Recent Imagery” tool in the lower right-hand corner of the map.



3. You will see the latest satellite image with less than 30 percent cloud coverage.



5. Click on the image to see other satellite images available for that area.

The screenshot displays a user interface for satellite imagery. At the top, it is titled "RECENT SATELLITE IMAGERY" with an information icon and a close button. Below this, the "ACQUISITION DATE" section features a dropdown menu set to "3 month:" and a "before" button followed by a date field containing "7 DEC 2018". The "MAXIMUM CLOUD COVER PERCENTAGE" section includes a horizontal slider with markers at 0%, 25%, 50%, 75%, and 100%. The current selection is "19 NOV 2018" with "7% cloud coverage" and "Sentinel 2 A" as the satellite source. A color selection dropdown is set to "Natural color". At the bottom, three satellite image thumbnails are shown, with the first one highlighted by a green border.

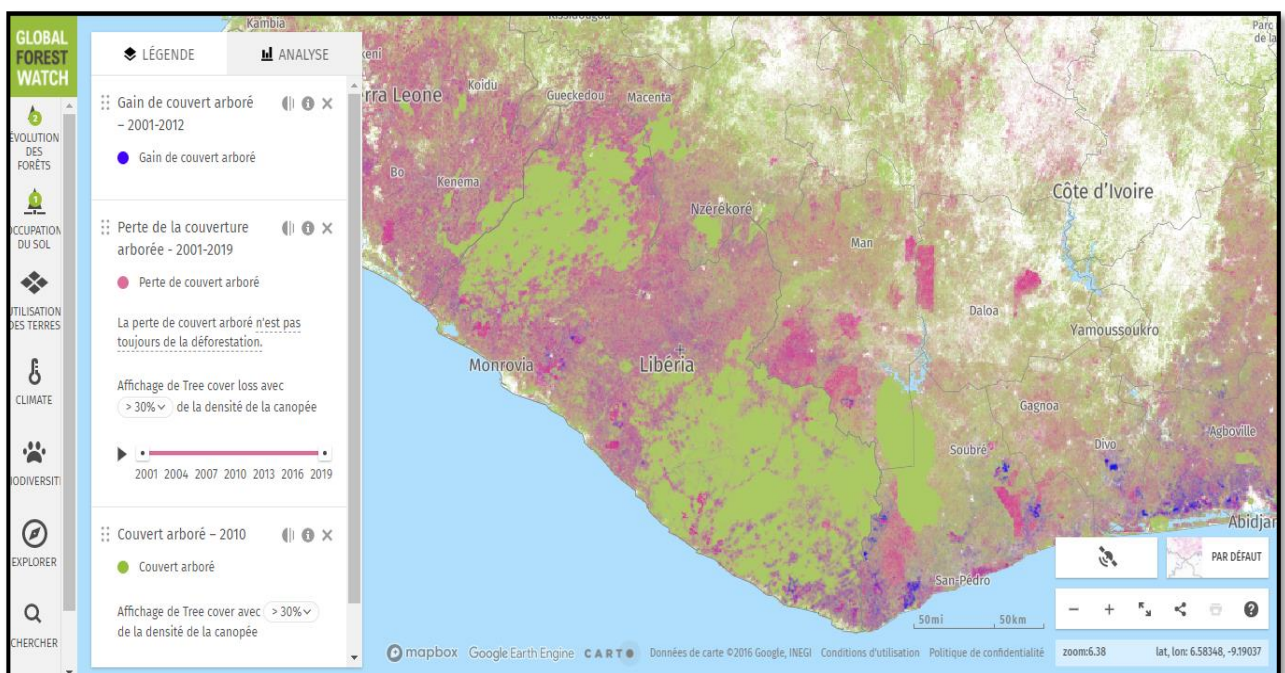
Access to GLAD alerts on GFW


On the GFW map, you can view GLAD Alerts along with other land conservation or use data, view high resolution satellite imagery, run analyzes to determine how many GLAD Alerts are occurred in a region, subscribe to email notifications when there are new alerts detected in a location you are monitoring

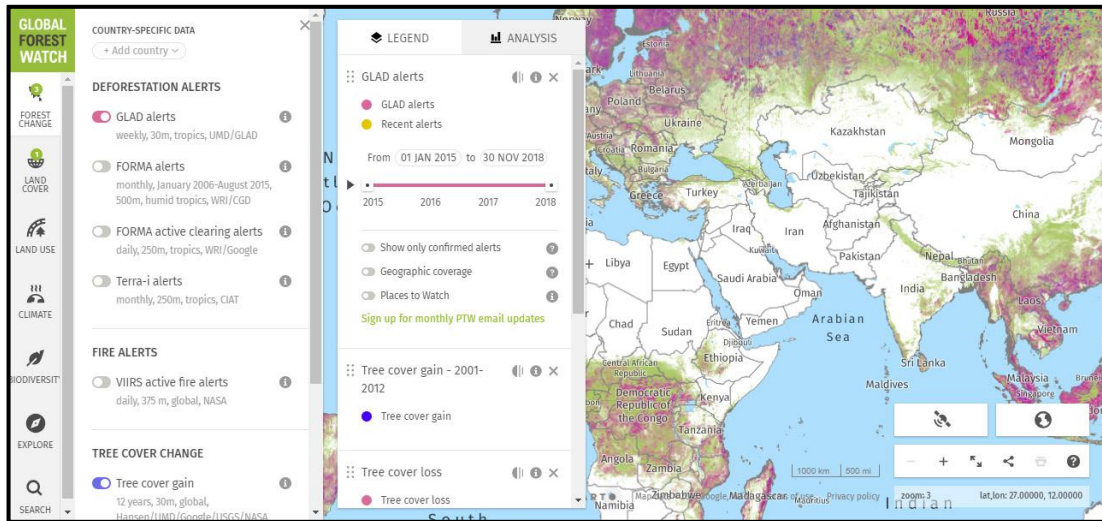
See GLAD alerts on the GFW map

View GLAD alerts from January 2015 to the present day and overlay them with concessions, protected areas and other data.

1. Go to the map <http://www.globalforestwatch.org/map>

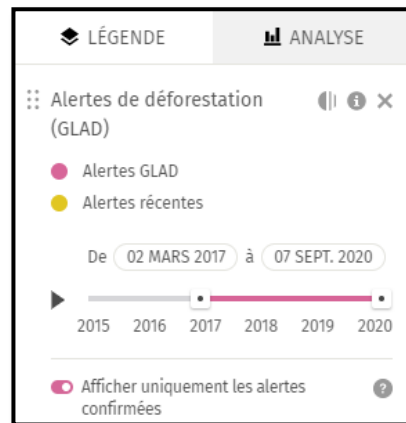
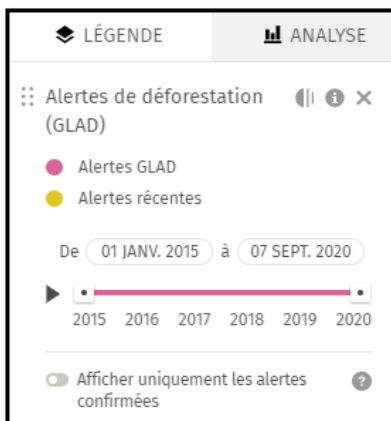


2. You will see the loss of tree cover, the gains in tree cover presented by default.
3. All data layers are organized by category on the left side of the map. Click the tabs to select the data layers you want to display. You can also click on the drop-down information icon  to learn more about each data layer
4. From the Forest Evolution menu, select GLAD Deforestation Alerts. You will see the data displayed on the map and in the legend on the left side of the map



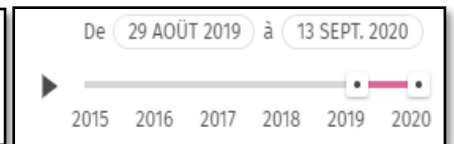
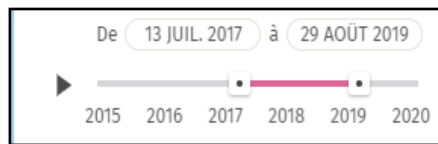
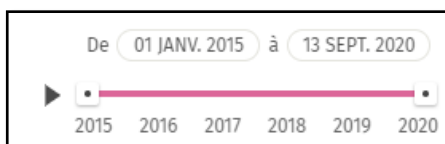
5. From the Forest Change menu, select GLAD Alerts. You will see the data displayed on the map and in the legend on the left side of the map.

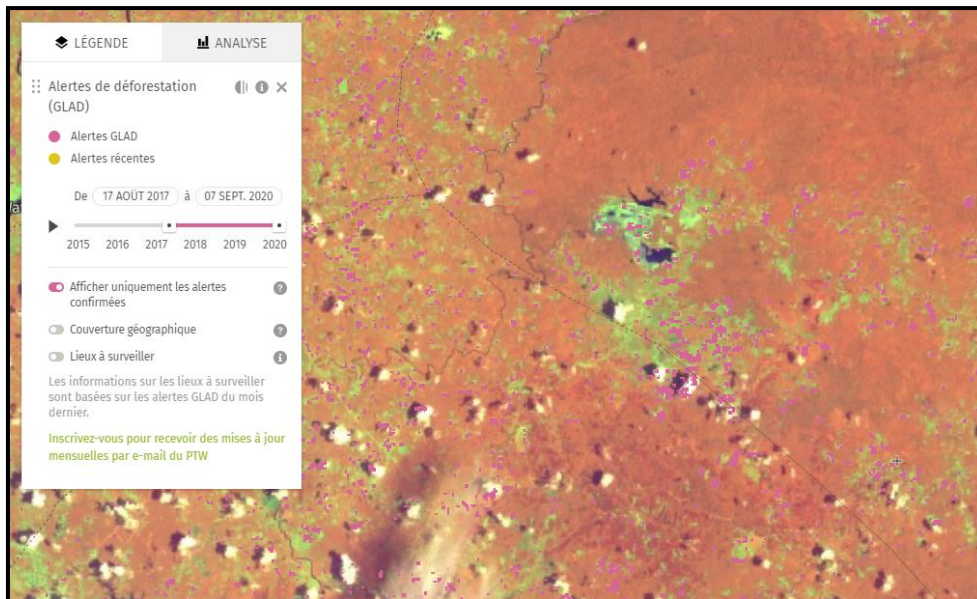
6. You can choose to display only confirmed alerts in the legend



7. Zoom into an area of interest. For example, here you can see an industrial palm oil plantation in Liberia.

8. Play GLAD alerts on the time slider at the bottom of the map to determine when the alert has occurred.



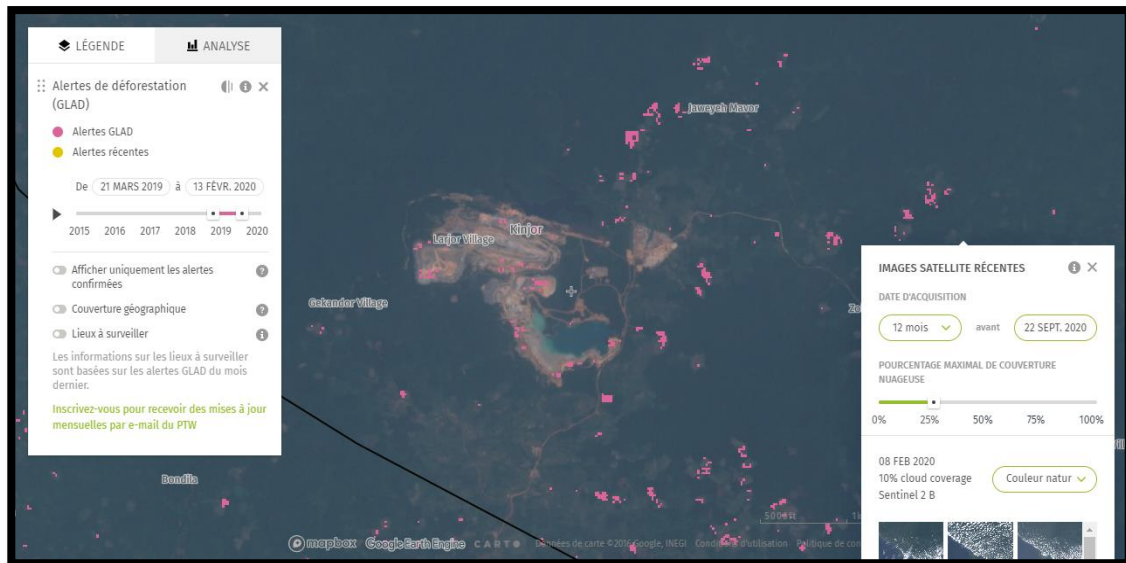


View high resolution imagery on the GFW map

Use high resolution satellite imagery from Sentinel Hub on the GFW map to check for GLAD alerts.

1. Zoom into an area of the map where you want to check for GLAD alerts or another set of forest change data
2. Go to the "View high resolution imagery" tab to the right of the map and turn on imagery.
3. Use the selection buttons to change the dates of the imagery displayed on the map. The card will always display the last available image within the time frame you select.
4. Click on an image tile on the map to see the date the image was taken
5. Open "Advanced settings" to adjust the sensor and minimum cloud cover for imaging.

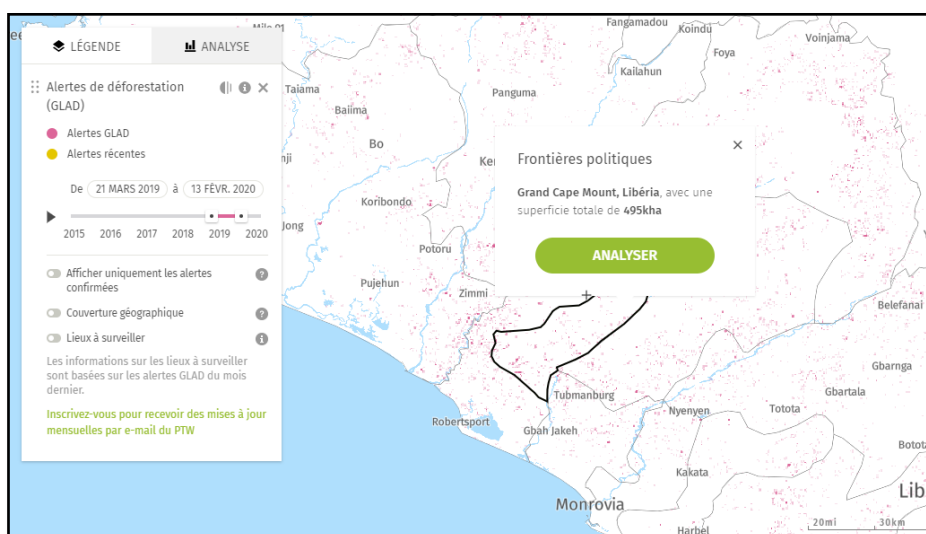




Analyze GLAD alerts on the GFW map

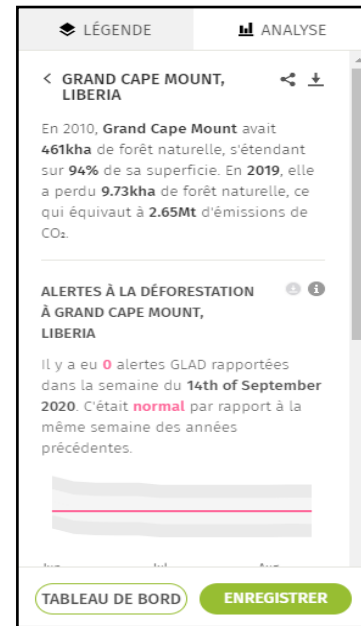
Perform GLAD Alert Analyzes on the GFW chart to calculate the number of GLAD Alerts that have occurred in the area during a specific duration.

1. Turn on the GLAD alerts on the GFW map under the Forest Evolution menu.
2. There are three types of areas you can analyze: a form of a dataset (such as a national park), a custom shape drawn on the map or downloaded, and a country or subnational area.
3. To analyse one form of a data set:
 - a. at. Select a layer of data you would like to analyse (such as protected areas, concession, or community forests) using the Land Use, Conservation, or People menus at the top of the map or choose the country of interest from the Data menu of country.
 - b. When the data layer displays on the map, click on the shape to learn more about it.



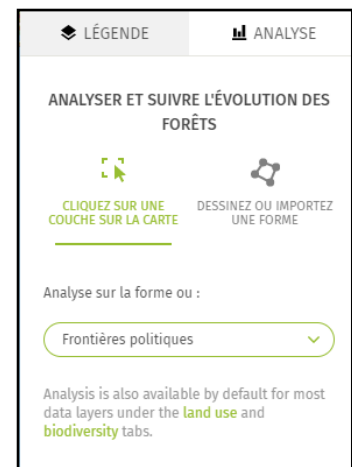
- c. Click the green "Analyze" button to determine the number of GLAD alerts that have occurred in the form. The analysis will be displayed in the table to the right of the map.

- d. Change the dates at the bottom of the card to update the analysis.



4. To analyze a custom shape:

- a. Click on Analysis right next to the Legend, click on "Draw or download the shape".
- b. Click on "Start drawing »".
- c. Click on the map to draw the points.
- d. Double click on the map or click on the first point to complete your shape.
- e. The analysis will be displayed in the table to the right of the map.
- f. Change the dates at the bottom of the card to update the analysis.



- g. To download a shapefile, drag a shapefile from your computer's file browser to the window area on the right side of the card. Click the information icon to learn more about eligible data formats.
- h. Your shape will appear on the map along with the analysis.

5. To analyze a national or subnational jurisdiction:

- a. Select "Country or region" from the table to the right of the map.
- b. Choose your country and subnational area from the drop-down menu.
- c. The analysis will be displayed in the table.

- d. Change the dates at the bottom of the card to update the analysis.

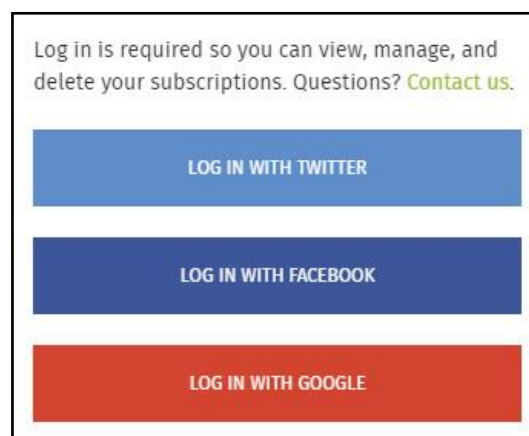
Subscribe to GLAD alerts on the GFW map

Use the GFW Card Subscription Tool to receive email notifications when there are new alerts detected in a location you are monitoring.

1. Select the area you want to monitor using the steps above (either a form from another dataset, a custom area, or a national or subnational jurisdiction).
2. Click the green "Register" button».



3. If you are new to GFW, log into My GFW using your Twitter, Facebook, or Google account and create a profile.



4. Enter the email address you want to receive alert notifications from.

5. Select the alerts from which you want to receive notifications (GLAD alerts).

6. Name the area to be saved in your subscriptions and select the language in which you would like to receive emails.
7. You will receive a confirmation email. You must click to confirm your subscription.
8. You can log into My GFW at any time using the icon at the top of the page and click "My Subscriptions" to view and update all of your subscriptions.

Access GLAD Alerts on Forest atlas

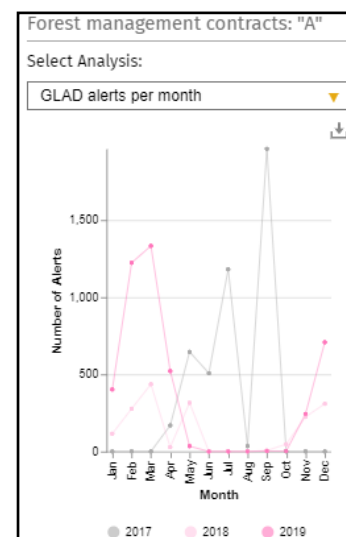
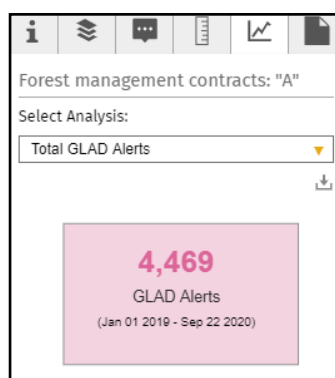
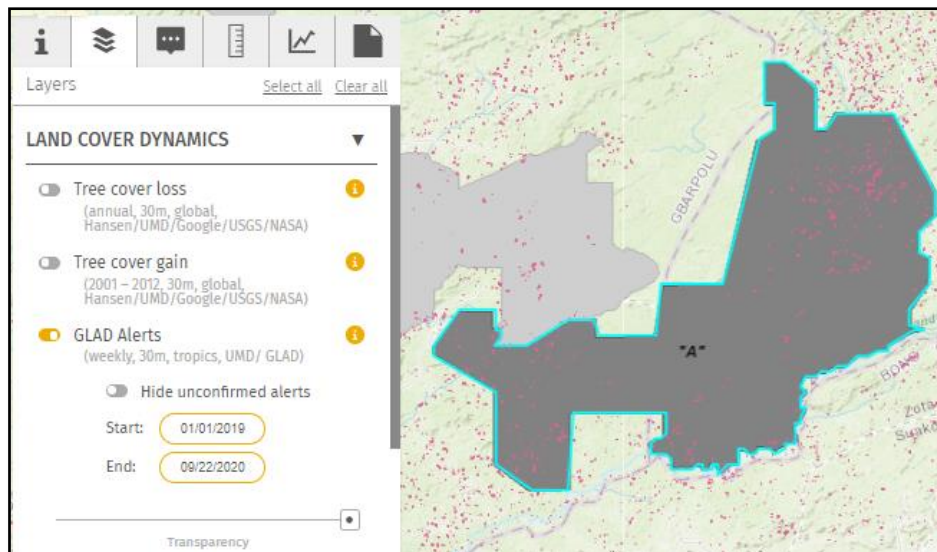
You can also view GLAD Alerts on Forest Atlases, where you can view GLAD Alerts along with local land use data and perform analyzes to determine how many GLAD Alerts have occurred in an area.

View GLAD alerts on forest atlases

Voir les alertes GLAD sur les Atlas forestiers de janvier 2015 à nos jours et les superposer avec les concessions, permis de coupe, infrastructures, forêts communautaires, parcs et autres données locales.

1. Open [Liberia forest Atlas](#) .
2. Go to Forest Atlas Map. <https://lbr.forest-atlas.org/map/>

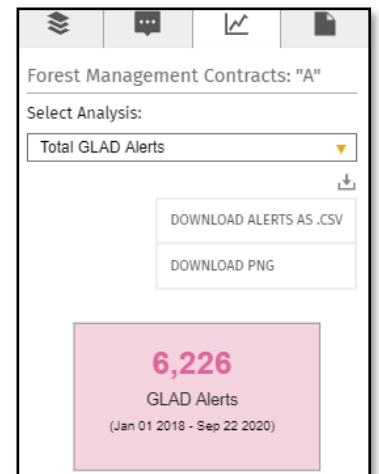
3. You will see the data on Land Cover Dynamics and a data legend to the right of the map.
4. Select a polygon draw a polygon which you are interested.
5. Go to the analyze section and choose Total Glad Alert or Glad Alert per month and run the analysis
6. You can display only confirmed GLAD alerts by selecting "Hide unconfirmed alerts"



Download GLAD Alerts on Forest Atlas

Analyze the Forest Atlas to see the number of GLAD alerts that have occurred in a region of the map from January 2015 to the present day.

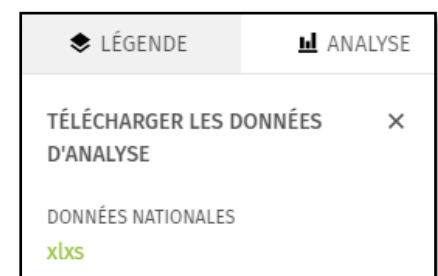
1. Turn on GLAD alerts on the Forest Atlas map together with the dataset you want to analyze.
2. Click on a shape on the map that interests you. NOTE: When there are overlapping shapes, click "Next" in the table to the left of the map to select the shape from the data layer you are interested in.
3. Once you have selected the shape, click the Analysis icon.
4. Select "GLAD Alerts" from the drop-down menu and the analysis will display as a graph showing the number of alerts in the region over time.
5. You can then click the Menu button at the upper right corner of the diagram to print or download the analysis as an image or a CSV file of alerts.



Téléchargez les alertes GLAD sur GFW

Download GLAD Alerts from the GFW map as point data for a specific range of area and dates.

1. Go to the [GFW Map](#).
2. Select GLAD alerts from the Forest Evolution menu.
3. Set the date that interests you.
4. Analyze your area
5. Click on the download icon located under the Analysis tab
6. Click on xlsx data to download the alerts in Excel format
7. The results of the scan will be displayed in the table to the right of the map, informing you of the number of GLAD alerts that occurred in the region during the date you selected.
8. Click on "Download data" and choose the CSV or JSON file.
9. The downloaded file will contain the following attributes for each alert point



Attribut	Libellé
Year	Year in which the alert was detected
Valeur de confiance	2 = alert not confirmed 3 = alert confirmed Alerts become confirmed when a second satellite pass also identified the pixel as an alert. Most of the unconfirmed alerts did not receive another satellite pass, due to the 8 day re-sighting period or cloud cover.
Longitude et latitude	Coordinates lat. /long. alert
Date	Date value from 1 to 365 (Julian year) when the alert was detected
ID	Unique ID of the alert - you can ignore this

10. If you want to convert the CSV to a shapefile:
 - a. Open the CSV in ArcMap by selecting "File," "Add Data," and "Add XY Data»
 - b. Select the longitude for the X coordinate and the latitude for the Y coordinate.
 - c. Choose WGS_1984 for the projection.
 - d. GLAD alerts will then open in ArcMap as a shapefile

Integrate GLAD alerts into GIS programs

When you have downloaded GLAD Alerts, you can view and analyze them in conjunction with your GIS programs such as ArcGIS Online and ArcGIS Desktop.

View GLAD raster data in ArcGIS Desktop

1. Download GLAD Alerts as raster tiles from the GFW Open Data Portal. If you are interested in Confirmed GLAD Alerts, also download GLAD Confidence Values.
2. Open the file (s) in ArcGIS desktop. Since GLAD alerts are stored as different files for each year, you will see the years as different layers in ArcGIS.
3. To view the attribute information for GLAD alerts:
 - a. Use the "Build Raster Attributes Table" tool.
 - b. Click on "Open Attribute Table" to see how many GLAD Alerts either occurred during each date of the year.
 - c. When you click on a GLAD card alert, you will see the following attribute information

Attribut	Libellé
Year	Year in which the alert was detected
Date	Date value from 1 to 365 (Julian year) when the alert was detected

4. If you choose to download the trust data, you will see the following information about the attributes of each trust point on the map.

Attribut	Libellé
Trust value	2 = unconfirmed alert 3 = alert confirmed

5. To shape GLAD alerts and trust data:
 - a. Click on "Properties," then "Symbology. " Use the classified shaping option then select your color scheme and / or symbols to show the progress of alerts over time or to differentiate between confirmed and unconfirmed alerts
6. To set GLAD alerts using the trust value:
 - a. Select the "Reclassify" tool from the 3D Analyst Toolbox.
 - b. For the input format, select the trusted format. (Reclassify the trust format using the values)
 - c. In the Reclassify field, select "Value"
 - d. For old values, select 2 and 3 (the confidence values of unconfirmed and confirmed, respectively).
 - e. For new values, select 0 and 1 (you will reclassify the unconfirmed value of 2 as 0, and the confirmed value of 3 as 1. So, make sure they match on the table)
 - f. Choose where you want to save the new format. The tool will therefore create a new binary format that shows a value of 0 for unconfirmed alerts and 1 for confirmed alerts.
 - g. Select the Time tool from the 3D Analyst Toolbox.
 - h. For the input value, select the binary trust format, then choose GLAD alerts as the input format dataset.
 - i. For the output value, select the location where you want to save the new format. The new format will only show confirmed GLAD Alerts (setting GLAD Alerts to those that coincide with confidence values of 3).
7. To refocus GLAD alerts on a national or subnational jurisdiction:

- a. Open the country and / or subnational border data in ArcGIS.
- b. Select the "Extract by Mask" tool from the Spatial Analyst Toolbox.
- c. Choose GLAD Alerts as your input format.
- d. Select the boundary data you want to use to define the area to fix.
- e. Name the resulting fixed layer. The tool will create a new layer that only shows GLAD alerts for the country or subnational area you selected.

Analyze GLAD raster data in ArcGIS Desktop

1. Select the "Statistics by Area as Table" tool from the Spatial Analyst Toolbox.
2. For the input format or feature area data, select a dataset that you want to analyze (ie concession or logging permit data).
3. For the Area field, select the attribute you want to use to identify the areas of the dataset that you are analyzing (ie the name or number of the dealership).
4. For the input value format, select GLAD alerts.
5. Select the location of the file where you want to save the resulting output table.
6. Select "ALL" for the statistic type to count all GLAD alerts in the area.
7. The result will show a table with the identifying attribute you selected and the count of GLAD alerts for the area.
 - a. Select the dataset you analyzed (i.e. concessions) on the left side of the screen and click "Attach. "
 - b. Choose the field on which the junction will be based: the field you choose in the Statistics by area tool to identify your data (ie: dealership name)
 - c. Select the table you created as the table with which the junction will be made.
 - d. Choose the same field as in step B above for the field on which the junction will be based
 - e. Click « OK. »
 - f. Now your dealership data will have the attribute "Account," which indicates the number of GLAD alerts that have occurred in each region.

View GLAD point data in ArcGIS online

1. Download a CSV file of GLAD alerts as point data from the GFW map.
2. Go to ArcGIS Online and open a new map or saved map project.
3. Click on "Add," and "Add layer from file," then select the CSV you downloaded from GFW.
4. GLAD alerts will open on the map, and you will have several data shaping options:
 - a. To display a heat map of where the alerts are concentrated, choose "Show location only" as the attribute and Heat map for the drawing style.
 - b. To see the progress of GLAD alerts during the uploaded period, select Julian day as the attribute and "Account and Amounts (color)."
 - c. Pour faire la différence entre les alertes confirmées et non confirmées, sélectionnez « Confiance » en tant qu'attribut et « Types (symboles uniques) » pour le style de dessin.
 - d. To differentiate between confirmed and unconfirmed alerts, select "Trust" as the attribute and "Types (unique symbols)" for the drawing style.
 - e. For any of the drawing styles, click "Option" to change color scales, symbols, transparency and more.
 - f. Click "Done" once you have finalized your style.
5. Click on a point on the map to see the year, confidence value, long./lat., And Julian day of the alert.
6. Click on the table icon to see the alerts listed on a table. Analyze GLAD point data in ArcGIS online.

Analyze GLAD point data in ArcGIS online

* NOTE: You must have an ArcGIS organizational account to perform the analyzes.

1. Select the analysis tool, then click "Summarize data," and "Summarize in. "
2. Choose the data layer in which you want to count GLAD alerts (this represents concessions or other data that you download).
3. Select GLAD alerts as a layer to summarize.
4. Choose the analysis you want to perform - for counting GLAD alerts in polygons from another dataset, leave "Scoring" checked, and leave "Field" and "Statistic" unchanged.

5. You can also choose a field to group the results (ie: if you wanted to see a count of confirmed and unconfirmed GLAD alerts or GLAD alerts per year).
6. Name the resulting layer, and choose where the data will be saved.
7. Uncheck "Use current map extent" if you want to analyze for an area larger than what is displayed on the map.
8. Click on "Perform analysis. "
9. The results will display as a new data layer. Either click on the individual polygons on the map to see the sum of the region's GLAD alerts (labeled "Point Count"), or click on the table icon to see the scan results for all shapes in the region

Insert GLAD points into the GPS device

1. If you are using Garmin or a similar GPS device, download the GLAD alert point data as CSV from the GFW map.
2. Import the CSV into your GPS device as custom Points of Interest.
3. GLAD alerts will display on your GPS device. To display only confirmed alerts, first open the CSV in Excel and filter the appropriate data to the confidence values of 3. Save as new CSV