

Update log: Places to Watch: Identifying high-priority forest disturbance from near-real time satellite data, Version 2 (March 2024)

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Summary of changes to the method

Described below are adjustments to the Places to Watch alert filtering methodology to account for improved data and an altered approach to maximize locations that could lead to greater impact.

These changes include switching the alert input from the GLAD-L alert system to the integrated deforestation alert layer which harnesses multiple alert systems to capture a wider variety of disturbances and surface alerts as soon as the earliest system detects a change.

A 5 km grid with a 2.5 km sliding window is now used to identify locations of alerts intersecting priority datasets (Intact Forest Landscapes, protected areas, and primary forest area), rather than a static 10 by 10 km grid. Adjacent grid cells with alerts are merged into a single polygon to avoid multiple entries in the output.

The approach allows more flexibility when selecting the input datasets by which to filter alerts. Since the script now interfaces with the GFW data API, it can call on the latest versions of datasets instead of the static grid which was derived from datasets which have since been updated. This change greatly improves the quality of locations by no longer selecting alert areas which are now within known plantations in the Spatial Database of Planted Trees or sites where there is no current protected area. This change also allows us to focus on identifying remaining intact forest areas, prioritizing locations with the most potential for conservation.

The input datasets for alert intersection now include locations which fall within primary forest or intact forest landscapes (IFLs) within a protected area, instead of solely protected IFLs.

Methods section. Input data:

1. The forest disturbance alert input was changed from the 30-meter Landsat-based GLAD-L alert system to the integrated deforestation alert layer which includes GLAD-L as well as 10-meter GLAD-S2 and RADD alerts which are derived from Sentinel-2 and -1 imagery, respectively. The RADD alerts offer the additional advantage of cloud-penetrating radar data, assisting in the rapid detection of small-scale forest disturbances. A study conducted by Wageningen University in collaboration with researchers from Global Forest Watch and University of Maryland's GLAD lab found that integrating alert systems results in faster detection of new disturbances by days to months and make use of the complementary capabilities of the optical and cloud-penetrating radar sensors to increase disturbance detection.
2. Geographic coverage of alert systems has expanded from 16 tropical countries to the entire tropics.
 - Table 1 featuring "Current extent of GLAD alerts and Places to Watch" was thus removed.

Methods section. Filtering criteria:

1. The 10 x 10-kilometer grid has been replaced upon scoping that a 5 x 5 km grid with a 2.5 km moving window can achieve similar results while minimally affecting processing time. The 5 km grid was also chosen to match other PTW approaches that contain additional filtering, such as for soy-driven or oil palm-driven locations. The moving window acts as a shifted grid, able to capture clusters of alerts split by the edges of grid cells that otherwise may have been divided into sections too small to get picked up as a PTW.
2. The former concern score approach which used a static grid weighted by the proportion of protected areas (accounting for World Database of Protected Areas (WDPA) categories) and the proportion of intact forest landscapes was replaced. Instead, the alerts are now filtered based on whether they intersect the priority datasets (protected areas and primary forests or intact forest landscapes (IFLs)). This was done to avoid selecting grids with alerts that don't overlap the priority layers. Also, the former grid had been created with datasets that have since been updated, such as the WDPA and Spatial Database of Planted Trees. By using the Global Forest Watch (GFW) data API to access the latest versions of datasets to directly filter the alerts, the locations are focused to current protected areas and do not occur within planted forests.
3. The logic has been adjusted so that alerts must overlap primary humid tropical forest or intact forest landscapes (IFLs) within a protected area, instead of solely protected IFLs. The primary forest layer offers an alternative high conservation value land cover to

IFLs; it is a main layer of interest for stakeholders and is the focus of many of GFW's communications (such as annual tree cover loss statistics). Although the extent of the primary forest layer is currently limited to the tropics and the preference for PTW is to use datasets with global coverage, a global primary forest layer is forthcoming.

4. The tree cover loss dataset was also factored into the logic as a mask to filter out alerts that fall in areas of previous loss, as the intent is to focus on previously undisturbed forest. Furthermore, the use of the GFW data API to access the latest version of the regularly updated IFL dataset limits alerts in forest areas that have been fragmented.
5. The method no longer distinguishes between the different categories of protected areas as the original method implemented in the weighted concern score. It was found that the information on these distinctions was often missing or incomplete in many of the protected areas. Therefore, the layer was simplified to include areas with any category of protection status.

Methods section. Identifying Places to Watch:

1. Mentions of monthly curation were adjusted to be more flexible, allowing for PTW curation on regular (monthly, quarterly) or ad hoc basis according to the needs of users.
2. New functionality permits the merging of connected grid cells, capturing larger areas of loss without taking away the opportunity to detect other locations. Figures demonstrating the benefits of this merging capability were added, as well as the benefit of the shifted grid/moving window.
3. The output selection was adjusted so that the original 20 locations in South America are split into 10 that fall within Brazil, and 10 that are located elsewhere in the rest of South America. This was done since the resulting locations of the original method would often all be concentrated within Brazil, usually during periods of large fires, limiting the method's ability to capture locations of high priority clearing in other South American countries.
4. The equation which calculated the concern score for grid cells was removed due to the change in methodology to the filtering by dataset intersection approach.

Results:

1. The results were updated to showcase locations detected using the new method (for alerts from December 1st – December 31st, 2023), removing the figure showing Location of Places to Watch, February 2017. The full archive of PTW locations identified by previous versions of the methodology was not regenerated using the new approach due to the near-real-time use case of the PTW initiative.
2. The figures which referenced the use of concern scores, including the map of concern scores and the distribution of February 2017 concern scores and number of GLAD alerts were removed.

Discussion section. From Places to Watch into Impact:

1. The mention of 30 automatically generated locations was replaced to be more general, as the output number is now flexible but usually outputs 70 automatically generated locations.
2. Detail was added to describe other contextual datasets which are used in the manual review phase of the PTW curation process.
3. A figure was added to display the PTW layer on the map with a pop up of a resulting article example.
4. The figure showing a logging road in Papua New Guinea detected by the original grid approach was removed.
5. The figure documenting the work stream of creating PTW was updated to incorporate changes to the method.

Discussion section. Limitations and Assumptions:

1. Mentions of this being the first iteration of an experimental method were removed.
2. It was added that primary forests, in addition to IFLs and protected areas, adequately represent areas that are most important to the target audience.

Areas for future work:

1. Since the PTW method has already been adapted to identify potential soy and palm oil expansion, new areas of future work were updated to include expanding the commodity-specific filtering possibilities.
2. Additionally, new future work may include adapting the PTW method to identify areas of few alerts, indicating potential conservation success stories.

Updated Data

The following datasets have been replaced with more recent data. Where the “latest version,” is indicated, it means that the method uses the most up-to-date version in the GFW data API. The API regularly pulls updates from data providers if there is a new version of the data available.

1. GLAD-L alert system -> integrated deforestation alerts
2. World Database of Protected Areas (WDPA; IUCN and UNEP-WCMC 2016) -> latest version of WDPA
3. Intact Forest Landscapes, 2013 (Potapov et al. 2017) -> latest version of IFL
4. Spatial Database of Planted Trees -> latest version of SDPT
5. Tree cover loss (2001-2016) -> latest version of TCL