

Image #5: Gold Mining Deforestation Intensifies along Upper Malinowski (Madre de Dios, Peru)

Recall that in [Image of the Week #1](#) we documented how gold mining deforestation continues to expand within the Department of Madre de Dios (Peru) in an area known as La Pampa (1,700 hectares of new deforestation between 2013 and 2015). Here, Image of the Week #5 examines the area immediately to the west of La Pampa along the Upper Malinowski River, where we document over 850 hectares of additional gold mining deforestation between 2013 and 2015. Like La Pampa, most mining along the Upper Malinowski is illegal because it is outside the permissible mining zone and within the official buffer zone of a protected area.

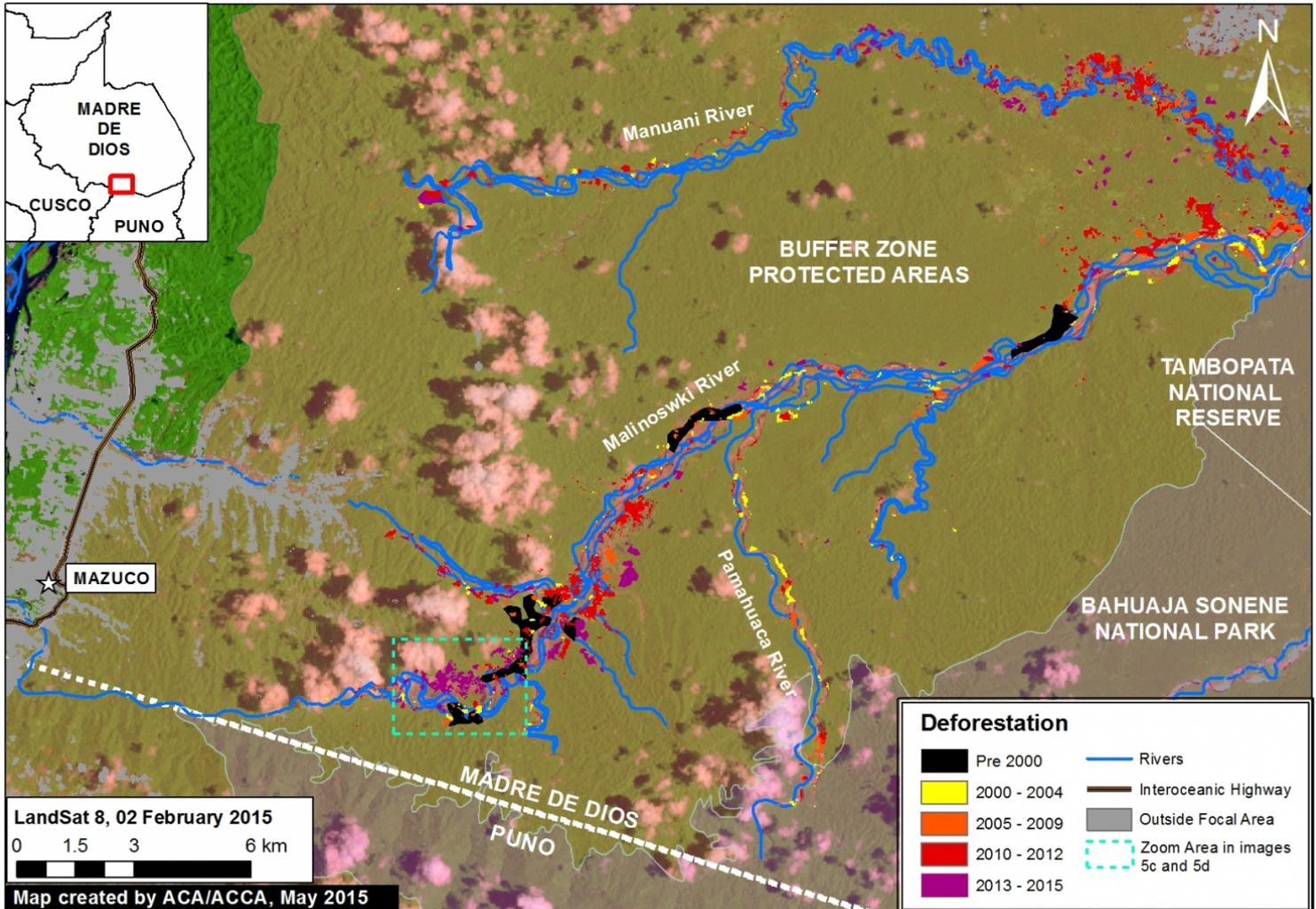


Image of the Week 5a. Expanding deforestation from illegal gold mining along the Upper Malinowski River. Key data sources: MINAM, SERNANP, ACCA, USGS, IBC, Hansen/UMD/Google/USGS/NASA.

Key Results

According to our CLASlite analysis, **864 hectares were deforested between 2013 and 2015 along the Upper Malinowski and nearby tributaries within the buffer zones of the Bahuaja Sonene and Tambopata protected areas.**

Image of the Week Description

Background map is a Landsat 8 image (30 m resolution) from February 2, 2015. Any variation of **green** indicates forest cover. Note there is some scattered cloud cover. Data is from [USGS](#).

Protected areas data is from [SERNANP](#). Dark green indicates established national protected areas and yellow-green indicates their buffer zones.

Black indicates areas that were deforested as of 2000 according to data from the Peruvian Environment Ministry ([MINAM 2009](#)). **Yellow, orange, and red** indicate areas that were deforested from 2000 to 2012 (each color covers a four year period) ([Hansen MC et al. 2013 Science 342: 850–53](#); [Data download](#)).

Purple indicates areas that were deforested between January 2013 and February 2015 based on our analysis of Landsat imagery using [CLASlite forest monitoring software](#).

Madre de Dios Mining Zone

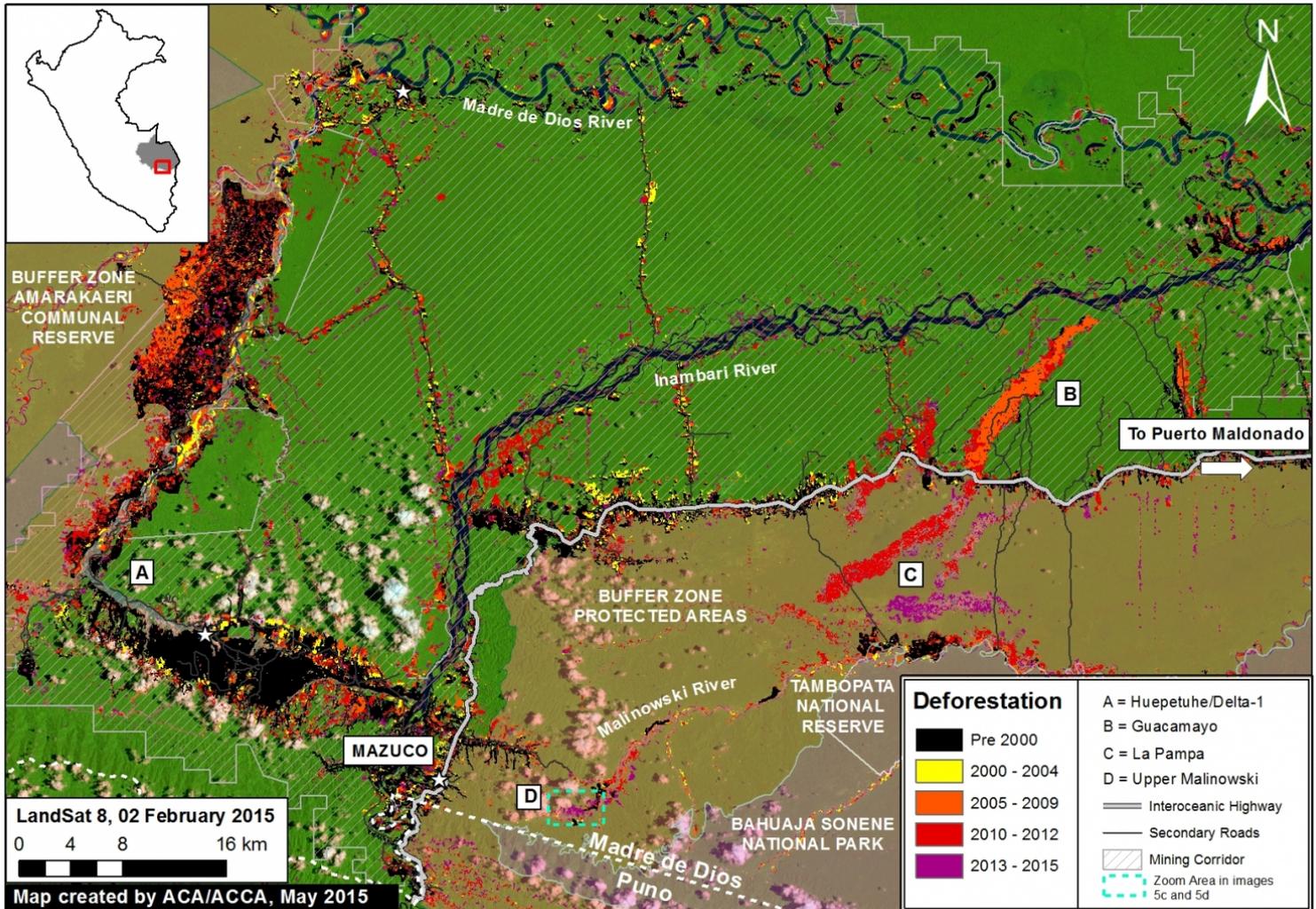


Image 5b. Madre de Dios mining zone, highlighting location of La Pampa and Upper Malinowski. Note that we did not include other land uses such as forestry concessions. Key data sources: MINAM, SERNANP, ACCA, Hansen/UMD/Google/USGS/NASA, USGS.

Image 5b provides greater context of the Madre de Dios mining zone, highlighting La Pampa at "C" ([Image of the Week #1](#)) and the Upper Malinowski at "D".

The **Permissible Mining Zone** was established in 2010 and indicates the zone that the Peruvian Government has delimited as potentially legal for small-scale and artisanal mining activities, but only if miners successfully complete a multi-step formalization process for each project. One of the key steps of this process is to resolve any land use conflicts due to overlapping land claims (for example if a section of the mining corridor overlaps with a forestry concession). Data is from ACCA.

Importantly, note that most gold mining in both La Pampa and the Upper Malinowski is **illegal** since it is located outside the permissible mining zone and within the buffer zone of two protected areas (Bahuaja Sonene National Park and Tambopata National Reserve).

Also note that on the lower Malinowski, deforestation is concentrated on the buffer zone side and largely absent on the

protected area side. This striking pattern indicates that official protection status is much more of an effective deforestation deterrent than the looser buffer zone status.

High-resolution Zoom

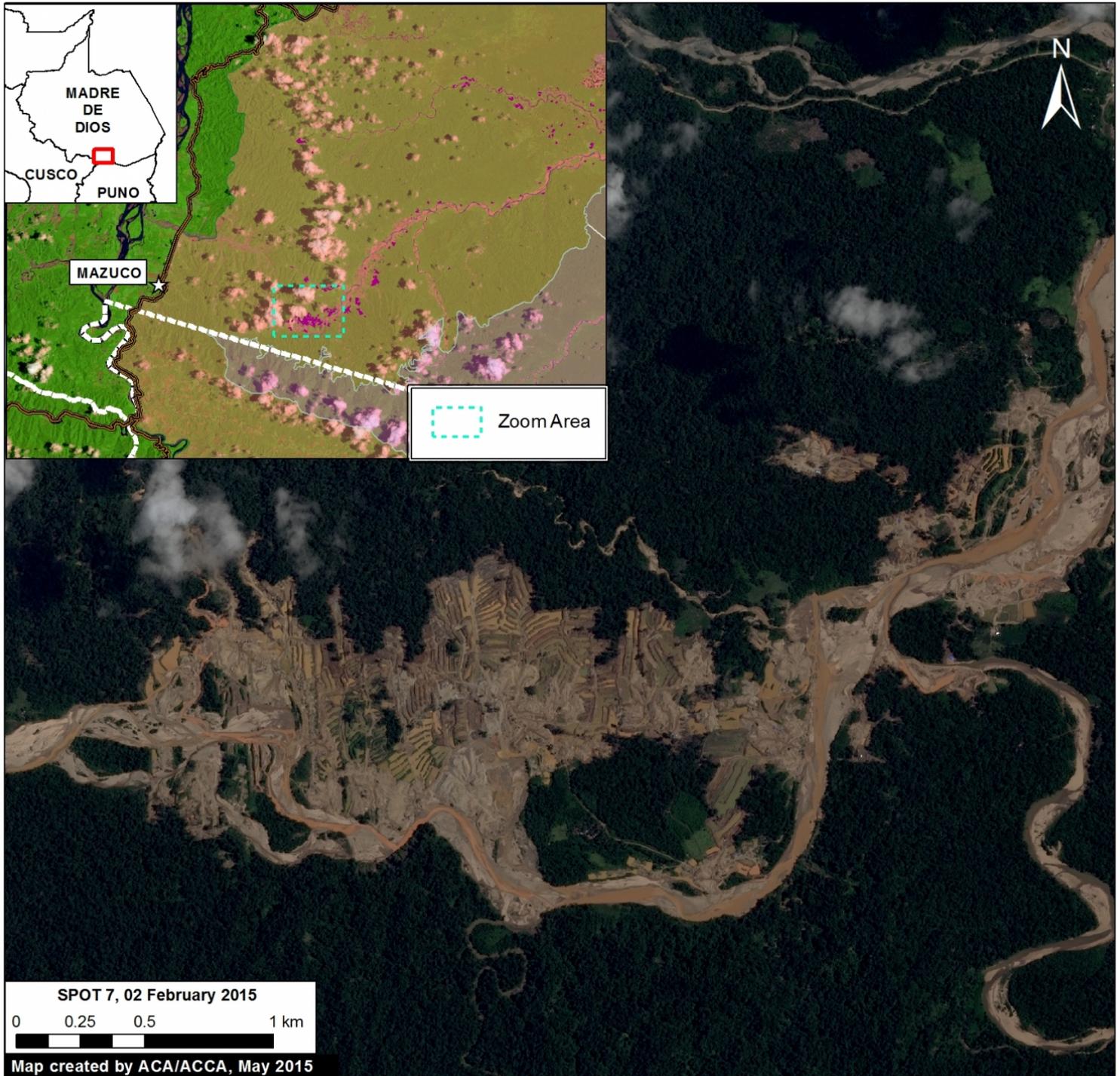


Image 5c. High resolution satellite image of deforestation along the Upper Malinowski River. Key data sources: SPOT 7, CLASlite.

To better understand the driver of the deforestation along the Upper Malinowski, we acquired **high resolution satellite imagery** (SPOT 7 with 1.5 m resolution). As seen in Image 5c, the pattern of the recent deforestation is characteristic of gold mining, and not other possible drivers such as agriculture. Note that the purple outlines indicate areas that were deforested between January 2013 and February 2015 based on our CLASlite analysis (this image shows 492 of the total 864 hectares of recent deforestation).

Satellite Image Time-series

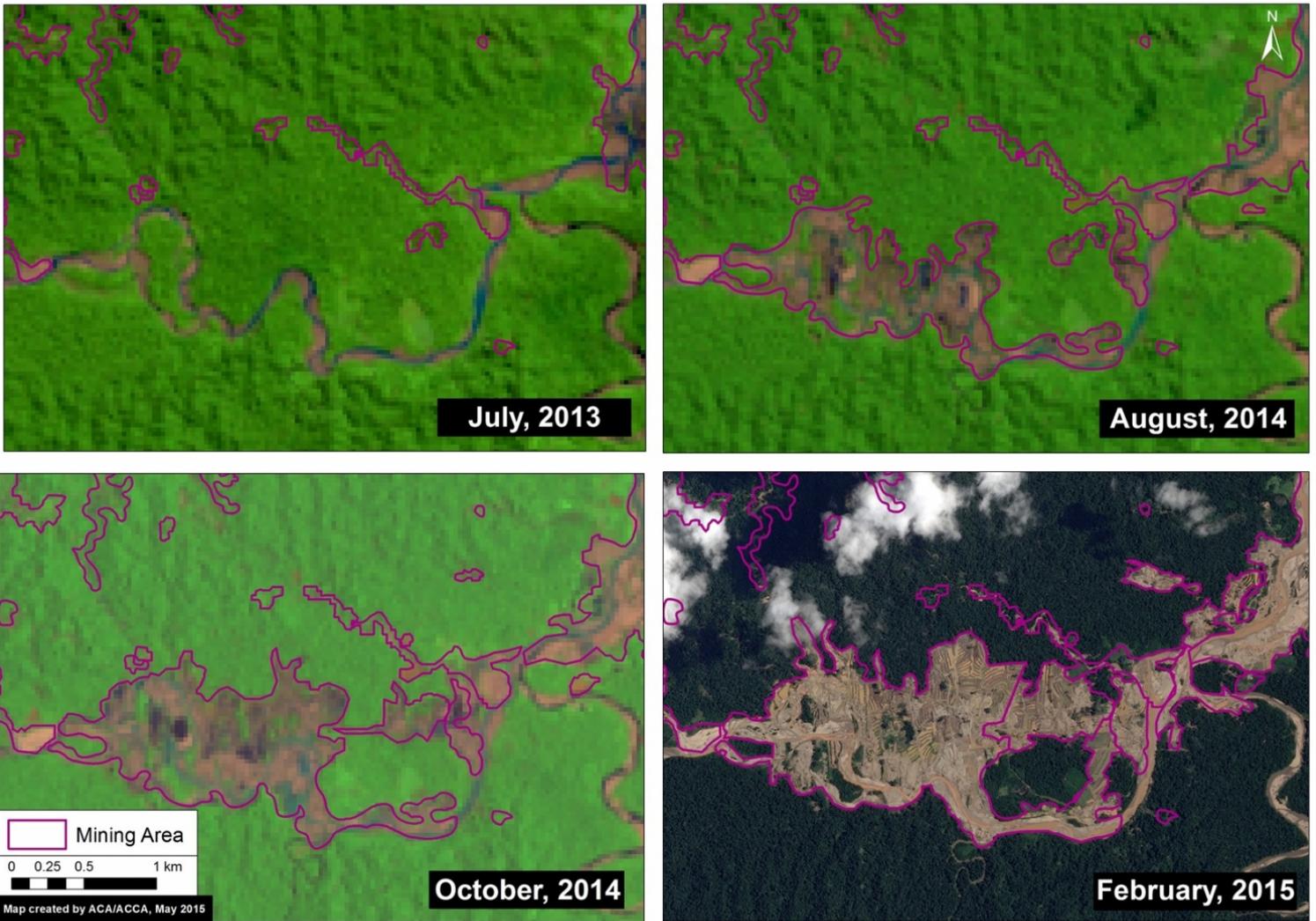


Image 5d. Satellite image time-series (2013 - 2015) of deforestation along the Upper Malinowski. Note that all four panels in Image 5d show the same location. Key data sources: USGS, SPOT 7.

To better understand the deforestation dynamics over time along the Upper Malinowski, we created a satellite image (Landsat and SPOT 7) time-series. As seen in Image 5d, there was a **rapid increase in mining deforestation in the less than two years between July 2013 and February 2015**. Note that all four panels in Image 5d show the same location, but appear different because of the deforestation.

Citation

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