



Environment and Conflict Alert

Burned Area Analysis in Iraqi Kurdistan

1 of 2



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Iraq, Middle East



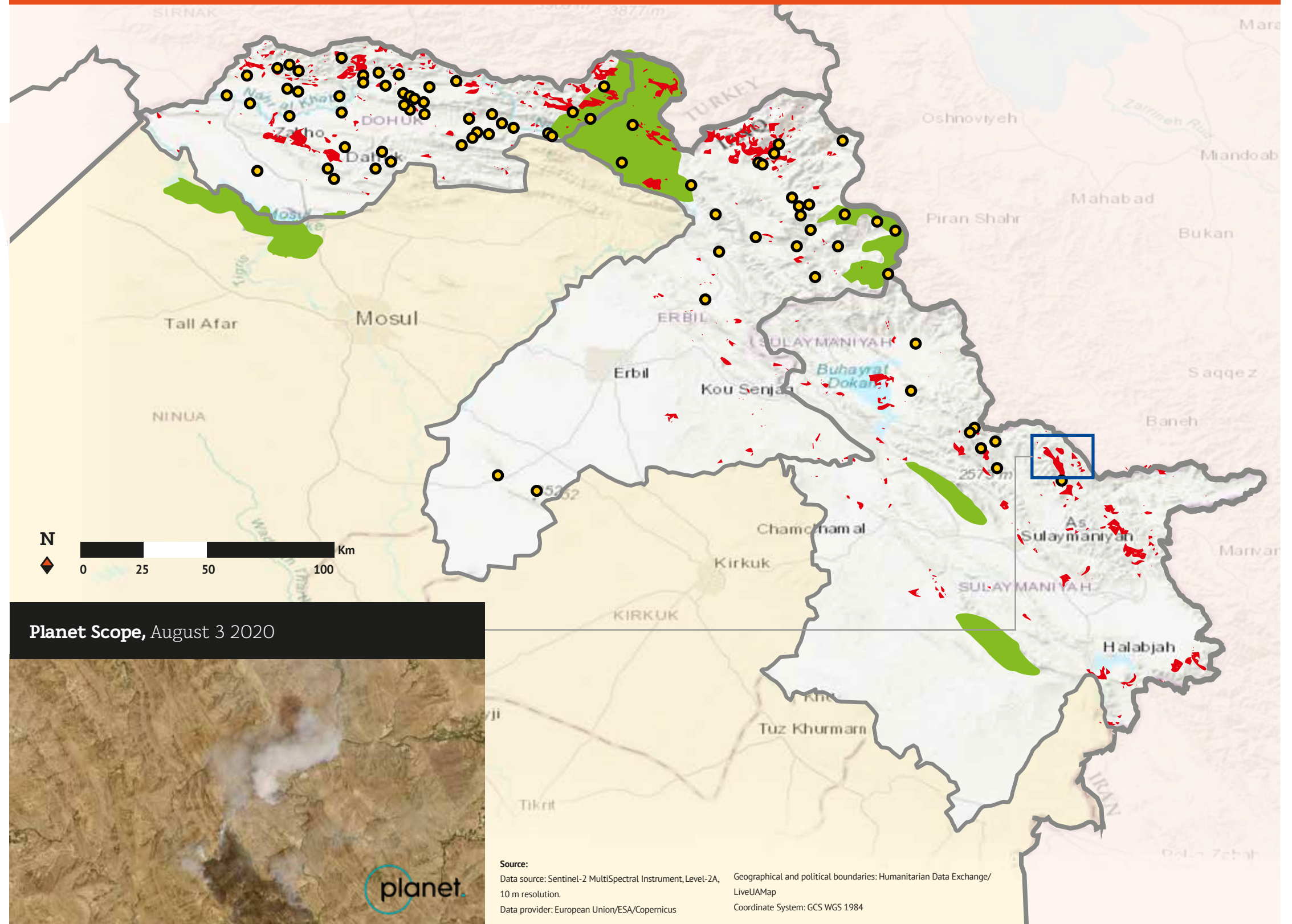
Bombing and burned lands in Iraqi Kurdistan

The data for burned area analysis is Sentinel-2A, 20 m resolution. The VIIRS fire alerts were extracted from Global Forest Watch- VIIRS fire alerts reported between 1st of June and 1st of October each year. Only the high confidence alerts from VIIRS were considered in the statistics. The data we use for the temperature map is MOD11A1.006 Terra Land Surface Temperature and Emissivity Daily Global, 1km resolution, provided by NASA LP DAAC at the USGS EROS Center. The variation between the temperature in year 2020 and 2010 was calculated based on the dataset from 1st of June till 1st of October. The Protected Areas map is based on data from the International Union for Conservation of Nature and Natural Resources.

Legend

- Burned Area, 2020
- Protected Areas
- Artillery/Air strikes (ACLED Event)

Dohuk, Erbil & Sulaimaniya province, North eastern Iraq





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Methodology

In this Environment and Conflict Alert, we have analysed the burned land in Iraqi Kurdistan, namely the governorates of Dohuk, Erbil and Sulimaniyah using Sentinel-2 satellite imagery. The relativized burn ratio was calculated based on Sentinel-2 imagery for burned area identification. We use the dataset of the Armed Conflict Location and Event Data Project (ACLED) on locations of air and artillery strikes in the period of May-September 2020. A buffer zone with 500 meter radius around those locations was used to recognize the burned land that is likely to be linked with the military campaign. To understand if there is a trend, we have also looked at the dataset from 2018 and 2019 for comparison to explore the relationship between airstrikes and burned areas in Iraqi Kurdistan. Earlier environmental [open-source investigations](#) in 2018 demonstrated the increase of conflict-linked fires and burned areas in this region. We also added the difference of land surface temperature during the past 10 years (i.e. between year 2020 and year 2010) to enhance our understanding of the fire from a climate change perspective.

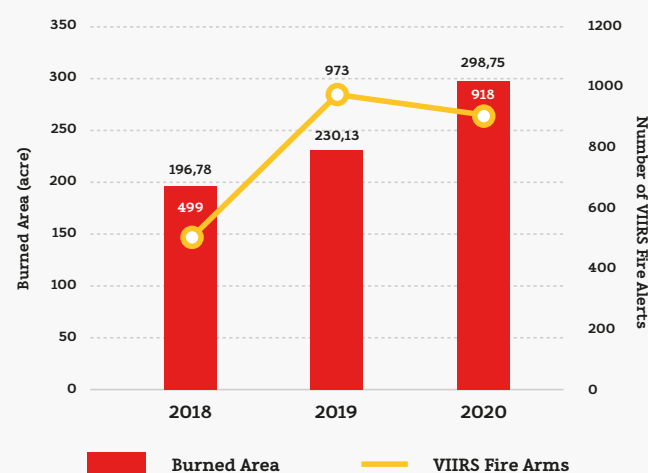
Conflict, Nature and Biodiversity

Roughly 93% of Iraq's woodland is in the Kurdistan area, yet much of it is under severe threat, as its biodiversity and the people who depend on it have been struggling with rapid deforestation. According to Iraq's 2019 [National Report](#) to the Convention on Biodiversity, the root causes are armed conflicts, a lack of [proper](#) management, forest fires, and increasing fuel prices that result in people cutting down trees for firewood and cooking. Host to many [unique](#) species of wildlife, birds and plants, the region also has several [designated](#) 'Protected Areas' by the International Union of Conservation of Nature (IUCN). Some of this area's [species](#) are on the brink of extinction, with serious concerns of the remaining biodiversity in the area. Tree cover loss from (illegal) logging and [fires](#) has been rampant in mountains of Iraqi Kurdistan over the last decades, with an [estimated](#) 20% loss in vegetation since 2014, and a [total](#) of 47% compared with 1999. In some areas, explosive legacies such as landmines from previous wars prevent logging, yet can also [claim](#) lives of firefighters when these contaminated areas burn.

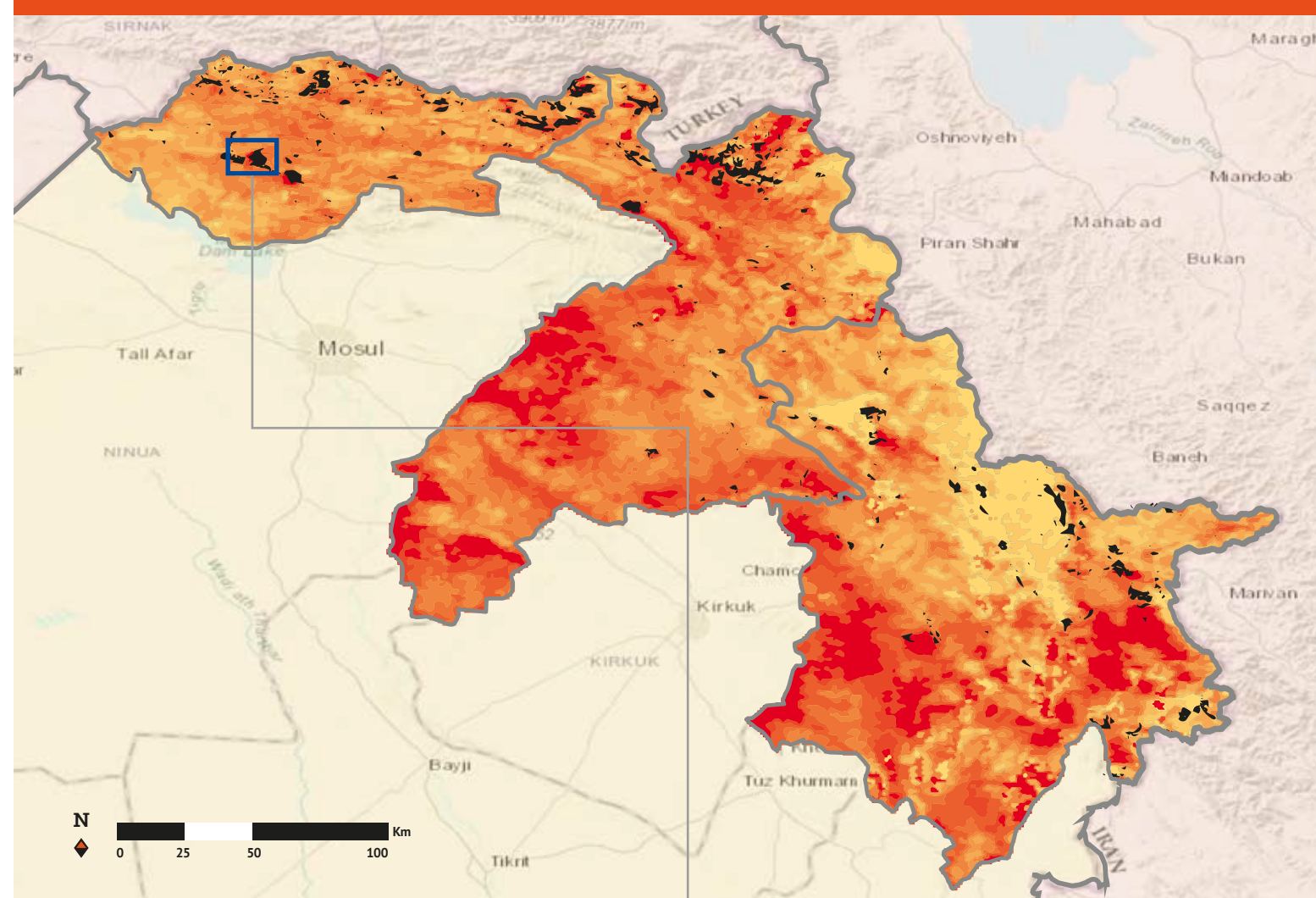
Wars and Wildfires: Results and Analysis

The 2020 military campaign by Turkey and Iran resulted in internal displacement throughout the region, with 504 villages [claimed](#) to be abandoned, most of them in the Dohuk and Erbil governorates. Data by the [monitoring](#) group Airwars shows that the bombings have claimed the lives of at least 15 civilians – and wounded many more, while also [killing](#) two high-ranking military officers. The fires killed livestock and destroyed farms and orchards, impacting livelihoods of local communities. Using the ACLED database of reported incidents, we matched the location against the burned area identified using remote sensing. We found 32 out of 81 reported incidents locations were overlapped with burned areas recognized from satellite imagery, with a total of 49,568 acres of burned land that are likely to be linked with the military campaign based on those numbers. Around 22,659 acres of burned land were in the protected zone. In total 298.750 acres of burned land were detected in the period May-September 2020.

Burned Area and Fire Alerts (June-September)



Surface Temperature Difference 2010-2020, Iraqi Kurdistan



Legend

Burned area

-3 °C

+3 °C

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Image modified with the Wildfire and Burn Scar Visualisation Script for Sentinel-2, written by Pierre Markuse.

Sentinel-2 L1C, July 20, 2020

