

HYDRAFloods

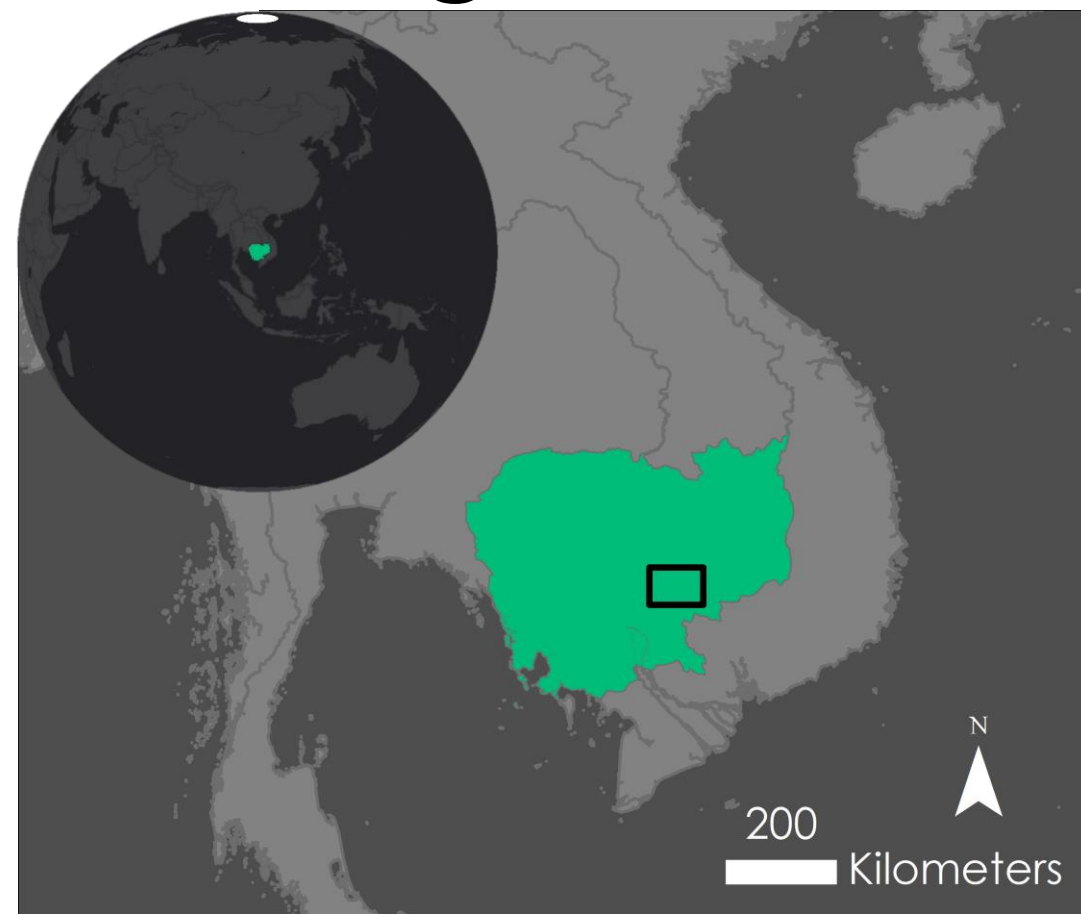
Near Real-Time Mapping of Flood Events Using Multiple Satellite Sensors

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Overview

Information about inundated areas is critical for distributing aid and resources in flood emergency response operations. Conventional methods of monitoring floods, like gauge based observations and reports from local authorities, provide very detailed and accurate information about flood depth and location. However, the geographic coverage of these point-based observations is limited and delays are common. Satellite-based images can help address these challenges, providing near real-time flood extent information over large areas of coverage. The Hydrological Remote Sensing Analysis of Floods (HYDRAFloods) tool, currently being developed by SERVIR-Mekong in collaboration with the Myanmar Department of Disaster Management, is one such example. Generating flood maps, even from satellite imagery, is challenging, given the many disparate sources of information. HYDRAFloods leverages the most recently available remotely sensed data acquired by multiple satellite platforms to automate the creation of daily flood maps. Through combining multiple satellite sources, including optical, microwave, and synthetic aperture radar datasets, near real-time flood maps with reduced cloud impact and increased satellite observations can be generated for use by disaster managers.

Flooding in Cambodia

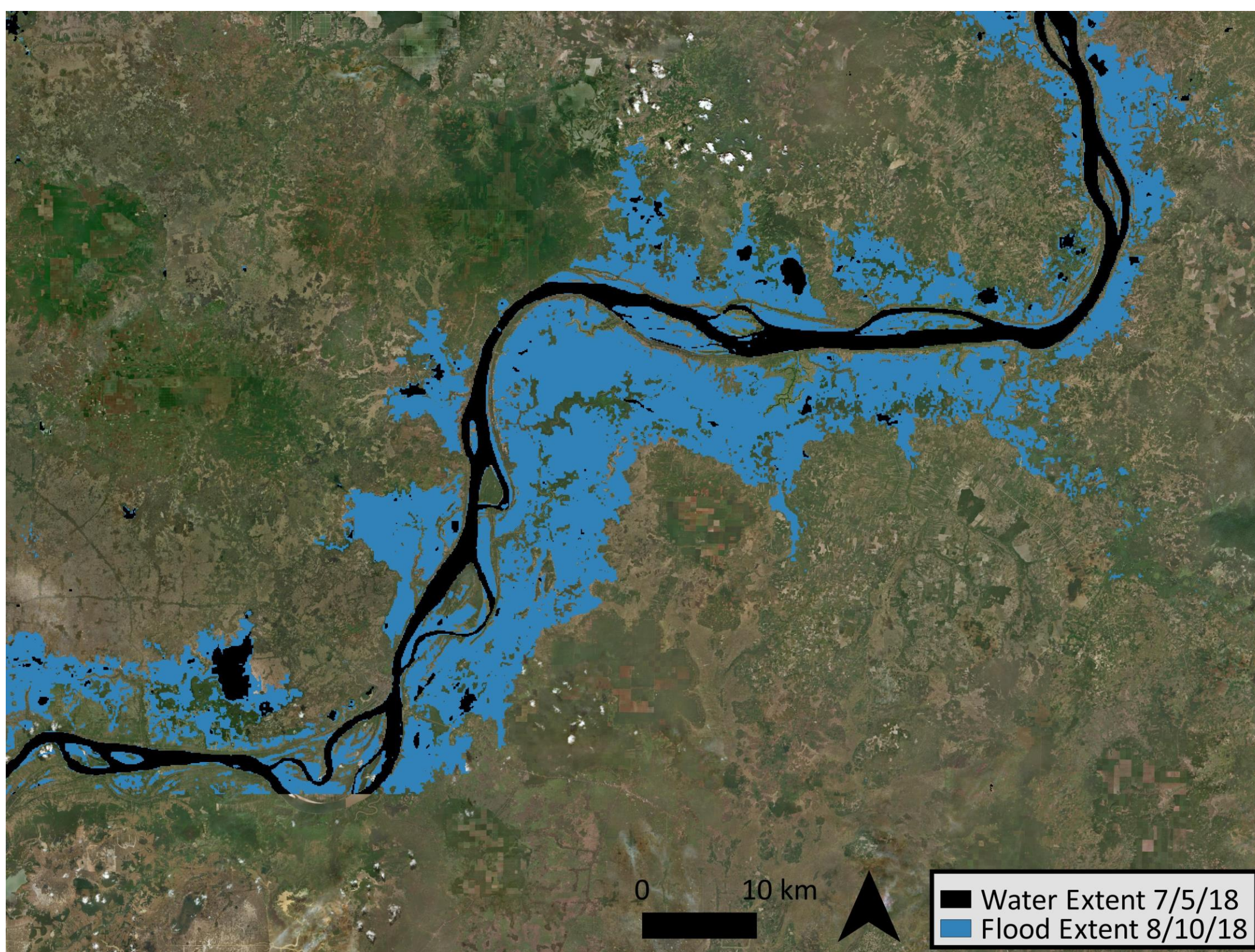


Monsoonal rains in July through August of 2018 caused flooding in Cambodia that led to

- ▶ 18 fatalities
- ▶ Over 80,000 families affected
- ▶ Over 45,000 hectares of crops inundated

Cambodia Sentinel 1 Flood Maps

We showcase here preliminary examples of HYDRAFloods Sentinel 1 SAR flood extent maps in the Cambodian provinces of Kampong Cham and Tbong Khmum generated in Google Earth Engine.

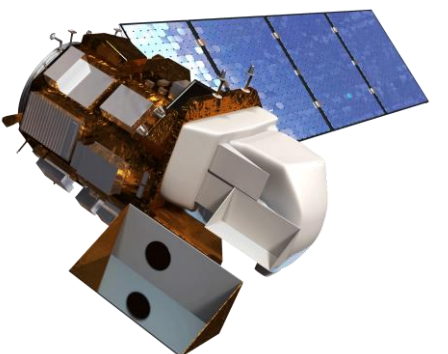


Data Sources: Water/Flood Extent: Sentinel-1 C-band SAR Ground Range Detected, log scaling, European Union/ESA/Copernicus; Base Layer: Bing Aerial

Data Products

Parameter	Platform/Sensor	Spatial/Temporal Resolution/Latency
Brightness Temperature	Suomi NPP / ATMS	16 km / 12 hours / 1-Day
Surface Reflectance	Landsat 8 / OLI	30 m / 16-Day / 4-Day
Surface Reflectance	Suomi NPP / VIIRS	500-1000 m / 1-Day / 1-Day
Backscatter	Sentinel 1a,b / C-band SAR	10-40 m / 6-Day / 1-Week
Surface Reflectance	Sentinel 2a,b / MSI	10-20 m / 5-Day / 1-Week
Elevation	MERIT / SRTM, ALOS	90 m / Static
Historic Water	JRC derived from Landsat 5, 7, and 8	30 m / Monthly (1985-2015)
Accumulated Precipitation	GPM / Constellation	~11 km / 1-, 3-, 7-Day / 1-Day

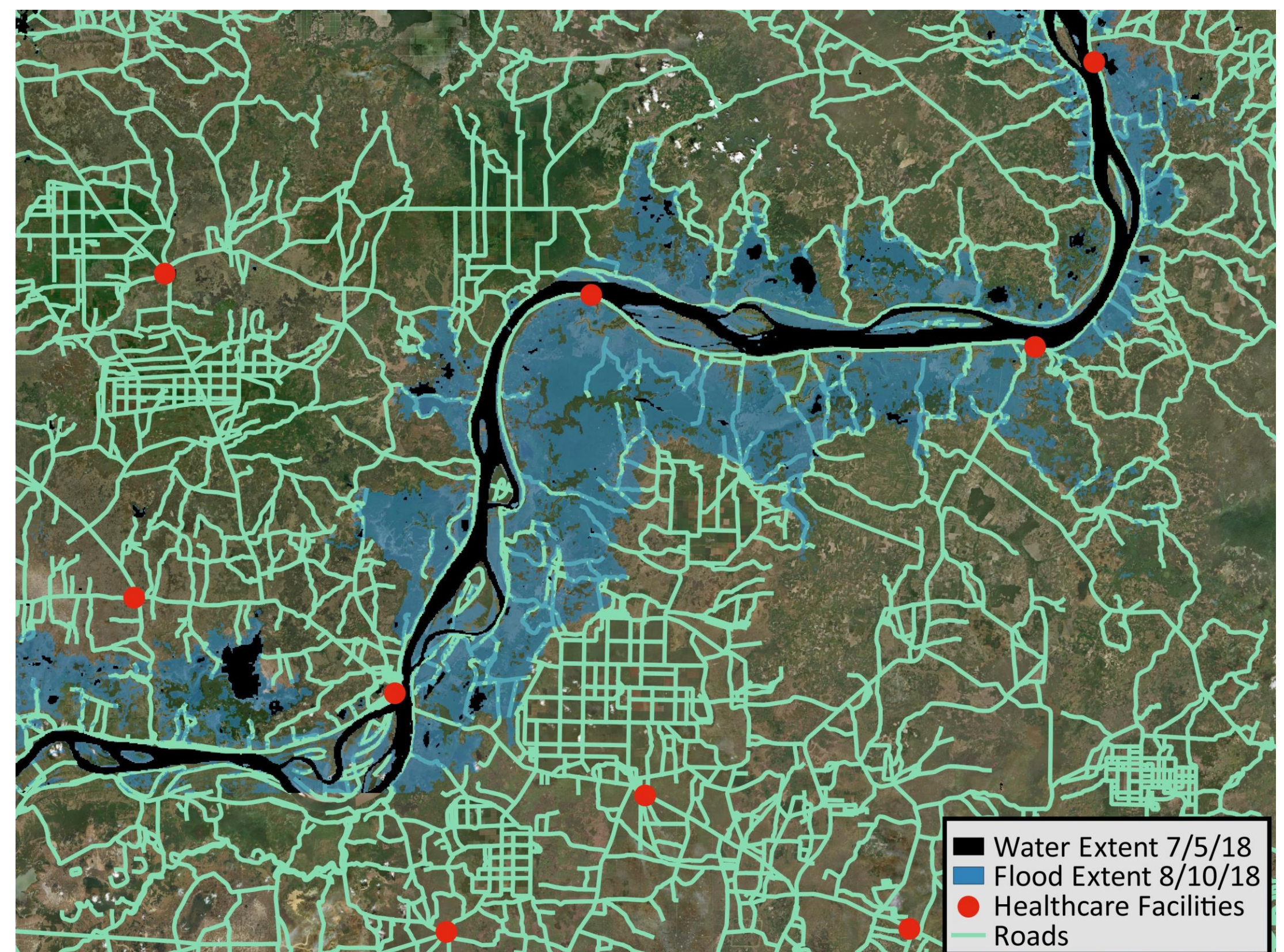
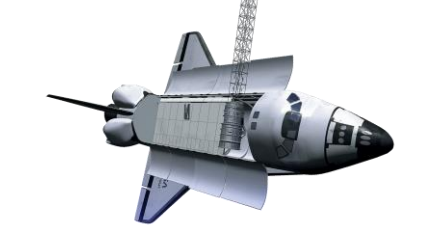
Landsat 8



Sentinel 1



SRTM



Additional Data Sources: Healthcare Facilities and Roads: Humanitarian Data Exchange

Impact

- ▶ Flood maps can be overlaid with population data to channel resources into areas most impacted by floods during and after the event.
- ▶ Critical infrastructure like hospitals, roads, bridges, dams, and water systems may be affected by flood events. Flood maps can be used to identify those areas and plan appropriate response. (See right map)
- ▶ Flood risk maps can be developed from historical flood extents to guide efforts to prevent potential future impacts.

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