Online Dam Inundation Mapping Tool: Model vs. Reality

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SERVIR MEKONG

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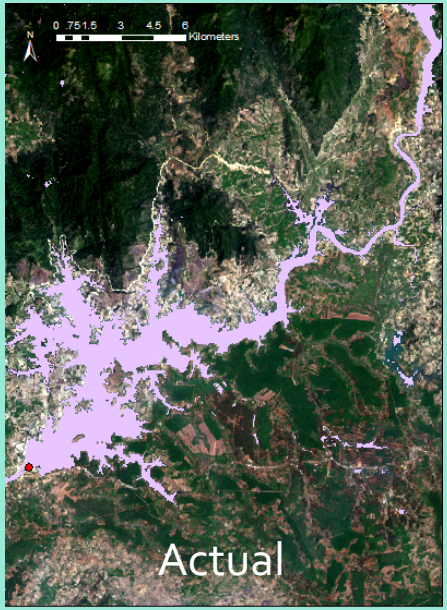
SERVIR-Mekong has created an online platform that provides a geoprocessing service outputting a reservoir footprint and volume calculation. The version of the tool showcased **on the right** uses Tethys as a host platform, and SERVIR-Mekong's Arc server. There are four different possible input scenarios for the tool: one dam with one height, one dam with many heights, multiple dams with one height, and multiple dams with unique heights. The tool uses the digital elevation model from the Shuttle Radar Topography Mission (SRTM-1) as a baseline for the river topography, then uses the Esri Hydrology tools of Fill, Flow Direction, and Flow Accumulation (this methodology has been adapted from Jensen and Domingue [1988]) to create a river system to help the user snap dam locations to, and to determine the watershed for the dam. After a dam location has been identified, the height value is used to extract any values from the DEM that are equal to or lower than the specified height and also upstream from the dam, which returns the reservoir footprint. The volume is calculated by subtracting the value of the elevation within the footprint from the dam height and multiplying by pixel area. The overall accuracy for the case study reservoir area (at one instance) is 0.66.

Screenshot of tool interface



The above maps show an area pre- and post- construction and commission of the Sesan Dam in Laos, PDR. The maps from left to right show: the river and landscape before construction, a true color image of the area after construction, the flooded area predicted by the Dam Inundation Mapping Tool, and the actual flooded area identified using the Modified Difference Water Index from Xu (2006).

Jenson, S K, and J O Domingue. "Extracting Topographic Structure from Digital Elevation Data for Geographic Information System Analysis." *Photogrammetric Engineering and Remote Sensing* 54.11 (1988): 1593–1600. *Photogrammetric Engineering and Remote Sensing*. Web.

Laboratory, Jet Propulsion. "Shuttle Radar Topography Mission: Mission." *http://www.2.jpl.nasa.gov/srtm/mission.htm* (2004): 20 pp. Print.

Landsat Project Science Office at NASA's Goddard Space Flight Center. *Landsat 7 Science Data Users Handbook*. Vol. 2008. N.p., 2008. *Landsat Project Science Office*. Web.

Xu, Hanqiu. "Modification of Normalised Difference Water Index (NDWI) to Enhance Open Water Features in Remotely Sensed Imagery." *International Journal of Remote Sensing* 27.14 (2006): 3025–3033. *International Journal of Remote Sensing*. Web.