

# Potential Damage to Ukrainian Cultural Heritage Sites

Report Coverage: 24 February 2022 to 30 November 2022

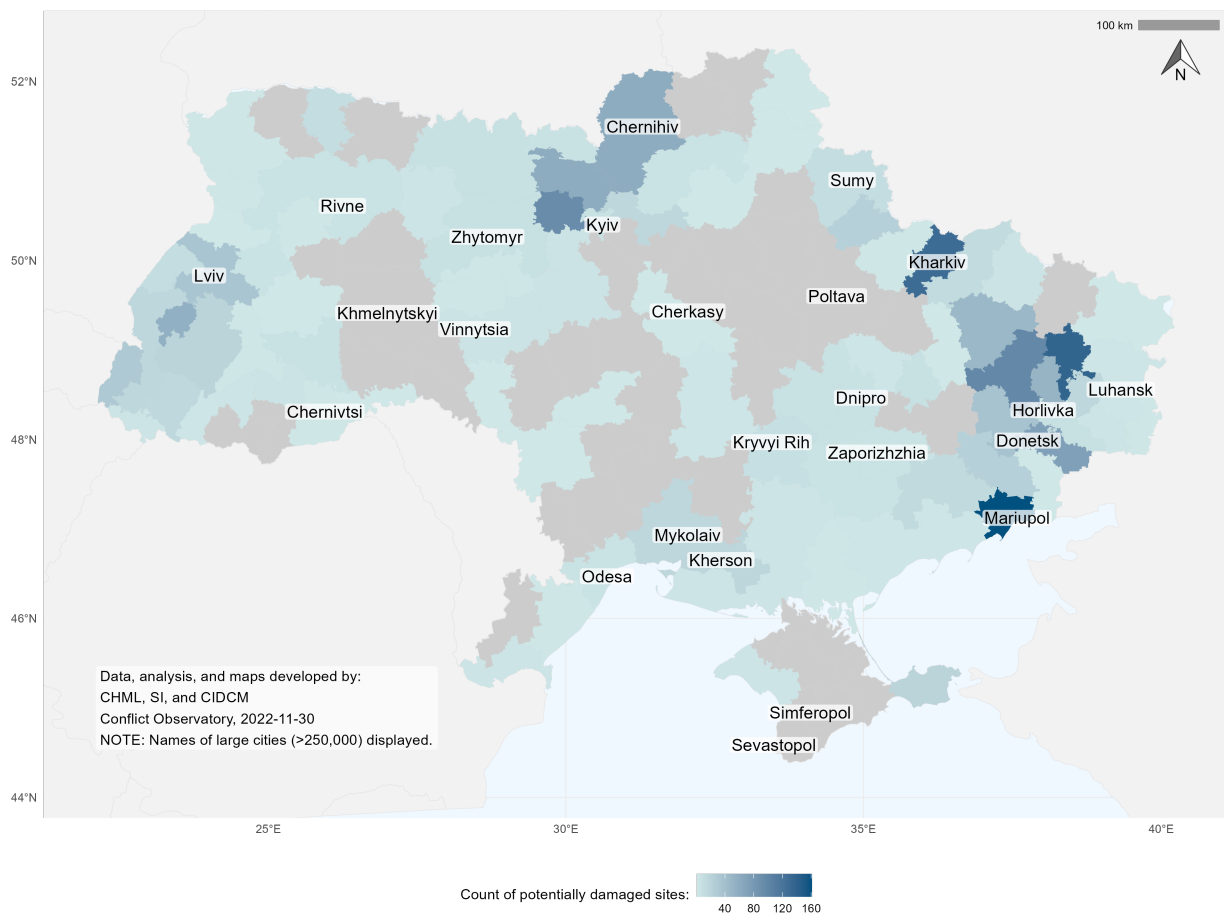


Smithsonian  
Cultural Rescue Initiative



CIDCM  
CENTER FOR INTERNATIONAL  
DEVELOPMENT & CONFLICT MANAGEMENT

**Executive Summary:** This report describes the potential damage to cultural heritage sites in Ukraine that occurred between 24 February 2022 and 30 November 2022.<sup>1</sup> In total, potential damage to 1,602 out of more than 28,500 cultural heritage sites in Ukraine has been identified. This reflects a change of 7 sites from the previous report that covered the period ending 31 October 2022. Overall, damage has occurred primarily in the raions of Mariupolskyi, Sievierodonetskyi, Kharkivskyi, Kramatorskyi, and Buchanskyi. The cultural heritage site types most likely to be damaged during the conflict so far include Memorial/Monument and Place of Worship & Burial.



**Background:** Cultural heritage in conflict is primarily protected by international law under the 1954 Hague Convention, which was adopted in response to the cultural destruction witnessed during

<sup>1</sup>See for previous report: Bassett, H. F., Aronson, J., Cil, D., Hanson, K., Meharry, J. E., Narimanova, N., Averyt, K., Carroll, C., Koropecyk, D. V., Harrell, K., Welsh, W., Wegener, C., and Daniels, B. I. (2022). Potential Damage to Ukrainian Cultural Heritage Sites, 24 February 2022 and 31 October 2022. Virginia Museum of Natural History, Cultural Heritage Monitoring Lab; University of Maryland, Center for International Development and Conflict Management; and Smithsonian Institution, Smithsonian Cultural Rescue Initiative. Available at: <https://hub.conflictobservatory.org/portal/apps/sites/#/home/pages/heritage-1>.

World War II. The Convention, to which Russia and Ukraine are member states, obligates State Parties to “respect” and “safeguard” cultural property in the event of armed conflict. Following Russia’s invasion of Ukraine on 24 February 2022, the international community rapidly responded to the urgent threat to Ukraine’s cultural landscape. Since the invasion, the Virginia Museum of Natural History’s Cultural Heritage Monitoring Lab (CHML) and the Smithsonian Institution’s Smithsonian Cultural Rescue Initiative (SCRI) have been monitoring over 28,500 cultural heritage sites in Ukraine.<sup>2</sup> Between 24 February 2022 and 9 May 2022, CHML, SCRI, and the University of Maryland’s Center for International Development and Conflict Management (CIDCM) confirmed a high frequency of site-level damage in or near the cities of Mariupol and Kharkiv and at places of worship, museums, and monuments across the country. Damage and looting to Ukrainian cultural heritage sites may represent criminal acts, violate the 1954 Hague Convention, and be potential war crimes or crimes against humanity.

**Findings:** A total of 1,602 potentially damaged cultural heritage sites were identified across Ukraine between 24 February 2022 and 30 November 2022, which represents approximately 5.6% of the sites monitored by CHML, SCRI, and CIDCM. Based on analysis, the highest number of sites with potential damage (38.8% total) were in the raions of Mariupol-skyi, Sievierodonetskyi, Kharkivskyi, Kramatorskyi, and Buchanskyi (see map). Memorial/Monument (43.6%) and Place of Worship & Burial (31.9%) were the most common types of sites sustaining potential damage across the country (see table).

Heritage Type	Count	Portion
Memorial/Monument	698	43.6%
Place of Worship & Burial	511	31.9%
Museum	122	7.6%
Library/Archive	108	6.7%
Heritage Building	100	6.2%
Undetermined	34	2.1%
Archaeological Site	19	1.2%
Performance Center	10	0.6%

**Methodology:** This analysis identifies potential damage to cultural heritage sites in Ukraine based on their proximity to non-agricultural fires visible on satellite data and social media posts. To create a list of cultural heritage sites that are potentially damaged, we use remote sensing technologies and a list of over 28,500 cultural heritage sites in Ukraine.<sup>3</sup> For this report, the term cultural heritage site includes archaeological sites, archives, arts centers, libraries, memorials, monuments, museums, and places of worship and burial. Conflict-related damage to cultural heritage sites ranges from complete destruction to partial damage from events such as fire, looting, and observable or unobservable structural degradation. This monitoring effort uses cultural heritage inventory data developed by CHML, SCRI, and CIDCM under the Cultural Heritage Site List (CHSL) data standards established by the Penn Cultural Heritage Center (PennCHC) at the University of Pennsylvania Museum.<sup>4</sup>

<sup>2</sup>Bassett, H. F., Koropecyk, D. V., Averyt, K., Hanson, K., Wegener, C., and Daniels, B. I. (2022). Ukrainian Cultural Heritage Potential Impact Summary (6 April 2022). Virginia Museum of Natural History, Cultural Heritage Monitoring Lab; and Smithsonian Institution, Smithsonian Cultural Rescue Initiative.

<sup>3</sup>This number includes the ruins feature type from the OSM data. Potential damage to ruins is being monitored but excluded from the total number of potentially damaged sites because this category includes both historic and contemporary ruins.

<sup>4</sup>See Daniels, B. I., and Golden, G. (2018). Conflict Culture Research Network: Cultural Heritage Site List Dataset, Codebook 3.0. University of Pennsylvania Museum, Penn Cultural Heritage Center. This data collection effort was supported by National Science Foundation Grant #1439549.

Potential damage to cultural heritage sites is identified using multi-spectral satellite data and credible social media sources. A potentially damaged site is one that has a moderate to high probability of having sustained conflict-related damage based on social media reporting or proximity to non-agricultural fires. A site is categorized as potentially damaged when it is proximate to an infrared signature identified through NASA FIRMS (Fire Information for Resource Management System) data that does not overlap with burned agricultural land.<sup>5</sup> Infrared signatures detected by satellite that do not overlap locations where agricultural burning may be present are likely indicative of conflict activity (e.g., artillery barrages, airstrikes, or sustained direct fire). Proximity between cultural heritage sites and infrared signatures recorded in FIRMS data is based on the resolution of the sensor: 1,000m for MODIS<sup>6</sup> and 375m for VIIRS.<sup>7</sup> Agricultural lands are identified based on MODIS Terra and Aqua Land Cover Type data.<sup>8</sup> Heat signatures detected in agricultural areas are excluded from the analysis of conflict-related potential damage to cultural heritage sites. Sites are considered “potentially damaged” until damage is confirmed or a ground assessment indicates that a property has not sustained damage. CHML, SCRI, and CIDCM teams continue to use high-resolution satellite imagery and open-source research to monitor and confirm ongoing damage to Ukrainian cultural heritage sites. As of 30 November 2022, analysis of high-resolution satellite imagery and open-source research have confirmed damage to 287 of the 1,602 cultural heritage sites with potential damage.<sup>9</sup>

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Learn more at <https://conflictobservatory.org>. Visit <https://www.vmnh.net/research-collections/chml> for information on CHML, <https://culturalrescue.si.edu/> for information on SCRI, <https://cidcm.umd.edu> for information on CIDCM, and <https://www.penn.museum/sites/chc/> for information on PennCHC.

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<sup>5</sup>Koropeckyj, D., Bassett, H., Harrell, K., Welsh, W., and Gunter-Bassett, M. (2022). Impacts to Cultural Heritage in Ukraine. Tearline. Available at: [https://www.tearline.mil/public\\_page/impacts-to-cultural-heritage-in-ukraine](https://www.tearline.mil/public_page/impacts-to-cultural-heritage-in-ukraine).

<sup>6</sup>MODIS Collection 61 NRT Hotspot / Active Fire Detections MCD14DL distributed from NASA FIRMS. Available at: <https://earthdata.nasa.gov/firms>.

<sup>7</sup>NRT VIIRS 375 m Active Fire product VJ114IMGTDL\_NRT distributed from NASA FIRMS. Available at: <https://earthdata.nasa.gov/firms>; NRT VIIRS 375 m Active Fire product VNP14IMGT distributed from NASA FIRMS. Available online <https://earthdata.nasa.gov/firms>.

<sup>8</sup>Friedl, M., and Sulla-Menashe, D. (2019). MCD12Q1 MODIS/Terra+Aqua Land Cover Type Yearly L3 Global 500m SIN Grid V006, distributed by NASA EOSDIS Land Processes DAAC, accessed 2022-08-26.

<sup>9</sup>Koropeckyj, D., Harrell, K., Fitzgerald, K., Maher, A., Bassett, H., Gunter-Bassett, M., and Welsh, W. (2022). Impacts to Cultural Heritage in Ukraine, 1 July through 31 August 2022. Tearline. Available at: [https://www.tearline.mil/public\\_page/impacts-to-cultural-heritage-in-ukraine-july-through-august-2022/](https://www.tearline.mil/public_page/impacts-to-cultural-heritage-in-ukraine-july-through-august-2022/).

Lab; University of Maryland, Center for International Development and Conflict Management; and Smithsonian Institution, Smithsonian Cultural Rescue Initiative.