Potential Damage to Ukrainian Cultural Heritage Sites

Report Coverage: 24 February 2022 to 31 August 2022



Executive Summary: This report describes the potential damage to cultural heritage sites in Ukraine that occurred between 24 February 2022 and 31 August 2022.¹ In total, potential damage to 1,501 out of 28,401 cultural heritage sites in Ukraine has been identified. Damage has occurred primarily in the raions of Mariupolskyi, Kharkivskyi, Sievierodonetskyi, Kramatorskyi, and Buchanskyi. The types of cultural heritage sites most likely to be damaged include Memorial/Monument, and Place of Worship and 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 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

¹See for previous report: Bassett, H. F., Koropeckyj, D. V., Welsh, W., Averyt, K., Hanson, K., Aronson, J., Cil, D., Wegener, C., and Daniels, B. I. (2022a). Ukrainian Cultural Heritage Potential Impact Summary (9 May 2022). Virginia Museum of Natural History, Cultural Heritage Monitoring Lab; and Smithsonian Institution, Smithsonian Cultural Rescue Initiative. Available at: https://hub.conflictobservatory.org/portal/apps/sites/#/home/pages/mm1-1.

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 28,000 cultural heritage sites in Ukraine.² 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 1,501 potentially damaged cultural heritage sites were identified across Ukraine between 24 February 2022 and 31 August 2022, which represents approximately 5.3% of the sites monitored by CHML, SCRI, and CIDCM. Based on analysis, the highest number of sites with potential damage (39.1% total) were in the raions of Mariupolskyi, Kharkivskyi, Sievierodonetskyi, Kramatorskyi, and Buchanskyi (see map). Memorial/Monument (43.8%), and

Heritage Type	Count	Portion
Memorial/Monument	658	43.8%
Place of Worship and Burial	488	32.5%
Museum	115	7.7%
Library/Archive	99	6.6%
Heritage Building	97	6.5%
Undetermined	24	1.6%
Archaeological Site	11	0.7%
Performance Center	9	0.6%

Place of Worship and Burial (32.5%) were the most common types of sites sustaining potential damage across the country (see table).

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 28,000 cultural heritage sites in Ukraine.³ 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.⁴

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

²Bassett, H. F., Koropeckyj, D. V., Averyt, K., Hanson, K., Wegener, C., and Daniels, B. I. (2022b). 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.

³This 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.

⁴See 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.

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.⁵ 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 MODIS⁶ and 375m for VIIRS.⁷ Agricultural lands are identified based on MODIS Terra and Aqua Land Cover Type data.⁸ Heat signatures detected in agricultural areas are excluded from the analysis of conflict-related potential damage to cultural heritage sites. Sites 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. Analysis of high-resolution satellite imagery and open-source research confirmed damage to 207 of the 1,501 cultural heritage sites with potential damage.⁹

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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 CICDM, and https://www.penn.museum/sites/chc/ for information on PennCHC.

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⁵See Koropeckyj, D., Bassett, H., Harrell, K., Welsh, W., and Gunter-Bassett, M. (2022a). "Impacts to Cultural Heritage in Ukraine." Tearline. Available at: https://www.tearline.mil/public_page/impacts-to-cultural-heritage-in-ukraine/.

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

⁷NRT VIIRS 375 m Active Fire product VJ114IMGTDL_NRT distributed from NASA FIRMS. Available online https://earthdata.nasa.gov/firms; NRT VIIRS 375 m Active Fire product VNP14IMGT distributed from NASA FIRMS. Available online https://earthdata.nasa.gov/firms.

⁸Friedl, 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.

⁹See Koropeckyj, D., Bassett, H., Harrell, K., Welsh, W., and Gunter-Bassett, M. (2022b). "Impacts to Cultural Heritage in Ukraine: July 01 to August 31, 2022" Tearline. Available at: https://www.tearline.mil/public_page/ impacts-to-cultural-heritage-in-ukraine-july-through-august-2022/.