Monitoring Cultural Heritage in the Nagorno-Karabakh Conflict:
The Mission and Methods of Caucasus Heritage Watch (CHW)

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Abstract

This paper discusses satellite-based monitoring of cultural heritage sites in the Nagorno-Karabakh region of the South Caucasus, which for decades has been the center of a long-simmering territorial and ethnic conflict between Armenia and Azerbaijan. Following the ceasefire that concluded the Second Nagorno-Karabakh War in fall 2020, the co-authors formed CHW to address the lack of evidence-based documentation of past and present abuses of cultural heritage in this intractable conflict.

Keywords
Heritage monitoring; South Caucasus; Conflict heritage; Remote sensing

1. Introduction

This paper will discuss the work of Caucasus Heritage Watch (CHW), a research collaboration between Cornell and Purdue Universities that came together in the days immediately after the ceasefire to the Nagorno-Karabakh War of late 2020 between Armenia and Azerbaijan. As a team of archaeologists with decades of research experience in the South Caucasus, we formed CHW to address the lack of evidence-based documentation of past and present abuses of cultural heritage in what had become, over the past several decades, an intractable ethno-territorial conflict. CHW emerged from our own long-term collaborations and our long-standing relationships with scholars and heritage institutions in Armenia, including Monument Watch and Research on Armenian Architecture, which have become indispensable local partners.

Our primary work at CHW is to monitor heritage currently at risk of deliberate damage or destruction following the transfer of territories to Azerbaijan's jurisdiction under the 2020 ceasefire agreement and the subsequent ethnic cleansing of the Armenian population from Karabakh in September 2023. However, the impetus behind our seasonal monitoring work is the treatment of cultural heritage in the decades between the end of the First Nagorno-Karabakh war in 1994 and the eruption of the second war in 2020. We will therefore first review the methods and results of our historical research into the fate of heritage sites that were caught in the crosshairs of this enduring conflict. In the process, we will also highlight some of the distinct technical and epistemological challenges to remotely investigating heritage destruction events in the past, as well as impacts to sites as they unfold in the present. But first, a brief background to the conflict, as context for these investigations.

2. The Nagorno-Karabakh Ethno-Territorial Conflict

In the late Soviet period, Nagorno-Karabakh was an autonomous enclave within Azerbaijan with a deeply-rooted majority-Armenian population. Between 1988 and 1994, the first of two hot wars between Armenia and Azerbaijan ignited over this disputed enclave amidst the collapse of the USSR, costing some 20-30,000 lives, and displacing some 1.2 million more, mostly Azerbaijanis. An uneasy ceasefire in 1994 left Armenian forces in possession of the territory of Nagorno-Karabakh as well as seven surrounding districts, calcifying the territorial dispute into what many observers referred to as a "frozen conflict"**.** In fall of 2020, a second brief but devastating war erupted (the Second Nagorno-Karabakh War), which, following a succeeding rapid military operation in September of 2023, ultimately resulted in the expulsion of the entire Armenian population from Nagorno-Karabakh. The ethnic cleansing of Armenian communities left behind a densely built heritage-scape, including large medieval Armenian monasteries, historic churches, and cemeteries intermingled with sites that Azerbaijanis claim as heritage of their own.

The intervening decades between the two wars are often counted among the classic examples of post-Soviet "frozen conflicts" by international observers; but this is a misnomer, as hostilities simply morphed into new forms of violence including attacks on cultural monuments, as both sides staked their claims on narratives of ethnic autochthony and territorial homogeneity. Those intervening decades produced countless rumors of cultural heritage sites destroyed or damaged in territories where Armenians and Azeris had once co-existed for centuries, with little in the way of empirical validation or forensic investigation.

Concern over the fate of Armenian heritage in Azerbaijan initially coalesced in 1998, when eyewitnesses on the Iranian side of the border with Azerbaijan's Nakhchivan Autonomous Republic observed the first wave of destruction at the medieval cemetery of Jugha on the left bank of the Araxes River. According to a report by ICOMOS, they witnessed tombstones at the cemetery, "excavated by a crane and loaded onto railroad wagons on the cemetery grounds" [HW02]. Eye-witness video testimony emerged again in 2005 as Azerbaijani soldiers demolished Jugha's remaining cross-stones, or *khachkars*, with sledgehammers, and the cemetery was then leveled clean by bulldozers. Subsequent reports using satellite imagery brought Jugha's destruction to light, as well as the complete erasure of seven historic Armenian churches in the village of Agulis, which elicited little response from global institutions [MP19].

3. Historical Investigation I: "Silent Erasure"

As a result of these findings, CHW resolved to undertake a full assessment of the entire locatable inventory of Armenian heritage in Nakhchivan. In 2022, we released a 430-page report, entitled "Silent Erasure", that documented in painstaking detail the fate of Armenian cultural heritage in Nakhchivan, the first of two lengthy investigations on the treatment of cultural heritage after the Soviet collapse [CHW22]. For this investigation we examined 159 monasteries, churches, and cemeteries.

One of the greatest challenges of our historical research was simply locating known Armenian heritage monuments on the landscape, since the vast majority were excluded from Azerbaijani heritage inventories. Because most Armenian sites were omitted from official monument lists, published archival resources and publications describing site locations and other orienting details provided the starting point for geolocation. In Nakhchivan, we started with the publications of historian, Argam Ayvazyan [A90], who documented the Armenian monuments of Nakhchivan during the late Soviet era. We then consulted Soviet topo maps of the 1950s-70s, on which most of the monuments were marked, to verify Ayvazyan's descriptions. We also relied on declassified Cold War-era Hexagon imagery that provided us a baseline assessment of conditions during the late Soviet period. Once we confirmed each site's precise coordinates, we could compare their appearance in the historical imagery to recent satellite imagery, photographs, and videos.

These combined resources allowed us to geolocate 127 of the 159 sites, of which we could assess the condition of 110 sites. Out of these 110 sites, 108 (or 98%) had been systematically erased between 1997 and 2010. Through the destruction of historic monasteries, churches, and cemeteries, the entire Armenian heritage landscape of Nakhchivan was eradicated. The most distinctive feature of the destruction was its totality, by which we mean both the completeness of the project (leaving virtually no site intact), as well as the fastidiousness of the obliteration of each individual monument (leaving scarcely any trace). The program of demolition was pursued with such zeal and bureaucratic rigor that in several instances crews were deployed into already abandoned and remote mountain villages to surgically take out the ruins of an Armenian church. For example, the village of Mijin Ankuzik was already in ruins in 1973. Only a winding dirt road and two barns testify to activity in the twilight of the Soviet Empire. By 2009, the roads were fading from disuse and the collective farm a long-neglected ruin; but a satellite image from November 11 of that year shows the remains of the village's Armenian church, last renovated in the 17th century, had been surgically erased, completing the ruination of the village. Sites like the Mesrop Mashtots Monastery, which had stood since before the 15th century, were not just knocked over, they were razed and the site scoured. The 7th century Karmir Monastery was completely denuded after centuries of use. By 2010, all physical traces of Armenians in Nakhchivan were effectively gone. Azerbaijani officials not only deny the destruction, but they also refute that Armenian monuments had ever existed there, a rhetorical culmination of this program of complete cultural erasure.

4.0 Historical Investigation II: "Between the Wars"

Our second historical report, we used a similar methodology to study the treatment of Azerbaijani heritage in Nagorno-Karabakh under Armenian authority from 1994-2020. This investigation, released in 2023, showed that the treatment of Azerbaijani mosques, mausolea, and historic cemeteries under Armenian control was quite variable [CHW23]. Again, using a combination of satellite imagery, photos, videos, topo maps, and scholarly publications we assessed the condition of 109 sites, concluding that 38% remained structurally unchanged since the Soviet period, 44% sustained partial damage, and 13% were destroyed. These findings challenge the Azerbaijani state's official claim that virtually all their heritage was destroyed, damaged, or vandalized while under Armenian jurisdiction.

For instance, while we documented eight instances of mosques that were sacrilegiously repurposed by Armenians as animal pens, by far the most common impact was the removal of metal roofs for scrap. Investigations of the economics of heritage destruction in war zones have centered primarily on the extraction of value through the looting and illicit trafficking of antiquities, but in Karabakh, financial value of heritage extraction turned not on the looting of artifacts, but through the pillaging of fungible materials like metal roofs from mosques and other structures to be reused or sold on the scrap market, a practice that we refer to as "heritage mining." Of the 63 mosques we could geolocate, 35 were looted of their fungible materials. By contrast, virtually all the mosques with *earthen* roofs that could not be stripped and sold, were more often left alone.

With these two retrospective investigations as context, CHW's primary activity is focused on current conditions of heritage sites in the territories of Karabakh recently ceded to Azerbaijan. Given the cultural erasure in Nakhchivan described above, it was clear that hundreds of Armenian heritage sites in Karabakh were also now at risk. Since spring 2021, we have used Planet Labs' commercial SkySat imagery (~50cm resolution) to maintain regular surveillance of vulnerable sites. We are currently on our 12th monitoring mission, assessing over 600 heritage sites in the Karabakh region. As of last fall, CHW has established that Azerbaijan has destroyed 14 heritage sites since the 2020 war, and damaged 14 more. We have also assessed 31 cultural properties facing immediate threat of damage or destruction due to construction activities.

4.1. Monitoring Workflow and Thresholds of Detectability

Our data management and analytical work is based on the ArcGIS platform, which offers the necessary balance between data security and collaboration. For our monitoring program, when impacts are detected, the team confers over the evidence, consults with heritage teams in the Caucasus, debates a course of action, and, when advisable, communicates alerts via social media and shares updates on our monitoring dashboard. As an example of our monitoring process, in May 2021, CHW issued one of our first destruction alerts based on a SkySat image that had captured a view of the historic cemetery in the village of Mets Tagher. The wooded cemetery, visible in earlier imagery as crowded with plots and memorials, had been reduced to a gray earthen smear, a slash of the bulldozer clearly visible amidst the churned earth and dislodged burial markers. The demolition took place during road construction initiated soon after the recent war. Imagery from subsequent missions showed the continuing roadwork, which in its final form barely impinged on the territory of the former cemetery. The destroyed Armenian cemetery was thus not a sacrifice to the needs of development, but a target in its own right.

Our research for both our monitoring and historical reports discussed above have highlighted some of the methodological challenges commonly encountered by remote heritage monitoring projects, which Eyal Weizman of Forensic Architecture neatly captures in the term "threshold of detectability" [W97]. For Weizman, the threshold of detectability lies at the point at which an observed object challenges the capacity of a given sensor to discern it. At its most straightforward, this term refers to the quality of an image needed to visualize impacts to the built environment, which his team uses to investigate state and corporate violence and human rights violations. In addition to Weizman's thresholds, which tend to focus on the optical challenges of detection, CHW encountered

additional thresholds extending to *temporal*, *epistemological*, and *interpretive* thresholds, each encountered at different stages of our investigations.

For example, we confronted a *temporal threshold* of detectability in the critical gap in available satellite imagery between 1986 to 2000, which spans the critical decade of the First Nagorno-Karabakh War and its initial aftermath. After Hexagon imagery in the 1970s, the launch of the IKONOS platform during the early 2000s (later joined by Quickbird and WorldView) provided the first available commercial imagery of sufficient resolution for heritage forensics. And it was not until the 2010s that the pace of image captures in the Caucasus became sufficiently regular to allow for more refined time-series analysis.

5. Conclusion

Additional finer-grained conclusions of our two historical studies and regular monitoring missions, including hundreds of StoryMaps that provide an interactive account of impacted sites and our methods of analysis, can be found on our website (https://caucasusheritage.cornell.edu). Because we seek to shape public fora, we strive to be explicit about the datasets we use and the techniques we deploy to promote transparency and reproducibility. In our experience, state responses to our work have sought to ignore the evidence, delegitimize the technology, and disparage the witnesses. Indeed, critical reactions to our work on social media tend not to marshal evidence to counter our findings but limit themselves to *ad hominem* attacks on our investigative team.

Nevertheless, to date, our findings have been entered as official evidence and testimony with international legislative and juridical bodies, including the International Court of Justice [ICJ23], the United Nations, the British House of Commons, the United States House of Representative's Committee on Human Rights, and the United States Commission on International Religious Freedom. CHW is thus a fundamentally political and ethical intervention. We seek to understand the forces that drive abuses of heritage, evaluate the nature of their impacts, and assess the possibilities that these new tools offer for intervening in programs of cultural erasure. The heritage forensic techniques employed by CHW in Nagorno-Karabakh and Nakhchivan constitute initial steps toward Weizman's civil practice to bring acts of heritage violence into public view.

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