CULTURAL HERITAGE PRESERVATION PROJECTS IN AFGHANISTAN AND CENTRAL ASIA

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In 2021–22, we completed the tenth year of cultural heritage preservation projects in Afghanistan and carried out the third year of our heritage training initiative in the post-Soviet republics of Central Asia. Three cultural heritage grants in Afghanistan have been funded by the US Department of State and the US Embassy in Kabul. The Central Asia heritage project is based in Uzbekistan and supported by the US Embassy in Tashkent.

AFGHANISTAN

Since 2012, we have been carrying out our cultural heritage projects in Afghanistan in partnership with the National Museum of Afghanistan (NMA), whose current director is Fahim Rahimi, and the Afghan Institute of Archaeology (AIA), whose director is Noor Agha Noori. Grants from three sources fund these efforts: Core Operations, the Mobile Museum Project (MMP), and the Afghan Heritage Mapping Project (AHMP). At the US Department of State, our key partners have included Dr. Laura Tedesco, who is responsible for Afghanistan and Pakistan as cultural heritage program manager at the Office of Press and Public Diplomacy, and Jacqueline Viselli, who has overseen financial management of the grants.

In winter 2020, it became impossible for us to work on-site in Afghanistan because of the COVID-19 pandemic. But our international team continued to work remotely in 2021 and early 2022 on all our projects in tandem with the on-site work conducted by our Afghan project staff and local partners in Kabul. By July 2021, the continuing pandemic and the decline in security conditions in Afghanistan made it impossible for even our Afghan team members to continue their work on our projects. As a result, we reluctantly decided to suspend all in-country project work in Afghanistan and shut down the "OI House" in Kabul. On August 15, 2021, the Ashraf Ghani government of Afghanistan collapsed with the military takeover of the country by the Taliban and their establishment of the Islamic Emirate of Afghanistan. At that point, all formal institutional contact between the OI projects and the NMA came to a halt; but our international team's remote work on the three Afghan heritage grant projects continued in the US and Europe. As our three projects entered their final year of funding in 2022, we accelerated our efforts to preserve Afghan heritage through analysis, documentation, and publication.

The Hadda Sculptural Project

In spring 2001, before they demolished the two monumental standing Buddha statues in the Bamiyan valley, members of the Taliban systematically worked their way through the NMA in Kabul, smashing every statue they could find, including hundreds of sculptures that had been recovered by excavations at the early Buddhist monastic center of Hadda, near the Khyber Pass in southeastern

Afghanistan. The museum's curators, at great risk to themselves, secretly swept up and stored the thousands of sculptural fragments (fig. 1). Since its inception in 2016, the OI's Hadda Sculptural Project (HSP) has been working to document, conserve, and reassemble the hundreds of rare early Buddhist, Gandharan-style sculptures from Hadda, while also training the NMA's conservation staff—first through in-person training sessions and then, from 2020–21, through online workshops.

Figure 1. A curator from the NMA with some of the thousands of fragments of rare early Buddhist sculptures smashed by the Taliban in 2001. Photo by Robert Nicklesberg.

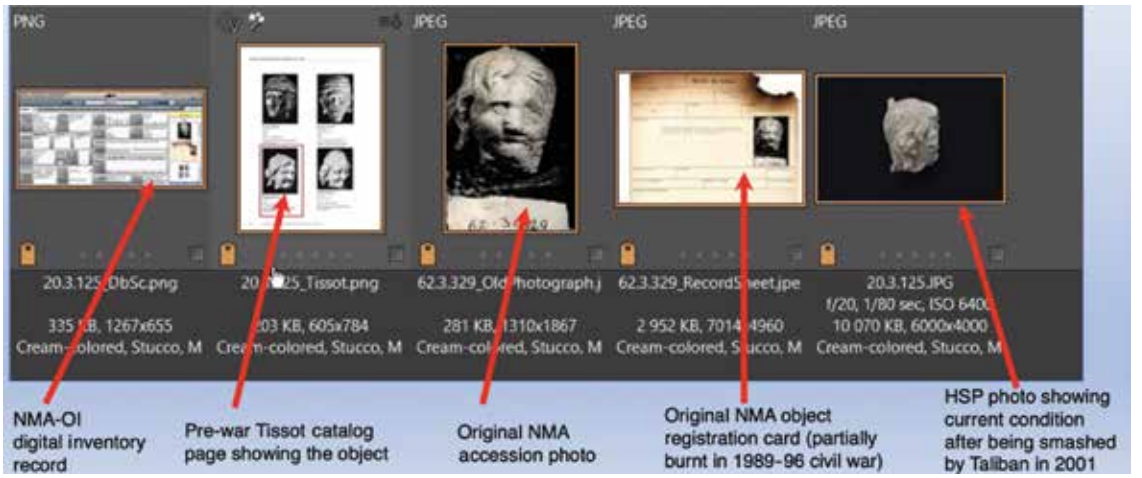

Figure 2. The HSP Digital Assets Management System is an image database for use in both cultural heritage documentation and scholarly research. This folder brings together all relevant images documenting partially reassembled Hadda sculpture 62.3.329.

Figure 3. Left: 3D manipulation of rope impressions on an interior fragment of a Hadda sculpture to produce a "positive" raised relief rendering of the rope fragments. Center: Fragment of 20.3.454, probably part of a seated figure. On its interior (exposed when the statue was smashed) are clearly visible impressions of a bundle of sticks bound together with ropes. Right: Schematic section drawing of the support structure for a multimaterial sculpture, as described by Z. Tarzi (1986) in his publication about the techniques used to fabricate Hadda clay sculptures.

We have sorted, conserved, and documented more than 7,600 sculptural fragments and partially reassembled more than 480 of the sculptures smashed by the Taliban in 2001. We have made 3D digital models of the forty best-preserved, partially reassembled sculptures and used these models to reassemble those sculptures digitally. We have also pulled together thousands of images and whatever records survived of the Hadda sculptures into a searchable digital assets management database as a resource for both cultural heritage documentation and scholarly research (fig. 2).

An especially interesting discovery made by the HSP team is that the sculptural fragments preserve rope and wood impressions on their shattered interiors that allow us to reconstruct the ways the master craft specialists and artists actually produced the sculptures. They started with a core of bundled sticks tied with ropes, then added layer upon layer of progressively finer stucco until they completed, and then painted or gilded, the finished sculpture (fig. 3).

In 2021–22 the HSP team focused on completing our digital image database and on writing a series of technical reports to document the project's analyses and conservation work.

The Afghan Heritage Mapping Partnership

The AHMP with the AIA has focused on three key areas: (1) discovery and spatial inventory of archaeological sites across Afghanistan by using remote-sensing satellite imagery of the country, along with other available resources (Soviet-era maps, aerial photography, and archaeological data from surveys and excavations); (2) detection and monitoring of looting of heritage sites; and (3) training the AIA staff in geospatial techniques for heritage preservation and management. The AHMP Chicago staff included Tony Lauricella, acting director of the Center for Ancient Middle Eastern Landscapes lab; Andrew Wright, project manager; and five students who serve as data analysts. Although we can no longer conduct training sessions for the AIA, we have continued with our primary project goals of site discovery/documentation and detection/monitoring of looting at cultural heritage sites across Afghanistan. In the fifty-seven search areas examined through late spring 2022, the AHMP identified 12,394 sites and 17,230 underground irrigation systems, for a total cleaned dataset of 29,624 locales with cultural heritage significance (fig. 4).

In the seven years since the project began, we have conducted visual searches of approximately 55 percent of the land surface of Afghanistan. The process of visual inspection is highly accurate but is also labor-intensive and time-consuming. To complete coverage of the entire country of

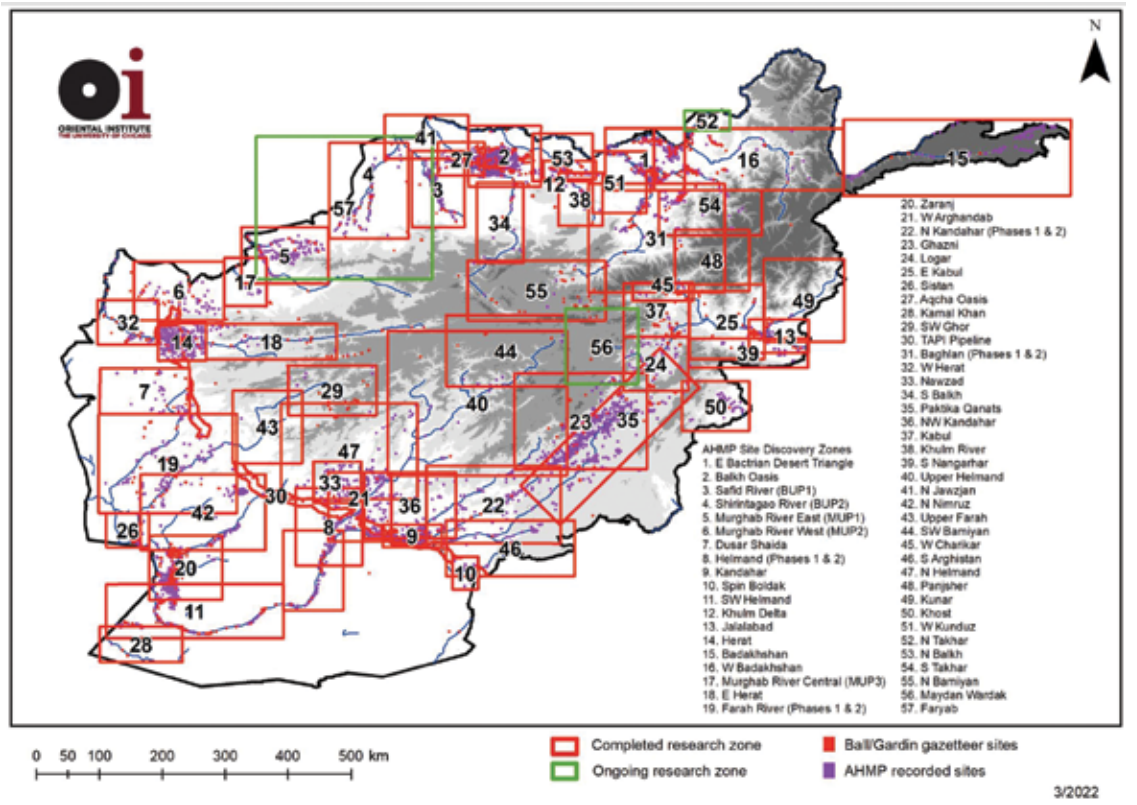

Figure 4. AHMP site search areas though spring 2022.

Afghanistan before the end of the AHMP grant in December 2022, in 2021 the AHMP entered into a collaboration with the University of Chicago's Research Computing Center (RCC) to develop an artificial intelligence (AI) deep-learning model that will teach the RCC computer to scan the remote-sensing images and identify the archaeological sites. In 2021–22 the RCC developed the AI deep-learning model, and our project used its data of thousands of site identifications to train the model to identify the main archaeological site types: mounds, caravanserais, forts ("qalehs") and qanat underground irrigation systems (fig. 5A). After these identifications are made, AHMP data analysts visually check the computer's site predictions to verify their accuracy (fig. 5B). We are using four kinds of remote-sensing imagery: light detection and ranging (LiDAR), BuckEye, Digital Globe, and the Environmental Systems Research Institute (Esri) World Imagery basemap. Together, these imagery classes cover almost the entire surface area of Afghanistan. Once developed and tested, the deep-learning model took just one week to search every LiDAR image of Afghanistan and identify tens of thousands of sites (fig. 5C–D). Our AHMP data analysts are about halfway through the six-month process of verifying every predicted site that has a probability of more than 80 percent. We are now adjusting the model so it can also analyze BuckEye images in the next stage of the project.

The Mobile Museum Project

In 2021–22, the OI's MMP focused on writing *A History of Afghanistan in 100 Objects: Treasures from the National Museum in Kabul.* The NMA is the world's most important repository for the

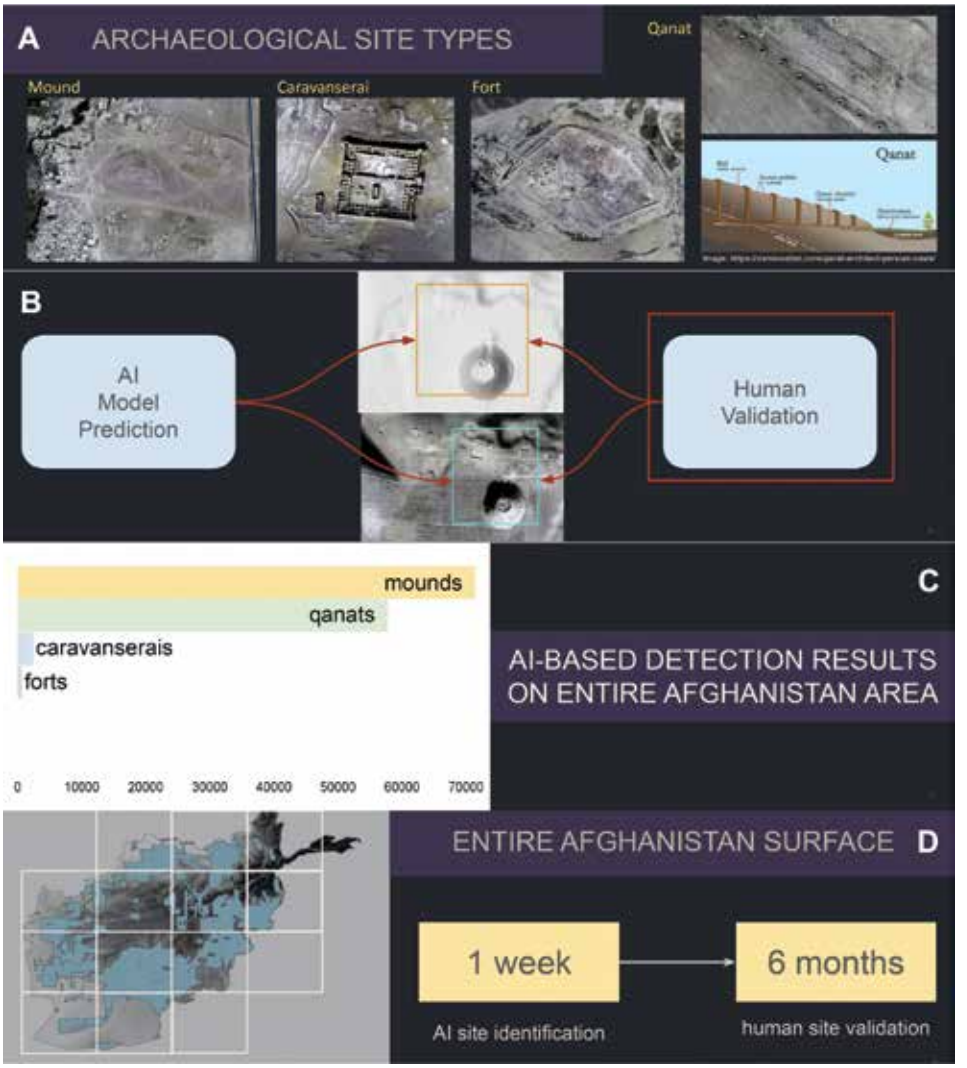

Figure 5. The OI-RCC's AI deep-learning model for computer detection of archaeological sites in remote-sensing satellite images of Afghanistan. *A*, The main types of archaeological sites the deep-learning model has been trained to identify. *B*, Illustration of the deep-learning model's identification of sites at different levels of probability, which are then checked and verified through close examination by AHMP data analysts. *C*, Breakdown of types and numbers of sites identified by the deep-learning model through its examination of the LiDAR imagery of Afghanistan. *D*, Blue areas in the left-hand map showing the parts of Afghanistan covered by LiDAR imagery. The power of the RCC computers allowed the deep-learning model to scan every available LiDAR remote-sensing image and identify all archaeological sites in just one week. We estimate that it will take the AHMP data analysts up to six months to check and verify visually the tens of thousands of sites identified by the model.

artistic masterpieces and objects of daily life that exemplify Afghanistan's 50,000-year history and role in world cultural heritage. The 100 objects presented in the book illustrate the creativity and cross-cultural connections that shaped Afghan culture through the millennia (fig. 6). The chapters are organized by chronological period to highlight the key transformations in Afghanistan's history, from the stone tools of the Ice Age to twentieth-century ethnographic collections.

Figure 6. One of the pieces featured in the MMP's forthcoming e-publication *A History of Afghanistan in 100 Objects: Treasures from the National Museum in Kabul*. The photo shows a gold-and-turquoise clasp of a garment from the "Bactrian treasure" found at Tillya Tepe in northern Afghanistan. The site contained the burials of a Yuezhi tribal leader and his household dating to the first century CE. At that time, the Yuezhi nomads from Central Asia who had invaded Afghanistan were settling down and forming what would become the Kushan Empire. Photo courtesy of Alamy Images.

CENTRAL ASIA

Two cultural heritage projects comprise the OI's pursuits in Central Asia. The C5 Cultural Training Partnership for Artifact Conservation (C5 CTPAC) began in 2018. A second capacity-building program, Cultural Heritage and Economic Development, is currently under development.

The C5 Cultural Training Partnership for Artifact Conservation

The C5 CTPAC is a three-year program of capacity building and advanced training for artifact conservators at the national museums of the five republics of Central Asia: Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, and Uzbekistan (fig. 7). The workshops take place at the State Museum of the History of Uzbekistan in Tashkent, where we have been fortunate to work in partnership with the museum's director, Ms. Jannat Ismailova, and deputy director, Dr. Otabek Aripdjanov.

In September–October 2021, we carried out Conservation Workshop 3, taught by Fabio Colombo (workshop coordinator), Susanne Gaensicke (head of antiquities conservation, J. Paul Getty Museum), and Alison Whyte (OI associate conservator). The training focused on a range of key topics: conservation photography (fig. 8), metal conservation, condition assessment of public monuments (fig. 9), preventive conservation, object assessment and treatment planning, emergency planning, and new technologies for object assessment. The workshop itself was conducted with live translation from English to Russian as the shared language of all participants.

Overall, the OI's cultural heritage projects in Afghanistan and Central Asia span a range of complementary foci. All the projects share the common themes of training local museum specialists in methods and approaches for preserving their own heritage, and all are direct projects that emphasize the concept of "preservation through documentation of objects, monuments, and sites."

Figure 7. C5 CTPAC participants and OI team at Training Workshop 3 at the State Museum of the History of Uzbekistan in September 2021.

Figure 8. Workshop coordinator Fabio Colombo leading photography training in the C5 CTPAC Training Workshop 3 in Tashkent.

Figure 9. Workshop participants learning how to conduct documentation and condition assessment of the Soviet-era cosmonaut monument in downtown Tashkent.

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