Quantifying Archeological Damage: The Operation Antiquity Seizures from Thailand

Joyce C. White,[1] **David J. Welch,**[2] **Judith R. McNeill**[3] **& Todd Swain**[4]

Abstract—"Operation Antiquity" (2002–2014), a United States criminal investigation, exposed the large-scale illicit trafficking of archeological materials from central and northeast Thailand, including Ban Chiang, and their acquisition by complicit dealers, collectors, and museums in the U.S. The investigation led to the seizure of tens of thousands of illegally imported artifacts. This article presents the methodology developed to assess the archeological damage caused by this trafficking as required for legal proceedings under the U.S. justice system. The assessment demonstrates the extensive destruction of Thailand's archeological record resulting from systematic looting and illustrates how damage assessment supports the protection of cultural resources and the prosecution of crimes against archeological heritage.

Keywords: Archeological Looting; Ban Chiang; Cultural Heritage Crime; Damage Assessment; Illicit Trafficking

Background

In the United States, the legal framework for assessing damage to archeological materials is codified in the Archaeological Resources Protection Act of 1979 ("ARPA")[5] and subsequent related regulations. ARPA was originally drafted to address looting, theft, and related damages to archeological resources on U.S. federal and Native American lands. In 1996, the U.S. Government began to apply ARPA to international trafficking cases (Marous & Marous 2006).[6] On the international level, general smuggling statutes, including some several centuries old, and laws such as the U.S. National Stolen Properties Act[7] also have been used in cases involving the illegal import of antiquities (Gerstenblith 2006; Levine 2006). Beginning in 2002, the United States Sentencing Guideline §2B1.5, was amended to apply to cases concerning damage to, destruction of, or illicit trafficking in cultural heritage resources,[8] and became the mechanism for applying ARPA methodology to all federal crimes involving cultural heritage resources

[1] University of Pennsylvania Museum, Philadelphia. Corresponding author. Email: banchang@upenn.edu.

[2] International Archaeological Research Institute (IARII, retired).

[3] International Archaeological Research Institute (IARII, retired).

[4] U.S. National Park Service Special Agent (retired).

[5] See: https://www.nps.gov/subjects/archeology/archaeological-resources-protection-act.htm (accessed 5 August 2026).

[6] See also United States vs Melnikas, 929 F. Supp. 276 (S.D. Ohio 1996): https://law.justia.com/cases/federal/district-courts/FSupp/929/276/1812948/ (accessed 6 August 2026).

[7] See: https://uslawexplained.com/national_stolen_property_act (accessed 5 August 2026).

[8] See: https://www.ussc.gov/guidelines/amendment/638 (accessed 5 August 2026).

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(looting, theft from a museum, smuggling, trafficking), including international cases. Thus, ARPA, in concert with other federal laws, provided one framework for charging and sentencing in cases concerning illegal trafficking of archeological materials with international dimensions.

The U.S. Government has a small number of agents with expertise in investigating the illegal movement of cultural materials; they develop cases in coordination with the United States Attorney's Office (USAO) within the U.S. Department of Justice (DOJ). In 2002, a special agent with the National Park Service (NPS) conducted an undercover investigation of the looting of American Southwest archeological objects illegally removed from federal lands. That case led to the discovery of smugglers and dealers of illicitly imported pre-Columbian artifacts and, subsequently, of dealers connected with museums, galleries, and collectors who also dealt in Southeast Asian antiquities. Over time, the agent uncovered a vast network of individuals, middlemen, scholars, professors, curators, galleries, and institutions involved in a scheme through which museums and private collectors acquired numerous illegally obtained artifacts. Many of these museum acquisitions also involved tax fraud. NPS, Homeland Security Investigations, and the Internal Revenue Service (IRS) conducted a large-scale, multi-year undercover investigation of this network. The U.S. Attorney's Office for the Central District of California (USAOCC) took the lead prosecutorial role over the case under the name "Operation Antiquity" (OA).

As the case developed, legal and logistical complexities and nuances multiplied with dimensions too massive to be reviewed here.[9] USAOCC discussed numerous legal frameworks, statutes, and approaches; since, however, the case was never fully litigated, legal strategies that would have been utilized by the prosecutors are unknown (but see below, Outcomes section). USAOCC did consult with the Royal Thai Consulate-General in Los Angeles and the Thai Fine Arts Department (FAD), including a visit by a federal attorney to Bangkok and a visit by FAD officials to Los Angeles to assist in identifications. These interactions provided important understandings of relevant Thai laws, particularly the 1961 (2504 BE), Act on Ancient Monuments, Antiques, Objects of Art and National Museums. This law outlawed the export of antiques discovered in Thailand and older than 100 years except when permitted by the FAD.[10] In 1972, the Thai National Executive Council passed a law making the purchase, sale, or export of specifically Ban Chiang artifacts illegal without FAD permission (Lyons & Rainey 1982: 8). Ultimately, the 1961 Thai Act provided the key legal foundation for the OA case, even though Thailand was not a State Party to the 1970 UNESCO Convention on the Means of Prohibiting and Preventing the Illicit Import, Export, and Transfer of Ownership of Cultural Property.[11]

[9] Some details including legal filings are available here: https://iseaarchaeology.org/ban-chiang-project/operation-antiquity/ (accessed 5 August 2026).

[10] See: https://media.unesco.org/sites/default/files/webform/mhm001/thailande_act_1961_engl_orof.pdf.

[11] Because Thailand is not a State Party to the 1970 UNESCO Convention, some dealers have argued or assumed that the international trade in Thai or pre-Thai antiquities falls outside the scope of international restrictions (Rachanie 2001). See: https://www.



Figure 1: Law enforcement officers during a museum search conducted as part of Operation Antiquity, 24 January 2008 © Joyce White

Constructing a case involving the looting and/or trafficking of archeological materials requires a team of law enforcement officials, one or more prosecutors, and expert witnesses, including archeologists. Regardless of legal, institutional, and situational complexities, such cases depend on professional assessments to establish the authenticity of trafficked objects. Archeologists may also be called upon to assign monetary damages according to specific protocols defined in ARPA and related legal statutes.

In 2005, the lead author of this article, Joyce White, then a member of the research staff at the University of Pennsylvania (Penn) Museum, was identified as the archeologist with the expertise in the prehistoric material culture of mainland Southeast Asia—particularly the Ban Chiang cultural tradition—needed to assess the authenticity of the majority of objects trafficked from prehistoric sites in Thailand, as well as to determine their likely regional origins and estimate their ages to a degree sufficient to satisfy legal requirements in U.S. courts.

By 2007, USAO offices in California and Illinois determined that sufficient evidence existed to conduct searches of several public museums and one private museum within their jurisdictions, as well as galleries, warehouses, storage facilities, and the residences of individuals investigated in the case. After obtaining search warrants, more than 500 federal agents carried out searches and interviewed employees and suspects in late January 2008 **[Figure 1]**. This article focuses only on the prehistoric materials from Thailand, which made

unesco.org/en/legal-affairs/convention-means-prohibiting-and-preventing-illicit-import-export-and-transfer-ownership-cultural.



Figure 2: Joyce White and a colleague conducting authentications during Operation Antiquity, revealing the extensive scale of archeological damage © Todd Swain

up the bulk of the items. Appropriate experts identified additional items from pre-Columbian, Burmese, and other East and Southeast Asian cultures.

Over the next few years, White evaluated thousands of prehistoric items originating from Thailand during in-person inspections of seized objects at appropriate institutions and storage facilities **[Figure 2]**. Materials generally came from prehistoric sites in northeast and central Thailand dating to the metal age and pre-metal periods (about 2300 BCE–500 CE). These visits resulted in extensive spreadsheets, containing thousands of rows documenting the seized artifacts, which were organized by the institutions and individuals involved.

This article does not examine the legal details of Operation Antiquity, but rather one stage in the preparation of the case. To understand its scale, the prosecutor requested that the expert, White, prepare a preliminary damage assessment based on ARPA guidelines, specifically evaluating the harm caused to Thai archeological sites represented by the seized prehistoric materials. The compiled data from these inventories provided the basis for the assessment report, which calculated damage according to the "archeological value" (AV) of the collections. The AV assessment in this article includes the OA seizures at five of the investigated museums, two of the "middlemen" (smugglers, gallery owners), and six of the implicated individuals. These investigated institutions or subjects are referred to as Museum 1, Museum 2, and so forth and not by the actual name of the institution or person (but see Rod-Ari 2021 for more information). Seizure data are presented in **Online Appendix 1**.[12]

Overview of the Legal Framework

Since ARPA's codification in 1979, a significant body of regulations, methods, and procedures has developed along with relevant publications and technical reports. McAllister et al. (2019) provides a recent brief overview of damage assessment in archeological cases with links to useful technical briefs. An edited book, *Presenting Archaeology in Court* by Hutt et al. (2006), provides concrete examples where the ARPA law has been instrumental in U.S. court cases dealing with site destruction or trafficking in antiquities and other domestic cultural properties, including international examples.[13]

[12] Available at: https://doi.org/10.69486/114.2.2026.3b.

[13] This link provides gateways to more information

In the U.S., cultural property cases may require an assessment of monetary damages before defendants are charged and tried. Such assessments allow prosecutors to evaluate the scale of the crime as they prepare their cases. Once a defendant is convicted of an archeological crime, they are sentenced, typically based upon the total amount of theft, damage, or vandalism stated in monetary terms. For sentencing, value calculations involve not only the documentation of stolen or damaged materials but also estimates for repairing the vandalism and curation of damaged materials. Of particular importance for archeological cases, according to ARPA guidelines, "damage is also assessed for the affected sites", not only the trafficked objects. Assigning monetary values follows the systematic process outlined below.

In addition to these basic legal system precepts, a plethora of other relevant legal standards and rulings must be followed. For example, in U.S. courts, "expert witnesses" must meet certain criteria: only a person found to be an expert may offer opinions or conclusions as part of their testimony. Non-expert witnesses may only testify to facts they personally know. For an archeologist to testify as an expert in U.S. court, she or he likely will need an advanced degree as well as significant work experience in the area and material culture involved in the case. It is also not enough for expert witnesses to guess the financial amount of theft, damage, or vandalism. Empirically based numbers must be assigned following specific procedures, including line-item budget estimates, and numbers must be defensible under the scrutiny of defense counsel and reasonable in the eyes of a judge.

Components of Damage Value Determinations

ARPA Uniform Regulations issued in 1984 define three values in cultural property cases that must be calculated by expert witnesses:

1. *Commercial Value* (CV)—The fair market value of an item between a willing seller and a willing buyer. In some cases archeologists make these assessments, but commercial appraisers who assess property for insurance or estate purposes may be engaged in this determination.[14]
2. *Cost of Restoration and Repair* (R&R)—The cost to quantify and document the damage, repair the damage, and stabilize and curate the affected items.
3. *Archeological Value* (AV)—What it would cost archeologists to do a legitimate excavation and documentation of the same proportion as represented by the damaged site during criminal activity. The underlying purpose of the AV is to quantify in monetary terms the loss of knowledge and information that occurred because of the looting. The AV recognizes that it is not simply the seized artifacts that have value, but that, in terms of

on ARPA and its applications in value determinations: https://www.nps.gov/subjects/archeology/archaeological-resources-protection-act.htm (accessed 20 July 2026).

[14] Note, since the 1970s, U. Penn Museum and many other public institutions nationwide have policies prohibiting staff on ethical grounds from appraising archeological objects for market, donation, or insurance values.

scientific and historical information, the archeological context (where the artifact is located in a site, what it is associated with, etc.) is of the *greatest* value. Context allows archeologists to determine an artifact's age and function within a society and to reach conclusions about the community that used it. Looters invariably destroy this contextual information.

A hypothetical example illustrates how the three aspects of this methodology might work for a site looted in the U.S.:

- Looters dig a one-meter square hole that is one meter deep in an archeological site in a national park. From this hole they recover an intact ceramic vessel they sell for US$100.
- CV: While the looters sold the vessel for US$100, the commercial value might be different if the expert finds similar pieces that have sold for more or less. For this hypothetical example, the looter's sale price will be considered the fair market value.
- R&R: Measuring, mapping, screening back dirt, and documenting the damage at the looters' pit are all considered legitimate costs in the R&R assessment. While the looters were only interested in retrieving an intact object, they likely tossed aside many other finds of scientific value, such as human and/or animal bones, tools, and pottery shards from cooking and other vessels. The R&R calculation includes wages of an archeologist and archeological technician to conduct field work to document the damaged site, sift the disturbed dirt, and record materials thrown out by the looter (a one-day cost for the two employees of US$500), and, in the office, to complete site forms, examine and estimate the date of the ceramic vessel, and write the R&R damage report (four more days for a total of US$1,280). Additionally, the curation and perhaps repatriation of the looted ceramic vessel must be calculated, which might cost US$500. Thus, the total R&R in this hypothetical example is US$2,280.
- AV: The looters' hole is comparable to a standard archeological unit (1 cubic meter), so the archeologist can reasonably price the costs for a legitimate scientific excavation of a comparable unit, study the finds, and produce the documentation in a report. This price includes legally required planning (consultation, permits, hiring excavation staff, acquiring equipment), curating and analyzing the excavated materials, dating the site, recording, photographing and illustrating the finds, and writing the final report. This cost could reasonably be around US$10,000.
- Overall, CV: US$100; R&R: US$2,280; AV: US$10,000; total components used for sentencing: US$12,380.

In this hypothetical example, the defense will likely aim to convince the jury and judge that the total cost of the damage and loss is merely the commercial value of the looted ceramic vessel (US$100). The archeological expert must provide firm and defensible numbers for R&R and AV, particularly damage that has been done to knowledge that could have been acquired with scientific excavation and the study of the site's

deposits if it had not been looted. These numbers provide the prosecution and court with the information they need to charge, try, and sentence the case.

Distinctive Aspects of Operation Antiquity Damage Assessment

The OA damage assessment had a number of distinctive features. As usual, professional appraisers made CV determinations, while the prices that middlemen, auction houses, and galleries charged for the smuggled items were also considered. Regarding R&R costs, because the locations where the pits had been dug to acquire the looted items could not be determined, calculating a large portion of the R&R costs became problematic. Therefore, the prosecutors asked the archeological experts to focus on the AV, as the statute specified:

> (a) *Archaeological value*. For purposes of this part, the archaeological value of any archaeological resource involved in a violation of the prohibitions in § 7.4 of this part or conditions of a permit issued pursuant to this part shall be the value of the information associated with the archaeological resource. This value shall be appraised in terms of *the costs of the retrieval of the scientific information which would have been obtainable prior to the violation*. These costs may include, but need not be limited to, the cost of preparing a research design, conducting field work, carrying out laboratory analysis, and preparing reports as would be necessary to realize the information potential (1984 ARPA Uniform Regulations, § 7.14; emphasis added).[15]

In cases of looting on U.S. federal lands, objects are sometimes traceable to specific sites and specific looters' pits at those sites. In those cases, archeologists can measure the disturbance, assess the kind of site, the kind and amount of finds based on both trafficked items and back dirt contents, and then calculate the cost of a proper scientific investigation to retrieve, study, and document the site as if it were undisturbed.

Because linking the thousands of objects identified by Operation Antiquity to specific looters' pits in Thailand was impossible, a different methodology to calculate AV became necessary. During the investigation period of 2002 to 2008, the NPS undercover agent learned that participating persons and institutions knew that prehistoric artifacts came from on-going looting in Thailand. Several suspects visited these looting operations and middlemen showed the agent photos of ongoing looting and described in detail how the looting and smuggling worked. Moreover, some of the seized materials had not yet been cleaned, for example, copper-base[16]

[15] The full text concerning archeological value is stated at: https://www.ecfr.gov/current/title-43/subtitle-A/part-7/subpart-A (accessed 20 July 2026).

[16] Metal artifacts, when greenish-blue, likely have copper in their composition. If no elemental analyses determined the exact composition of the artifact,



Figure 3: Uncleaned copper-base prehistoric bangles encircling arm bones © Glen Anderson

bangles encrusted in dirt encircling the arm bones of the deceased **[Figure 3]**. This indicated these materials had been rapidly removed (robbed from graves), boxed, and shipped to middlemen in the U.S. The investigation showed that the smuggling, trafficking, and museum donation scheme began at least as early as the 1990s.

The OA searches aimed to document all prehistoric objects from Thailand at the search locations, based on the 1961 Thai Act specifying the requirement for FAD approval for export of antiques older than 100 years.[17] That law preceded the time when extensive looting began at prehistoric Thai sites in the late 1960s onwards (Rachanie 2001: 8). If and when FAD granted approval for export, they would issue certificates and tags. Among the tens of thousands of objects examined, less than a handful of prehistoric artifacts from Thailand with such certificates and tags were found **[Figure 4]**.

Damage assessment focusing on archeological value at such a large scale was a significant feature of the OA case. Unlike many high-profile antiquity trafficking cases where the focus is on individual commercially valuable objects, the OA seizures involved large numbers of cultural items including utilitarian objects used in daily life (see Carter & Chhay, this Special Edition). The CV (commercial value) of individual pieces might be relatively small, but the aggregate AV (archeological value) becomes immense. Focusing on archeological value, defined not in terms of damages to artifacts treated as art objects, but rather to source sites and therefore to scientific knowledge from archeological contexts, meant that the evaluation of damages done by the looting would be calculated in terms of aggregate values.[18]

Calculating Archeological Damage

The lead author of this article, the archeological expert witness for the seizures of prehistoric materials from Thailand, was tasked under ARPA with assessing the AV of all seized materials based on "an assessment of the level that a scientific program would have needed to legitimately and professionally excavate, study, and document relevant evidence". A scale of depredation

to differentiate pure copper from an alloy such as bronze, the term "copper-base" is used.

[17] Preliminary archeological value assessment of Operation Antiquity seizures was not limited to acquisitions beginning in 2002 but included all prehistoric objects from Thailand seized from the targeted collections.

[18] See for example Federal Rules of Evidence (2024), no. 702, 703, 1006: https://www.uscourts.gov/sites/default/files/2025-02/federal-rules-of-evidence-dec-1-2024_0.pdf.



Figure 4: One of the very few pots with a FAD export approval certificate encountered during Operation Antiquity © Todd Swain

was calculated based on comparisons with scientific excavations at comparable Thai sites which yielded collections equivalent in quality to the seized materials. The lead author requested assistance from co-authors David Welch and Judith McNeill who had conducted several professional archeological investigations in Thailand and elsewhere to extract and organize the needed data from the massive spreadsheets of the seized materials.

Methodological Overview

The methodology for determining the archeological value of the seizures (the costs of the retrieval of scientific information which would have been obtainable if the source sites had not been damaged) involved five steps:

1. Compile and quantify the volumes from scientifically excavated archeological deposits that produced intact and reconstructible artifacts comparable to objects in the seized collections.
2. Calculate the average archeological deposit removed to retrieve one instance of an intact/reconstructible artifact for each class of artifact (pots, copper-base adzes, etc.).
3. Develop a budget for an archeological program (preparation, excavation, study, and report preparation) for a single year at a site in Thailand comparable to the ones from which the seized artifacts likely came, along with a resultant budgetary cost per cubic meter to undertake a scientific study at such a site.
4. Calculate metrics for damages represented by each individual seized artifact (i.e., average number of excavated cubic meters for professional archeologists to retrieve one artifact [from step 2] times cost per meter for study of said artifact [from step 3]). Resultant metrics provide AV for individually seized artifacts.
5. Results of step 4 are used to estimate damages in terms of AV.

These damage values are applied to each collection held by an investigated person or institution, to each class of objects, as well as to assess the entire aggregate of objects to provide the damage assessment for the seizures as a whole.

Examination of data from scientifically excavated sites provides metrics for the average volume of deposit removed to recover an intact pot, an intact copper-base adze, etc. Since neither archeologists nor looters have X-ray vision to see below the earth's surface, looters are almost certain, in the course of retrieving intact objects, to dig through a volume of soil at a scale comparable to an archeological team, disturbing context, discarding unwanted cultural and biological materials, and damaging deposits surrounding the object and other artifacts near the found intact object.

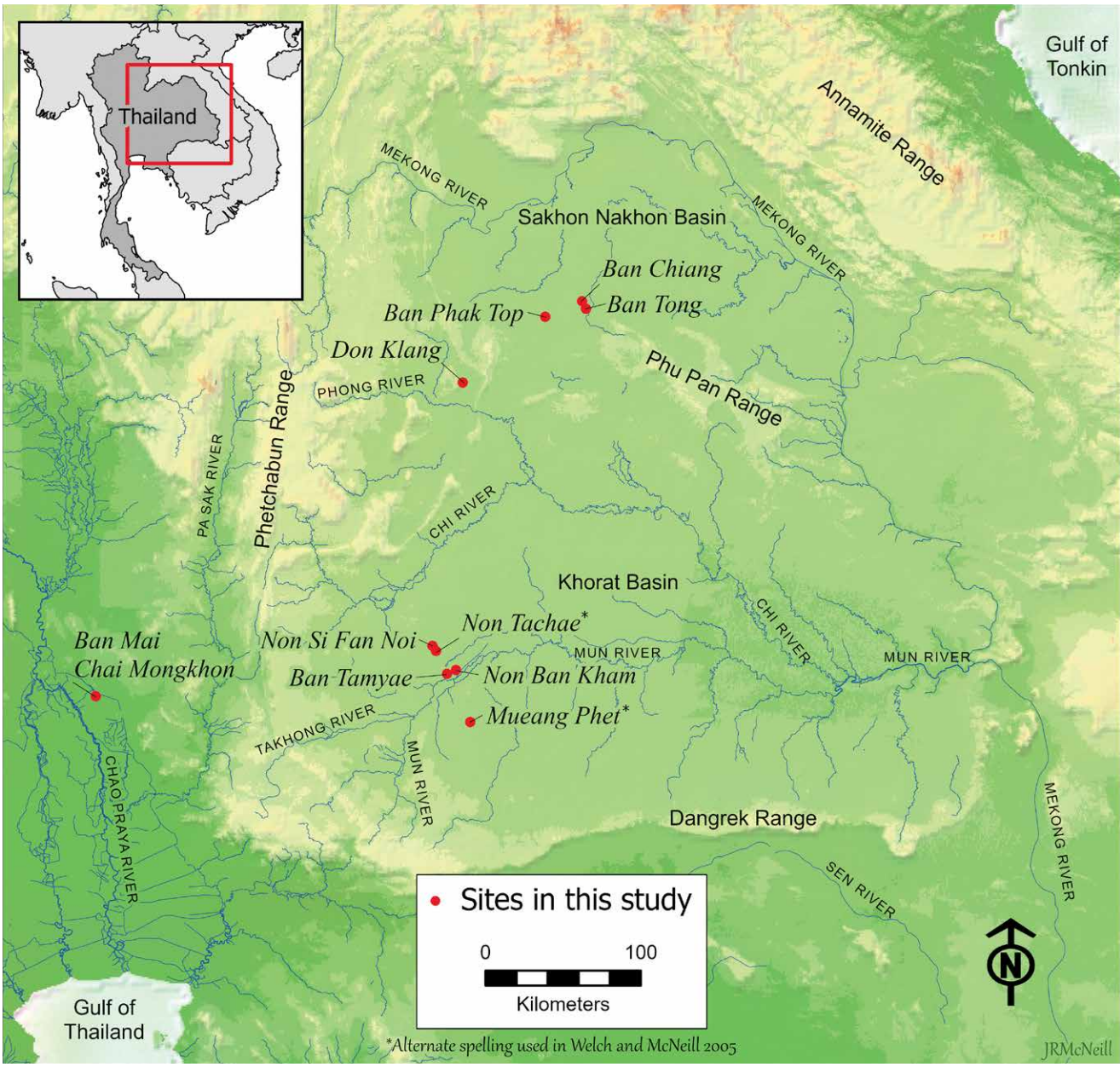
Operationalizing Methodology

Step 1. Compile Baseline Archeological Data

Baseline data on excavation volumes and recovery rates for intact or reconstructible objects were compiled from scientific excavations of Thai prehistoric sites that yielded materials broadly comparable to those represented in the seized collections. These data were drawn from several well-documented excavations. White contributed the records from the two Penn Museum–Thai FAD projects at Ban Chiang (บ้านเชียง; 1974–1975), together with the contemporaneous excavations at Ban Tong (บ้านโทง) and Ban Phak Top (บ้านผักตบ) in Udon Thani province and Don Klang (ดอนกลาง) in Khon Kaen province.[19] She also incorporated comparable data from the 1994–1995 Silpakorn University excavations at Ban Mai Chai Mongkhon (บ้านใหม่ชัยมงคล) in Nakhon Sawan province, analyzed by Chureekamol Onsuwan Eyre (2000). David Welch and Judith McNeill contributed data from their excavations at Ban Tamyae (บ้านตำแย), Non Ban Kham (โนนบ้านคำ), Mueang Phet (เมืองเพชร), Non Si Fan Noi (โนนสีฟันน้อย), and Non Tachae (โนน ตาแจ้) in the upper Mun River valley of Nakhon Ratchasima province (Welch 1985; McNeill 1997; Welch & McNeill 1988–89, 2005). These 11 excavations at 10 sites include diverse site types located in different environments covering different regions of Thailand **[Map 1]**. Cultural materials from these sites cover the temporal range when the artifacts in the seized collections were manufactured.

Archeologists excavating these sites recorded the total amount of deposit excavated, the number of burials, and the number of intact or reconstructed artifacts of various types as well as all fragments—Ban Chiang had more than 1 million sherds—and other items such as bone and charcoal. The rates of recovery in scientific excavations of the kinds of intact objects that collectors and museums are interested in acquiring can be calculated from these data. At these excavations, the volume of deposits removed ranged from 8 to 226 cubic meters, while the total volume of excavated deposits from all 10 sites is 712 cubic meters. Forty-one classes of artifacts are noted from all sites. Since

[19] For an overview of these sites, see White 2018.



MAP 1: Prehistoric sites providing reference data from scientific excavations
© Judith R. McNeill

sites vary in the density and types of intact artifacts recovered, combining the volume and recovery data from all 10 sites provides the most realistic "rates of recovery" of intact/reconstructible objects per volume of deposit, forming the basis of quantifying archeological values for the seized collections. **Online Appendix 2** provides the overall table of the excavated volume and the quantities of intact/reconstructible objects recovered at each site.[20]

[20] Available at: https://doi.org/10.69486/114.2.2026.3b.

Table 1: AV Calculation for Selected Excavated Artifact Classes

Number of artifacts recovered from 11 excavations in Thailand
Total volume excavated = 712 cubic meters
(See Online Appendix 2 for full list)

	COMPLETE	TOTAL	DENSITY	RECOVERY	AV in US$
Copper-base adzes	1	1	0.001	712.00	7,298,000
Copper-base bangles	29	100	0.041	24.55	251,655
Beads: translucent glass	59	94	0.083	12.07	123,695
opaque glass	224	231	0.315	3.18	32,580
stone	3	3	0.004	237.33	2,432,667
Copper-base bells	5	7	0.007	142.40	1,459,600
Pottery vessels	109	668	0.153	6.53	66,954
Clay rollers	41	232	0.058	17.37	178,000

COMPLETE = intact or reconstructed artifacts; good provenience only (no unprovenienced surface collections)
TOTAL = number of artifacts both complete and fragmentary
DENSITY = number of complete artifacts per one cubic meter
RECOVERY = estimated recovery rate, cubic meters per one complete artifact
AV = US$ per complete artifact (see Online Appendix 2 for cubic meter rate determination)

Step 2. Calculate Rates of Recovery of Intact Objects from Archeological Deposits

These data can then be used to provide quantitative evidence for an average number of cubic meters that would be excavated to retrieve one intact/reconstructible artifact of each of the various classes. For example, an average of about 25 cubic meters of excavated deposit could produce one intact copper-base bangle. **Table 1** shows average cubic meters likely needed to excavate intact artifacts from several example classes: pots, copper-base adzes, copper-base bangles, clay pellets, and beads. **Online Appendix 2** presents an overview of all data.

Step 3. Develop Archeological Budget for Commensurate Site

In 2009, USAOCC requested that the damage assessment team prepare a preliminary monetary assessment of archeological value for a subset of seizures. As required by ARPA, the team developed a budget for a hypothetical archeological project to undertake a suitable scientific excavation and study of a site in Thailand of the kind that produced the majority of the seized objects. Understanding the budget first requires appreciation of the kind of sites characteristic of the relevant time period in northeast and central Thailand and the archeological methods needed to obtain scientific understanding of such sites. Archeological budgets are not "one size fits all". Different kinds of sites require

different scales of excavation, ranges of expertise, types of post-excavation studies, laboratory expenses, etc.

Distinctive Aspects of Thai Prehistoric Archeology

Type of Site and Site Formation

Because burials tend to provide archeologists with intact artifacts in good condition, most prehistoric objects from Thailand seized in Operation Antiquity would have been grave goods. However, sites with burials in Thailand usually were also locations where people lived and may continue to live. Thus burials were apparently placed under, between, or adjacent to houses, a practice known as "residential burial" (White & Eyre 2011). Moreover, these sites were often inhabited for centuries; prehistoric Ban Chiang had people living there for more than 2,000 years. Archeologists conducting scientific excavations at these mixed mortuary/occupation sites usually find dense, deep, complicated deposits that not only include human burials, but also debris and features from daily life **[Figure 5]**.

Scientific excavations in Thailand rarely recover intact objects from mixed mortuary/occupation sites. **Online Appendix 2** lays out the evidence from 11 excavations at 10 sites, including the two at Ban Chiang where field seasons

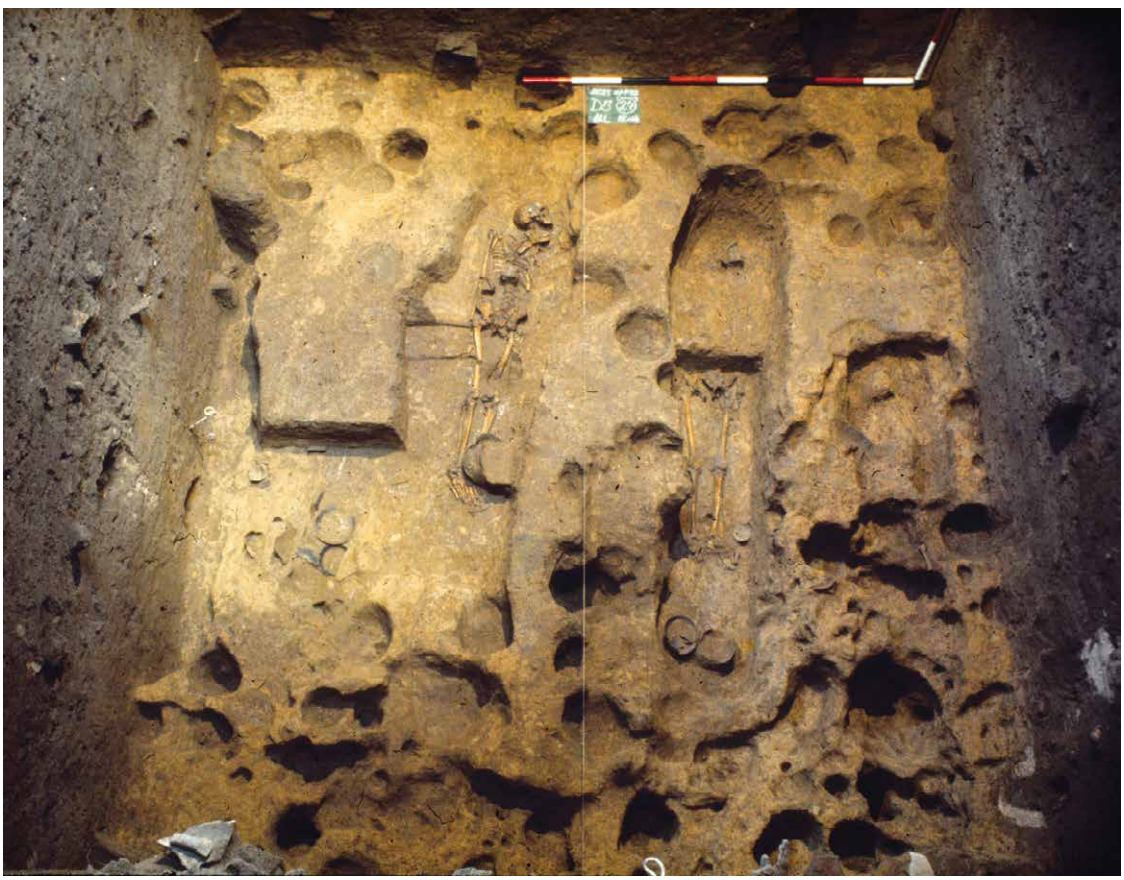


Figure 5: Ban Chiang excavation, 1975, showing the depth and complexity of the mixed burial and occupation deposits © Ban Chiang Project

lasted 6–9 months each. Non-marketable remains from burials and habitation contexts tossed aside by looters represent the vast majority of finds at these kinds of sites. Scientific excavation and analysis of these sites provide important evidence of past human occupation of contemporary Thailand's landscape and answers to questions about regional origins of agriculture and metallurgy, economic development from production activities and regional trade, the development of hierarchical societies and other societal structures, as well as human migrations and interactions.

Excavation Challenges of Mixed Mortuary/Occupation Sites

Scientifically excavating mixed mortuary/occupation sites in Thailand, inhabited sometimes for millennia and often reaching 4–6 meters in depth, is difficult, time consuming, and expensive. While all archeological excavations require careful observation and meticulous attention to detail, 21st-century excavations in Thailand (and Southeast Asia in general) involve complexities of a high order, including relatively expensive budgets, numerous experts, and lengthy timetables.

Long-term occupation at these sites means that layers are often cut into by later graves and deposits, resulting in complicated stratigraphy. The tropical climate can blur stratigraphic layers and the outlines of burial pits and encourage insect and small animal activity that further mix deposits. In addition, these sites are often still inhabited. Excavating large areas to reach depths of several meters brings challenges of logistics and recording.

Specialists normally need to be on site to document and collect special samples for analysis. Physical anthropologists document human remains *in situ* through drawings and photographs, recording often fragile and fragmentary remains. They identify and separate the bones of individuals when multiple burials occur together and document possible ritual treatments of corpses or cremated remains. Geoarcheologists sample sediments to determine how deposits formed or became disturbed and chemical processes that may have affected preservation of the site's contents. Archeobotanists retrieve and study often microscopic plant remains to identify past vegetation around a site, as well as cultivated crops and wild plants used by past communities.

All these factors must be considered in estimating the time required, the know-how needed, and the budget necessary to conduct an excavation designed to retrieve the maximum amount of scientific information from a mixed mortuary/occupation site.

Post-Excavation Challenges

Scientific excavations are usually just the beginning of several years of study of retrieved collections and their contexts, plus additional years writing up the material leading to publication of the results (e.g., Gorman & Pisit 1976; White 1982, 1986; Pietrusewsky & Douglas 2002; White & Hamilton 2018–2022). Post-excavation study involves not only archeologists but also specialists such as archeometallurgists, ceramic specialists, archeobotanists, faunal analysts, and physical anthropologists. Archeologists compare the evidence from numerous

scientifically excavated sites to reconstruct regional dietary patterns and intercommunity relationships expressed in trade or conflict, providing insight into how past societies have adapted to and impacted on Thailand's landscape. Only by the sequence of (1) excavation, (2) post-excavation analysis, and (3) publication can knowledge of prehistoric past enter the public domain, first in primary scientific reports (peer-reviewed articles and monographs) and later in secondary syntheses for more general audiences.

Budgeting a Project Year for Excavation and Study at a Mortuary/Occupation Site

ARPA standards require the preparation of line-item budgets to estimate costs to retrieve the scientific information that would have been obtained before the damage to sites by looters. Budgets cover all expenses for a research program from initial planning to report writing with the goal of providing the basis for justifying archeological valuation for criminal cases. The budget for damage assessments was prepared by the authors, based on decades of experience in developing similar budgets for culture resource management activities in Japan, Micronesia, and Hawai'i and conducting research in Southeast Asia. The line-item budget estimated costs for one year of research, including a 2-month excavation season followed by 10 months of analysis and report preparation. This budget for one "project year" included the kinds of expertise and analyses that can be anticipated in this kind of archeological program in Thailand. For this article, the original preliminary budget prepared in 2009 has been updated in **Online Appendix 3**[21] to account for inflation to the year 2025 CE (2568 BE for the Thai calendar).

The expert team estimated that in a properly funded and staffed two-month field season, with a team of six archeologists, eight laborers, and three specialists, 48 cubic meters (4 x 4 x 3m, for example) would be excavated and, in the following 10 months, studied using proper procedures. Note that this 1-year program would excavate only a small portion of sites from this time period, some of which could be many hectares in size. Such an excavation would be considered "small". Costs include funding archeologists and experts (as detailed in the preceding section) for both excavation and post-excavation work at a mixed mortuary/occupation site similar to Ban Chiang. The experts and studies would address basic questions such as the sequencing and age of the site's deposits, description of mortuary evidence including burial rituals and the population that inhabited the site, dietary and environmental evidence, technological expertise, and so forth. The budget assumes a team of both Thai and non-Thai staff, with many specialists coming from other countries. The cost of a two-month excavation and the 10-month post-excavation analysis and report preparation came to approximately US$492,000 in 2025 dollars. This projected archeological program identifies what a one-year project might accomplish in ideal conditions and the scale of the budget needed to fully fund that project year.

The "cost per excavated cubic meter" can then be calculated (US$492,000

[21] Available at: https://doi.org/10.69486/114.2.2026.3b.

divided by 48 cubic meters) for a scientific study of a mixed mortuary/occupation site, resulting in a minimum estimated cost of US$10,250 per cubic meter. This amount does not include full publication, which would add substantially to the budget and the time needed for project completion.

To the layperson these numbers may seem high. However, the amounts are realistic and represent employment of a team of professionals and experts to participate in the wide range of tasks necessary in modern archeological research.

Step 4. Archeological Valuations of Objects

This step combines the data from Step 2 (average cubic meters of deposit per object) with data from Step 3 (cost of excavation and study of the relevant cubic meters). Based on data from these two steps, each artifact in the excavated collections can be assigned an archeological value (AV), which can then be applied to the seized collections. These values by artifact class are specified in **Online Appendix 2.**

The seized collections show that the prehistoric artifacts from Thailand of interest to collectors and museums include 176 artifact classes such as intact/reconstructed ceramic vessels, copper-base adzes/axes, copper-base bangles (rings, anklets, bracelets, and neck torques), copper-base bells, and clay rollers. **Table 1** illustrates AV values of a few of the more common classes.

For example, pottery vessels, many of which are "refurbished" **[Figure 6]**, are common objects in the seized collections. Scientific excavations at relevant Thai sites show that on average 6.5 cubic meters of archeological deposit are likely involved in the retrieval of one intact/reconstructible pottery vessel. At a rate of US$10,250 per cubic meter for scientific excavation and study, the recovery of one intact vessel represents an archaeological value (AV) of US$66,954. Copper-base adzes are considerably rarer, with only one recovered from 712 cubic meters of excavation at comparable sites. Accordingly, the AV of a single copper-base adze is estimated at US$7.3 million.

Beads

The most common class of artifacts in the seized collections is beads, numbering more than 20,000, made of different materials including glass, stone, and shell. Beads, which are particular targets for looters (Vallard et al. 2015), deserve special comment. Rachanie Thosarat (2001: 8) reported that, in the Bangkok Plain, "whole sites are sluiced for beads".

In seized material, beads are typically found strung together **[Figure 7]**. This raises the issue of how to count these beads? As "strings" or as individual beads? Normally, in an archeological context, beads are not found strung together. Thus, from both an archeological and an ARPA perspective, each bead is considered an individual artifact with its own composition, manufacturing history, uses (such as a trade good, grave good, or personal adornment), and archeological context, whether from a burial, a particular site, or a workshop. Contrastingly, the "strings" are assembled by looters and middlemen to make the beads marketable commodities. Interviews with Thai collectors have



Figure 6: Villagers at Ban Pulu, near Ban Chiang, refurbishing looted pottery vessels, 1979. Many seized vessels are pieced together and repainted for the market © Joyce White



Figure 7: Stringed beads from a seized collection; beads from multiple contexts, each counted as an individual artifact in the damage assessment © Todd Swain

shown that strings are made of beads collected from numerous different contexts and sites (Vallard et al. 2015).

Removal of beads from their archeological provenience and their subsequent agglomeration into marketable strings destroys their potential to contribute to interesting and important lines of archeological investigation. Scientific studies of beads from prehistoric Thai sites, such as Carter et al.'s (2022) study of glass beads from Phromthin Tai (พรหมทินใต้), Lopburi province, provide data of how the inhabitants at particular timeframes participated in exchange networks that included other parts of mainland Southeast Asia, South China Sea coasts, and beyond. The beads found in Burial 20 at this site had two different chemical signatures, meaning they probably originated from two different production/exchange networks. They likely dated from a period when bead exchange networks shifted from a South China Sea focus to an expanded Mekong River Interaction Sphere.[22] Such nuanced data showing how past communities in Thailand related to larger regional exchange networks is destroyed when beads are removed from their *in-situ* context and marketed as commodities.

Step 5. Application of Archeological Damage Valuations

AV numbers can be applied to seized materials to calculate the costs to recover and study these materials with scientific excavations and analyses. The collections documented from the investigated subjects range from 4 to 12,851 objects per entity and in aggregate more than 34,000 objects are listed in the OA spreadsheets **[Online Appendix 1]**. These are minimum numbers for OA seizures because Thai collections at several subject museums were incompletely documented and collections of some investigated subjects were never tallied.

Aggregate values can be calculated from the numbers available from seized collections in various ways to assess damages in terms of "archeological value"; they thus form one component of an archeological damage assessment for the OA case. However, because of the unpredictability of excavation at any particular location, a simple summation of the values for every artifact is not an accurate approach. Two cubic meters excavated by an archeologist to expose and remove one burial might contain multiple intact and marketable artifacts or it might produce no such objects.

The expert team (the authors of this article), in close consultation with federal attorneys, felt that it would be more accurate to present ranges of AV from possible maximum to probable minimum values. The objective was to develop an archeologically viable approach that would be reasonable and defensible in court. Those estimated ranges can be calculated for each subject investigated as well as by artifact classes across all seizures for aggregate numbers **[Online Appendix 1]**. These numbers also provide a sense of the scale of damage in terms of the cubic meters of deposit destroyed and the number of "project years" that would have been needed to conduct proper research of the evidence if undisturbed.

[22] See also Xu Siwen et al., this volume—*Editor's note.*

Table 2: Damage (AV) Calculations in US$ for a Sample of Seizures

Seizure Collection	Copper-base Adzes		Copper-base Bangles		Glass Beads		Stone Beads		Copper-base Bells		Pottery Vessels		Clay Rollers	
Museum 1	111	810,078,000	371	93,364,069	3,942	128,431,768	209	2,432,876	31	45,247,600	461	30,865,853	24	4,272,000
Museum 2	18	131,364,000	49	12,331,103	1,821	59,328,830			10	14,596,000	41	2,745,119	20	3,560,000
Middleman 1	256	1,868,288,000	2,884	725,773,517	42	1,368,375	4,482	10,903,212,000	1,058	1,544,256,800	1,158	77,532,881	130	23,140,000
Middleman 2	25	182,450,000	23	5,788,069	582	18,961,768	4,410	10,728,060,000	8	11,676,800	51	3,414,661	10	1,780,000
Individual 1	15	109,470,000	105	26,423,793					10	14,596,000	14	937,358	6	1,068,000
Individual 2	7	51,086,000	24	6,039,724					28	40,868,800	35	2,343,394	3	534,000
TOTAL	432		3,456		6,387		9,101		1,145		1,760		193	

	Copper-base Adzes	Copper-base Bangles	Glass Beads	Stone Beads	Copper-base Bells	Pottery Vessels	Clay Rollers
GRAND TOTAL	**444**	**3,879**	**6,390**	**9,128**	**1,158**	**1,953**	**571**
AV in US$	**7,298,000**	**251,655**	**32,580**	**2,432,667**	**1,459,600**	**66,954**	**178,000**
AV Damage in US$	**3,240,312,000**	**976,170,414**	**208,188,482**	**22,205,381,333**	**1,690,216,800**	**130,761,413**	**101,638,000**

TOTAL = the sum of the six (6) example seizures
GRAND TOTAL = the sum from all seizures reported in this article
AV = US$ per complete artifact (see Online Appendix 2)
AV Damage for OA seizure

Take pottery vessels as one example. Each pot has an AV of US$66,954; the total number of pots in OA documented seizures is 1,953. Therefore, the damage to archeological sites from pots alone comes to approximately US$131 million. That represents 12,757 cubic meters of damage or almost 266 project years of archeological research. Seized collections from individual investigated subjects can also be assigned AV damages. **Table 2** and **Figure 8** provide a snapshot of selected seizure valuations in aggregate and also by the main investigated subjects and their holdings of some classes of objects. Middleman 1, for whom 12,851 objects were documented—the largest collection seized—held 1,158 pots. His pottery collection thus represents an AV of approximately US$77.5 million (7,564 cubic meters of destroyed deposit and 158 project years of research). Museum 1 had 461 ceramic pots resulting in an AV damages of approximately US$30.9 million.

Copper-base adzes are extremely rare in archeological excavations, with only one recovered in 712 cubic meters from the excavated comparative sites. The total number of copper-base adzes documented in OA seizures was 444 which represents, based on their AV of approximately US$7.3 million each, a total AV of more than US$3.24 billion **[Figure 9]**. That represents 316,128 cubic meters of archeological damage needing 6,586 project years for research. Middleman 1 had 256 copper-base adzes representing a total AV of about US$1.87 billion. Similarly, Museum 1 had 111 copper-base adzes representing an AV of its adze collection of approximately US$810 million.

The very high recovery of beads, especially stone beads, from the OA seizures is reflected in **Fig. 8** and **Table 2**, as well as in the extraordinarily high AV assigned to stone beads, exceeding US$22 billion. Based on extrapolations from the documented seized collections, the overall damage to the Thai archeological record represented by OA falls within the range of hundreds of millions to billions of U.S. dollars. This publica-

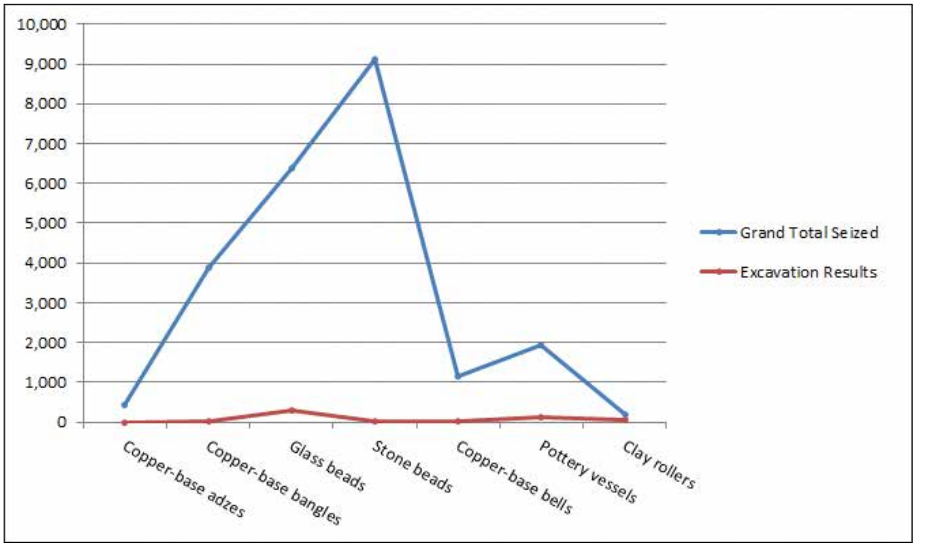


Figure 8: Whole artifacts from seized collections compared with those recovered from scientific excavation © Joyce White et al.

tion is the initial presentation of these valuation estimates.

The large monetary values generated by this methodology should not be mistaken for the commercial value of artifacts or the cost of excavating every threatened site. Rather, they serve as legally defined proxies for demonstrating the scale of archeological damage identified in the OA case, losses that are ultimately irreplaceable and beyond monetary valuation. No amount of funding can reconstruct the original contexts once they have been destroyed.

Outcomes

As with most court cases in the United States, Operation Antiquity was never fully litigated to a trial verdict. The U.S. Government brings only a portion of its investigations to litigated results and even fewer to trial; most cases end with plea deals and non-prosecution agreements, and some cases expire from statutes of limitations or because the subjects die. Sometimes the DOJ objective is more about changing behavior by shining a light on a problem than in bringing every individual or institutional wrongdoer "to justice".

OA did result in four felony convictions and, in an extremely rare example for antiquities cases in the U.S., actual jail time for one of the middlemen implicated in the trafficking.[23] Some artifacts have been returned to Thailand as a result of non-prosecution agreements[24] with two implicated museums and some antiquities originating from other countries were returned as well.[25]



Figure 9: 444 copper-base adzes from OA seizures (combined AV: ~US$3.24 billion). Only one comparable adze was recovered at Ban Chiang during the 1974–75 scientific excavations
© Joyce White

Perhaps one of the quickest and most important outcomes was the realization by U.S. museums that their accessioning of illicitly trafficked antiquities is punishable by stiff penalties. Museums

[23] See: https://www.justice.gov/usao-cdca/pr/los-angeles-art-dealer-sentenced-federal-prison-smuggling-stolen-antiquities-and (accessed 20 July 2026).

[24] Non-Prosecution Agreements are common resolutions in the U.S. legal system when objects of civil or criminal investigations agree to fulfill specific sanctions and the government agrees not to file charges.

[25] See: https://chasingaphrodite.com/2014/06/10/scoop-bowers-museum-will-return-500-thai-antiquities-seized-during-2008-raids/ (accessed 20 July 2026).

cannot afford images of hundreds of law enforcement officers encamped around their grounds and probing their collections and records. U.S. museums for years had been debating the ethics of acquiring unprovenienced and looted archeological objects, especially following the U.S. criminal trial of New York dealer Fred Schultz and Italy's criminal trial of J. Paul Getty Museum's curator in Los Angeles, Marion True (Murali 2012). However, the January 2008 well-publicized federal raids at several U.S. museums showed that criminal prosecutions would not be limited to middlemen or foreign courts. Those raids created a tipping point for U.S. museum recognition of their potential criminal liability from accessioning unprovenienced and looted archeological objects.

Thus shortly after the raids, on 3 June 2008, the Association of Art Museum Directors issued revised guidelines for Acquisition of Archeological Materials and Ancient Art, emphasizing detailed provenances that show the date the artifact was removed before 1970 from its original country or detailing clearly its legal exportation after this date.[26] The revised guidelines indirectly acknowledge the role that certain museums played in fueling looting and smuggling of artifacts; the Association set down stricter voluntary guidelines to attempt to curb this practice. Nonetheless, some scholars subsequently sought to fabricate provenance histories of objects to fit the new guidelines (Smith 2025).

Another important indirect outcome has been the energizing of source countries in Southeast Asia, including Thailand, to pro-actively seek repatriation of their illegally exported objects (Crosbie-Jones 2025). The articles in this Special Edition are a testament to changed attitudes in both international institutions and source countries, including new efforts by Southeast Asia nations to request restitution and repatriation of their heritage items from museums around the globe. Remaining unresolved are issues of the long-term custody and disposition of seized objects that have not yet been repatriated or addressed by other legal resolutions. These issues, while beyond the scope of this article, remain important aspects of the broader legacy of the case.

Some Final Thoughts

The pillaging of Ban Chiang and Thailand's archeological resources is not a new topic (Gorman 1982; Lyons & Rainey 1982). Publications decried the destruction for decades, but the losses were generally described in qualitative terms. Damage had not previously been assessed through a systematic methodology that quantified either monetary losses or the volume of archeological resources destroyed. Operation Antiquity provides, utilizing a comprehensive case study, a new quantitative perspective on both the financial consequences and the likely scale of archeological resource destruction.

Using the landmark OA case, this article has examined how monetary damages can be assigned to unprovenienced antiquities based on their archeological value. The assessment follows ARPA requirements by calculating damages according to the costs of recovering the scientific information

[26] See: https://culturalpropertynews.org/wp-content/uploads/2017/11/AAMD-REPORT-ON-ACQUISITION-OF-ARCHAEOLOGICAL-MATERIALS-AND-ANCIENT-ART-2008.pdf (accessed 20 July 2026).

that would have been obtainable prior to the looting of archeological sites. If the materials seized by Operation Antiquity had been recovered in scientific excavations and undergone scientific study and publication what would such a research program cost? The method employed by the authors was to use data from scientific excavations of Thai sites to provide figures for the amount of excavation that would likely be needed to retrieve intact artifacts comparable to the seized materials.

The OA case has additional significance because it involves a large volume of objects of archeological origin. Although many of these objects have relatively modest individual commercial value, their aggregate loss represents a massive amount of archeological damage. Whereas many prominent antiquities trafficking cases have focused on individual high-value art objects, such as the Getty's Aphrodite,[27] the AV assessment of the OA seizures—based on tens of thousands of looted objects—reveals a scale of archeological loss that far surpasses previous cases involving individual works of art, plausibly reaching into the billions of U.S. dollars.

The methodology presented here is specific to the ARPA framework and does not evaluate how the same evidence might be assessed under Thai law. Moreover, the OA seizures represent only a portion of the broader global dispersal of unprovenienced prehistoric objects from Thailand. The total archeological loss is probably considerably greater than the values calculated in this study, which do not include other museums and private collections holding significant Thai prehistoric materials.

Not included in these monetary calculations are broader economic and social losses, including potential impacts on national tourism and local communities that might have developed archeological resources through scientific research and heritage initiatives, as Ban Chiang village has done **[Figure 10]**. The assessment also does not account for lost educational opportunities related to national heritage, nor for potential employment opportunities for archeologists and heritage professionals at local, provincial, and national levels. Regardless of who assesses the damage or which methodology is applied, the tens of thousands of objects documented by Operation Antiquity demonstrate the devastating impact of looting on Thailand's archeological resources. Twenty-five years ago, Rachanie Thosarat (2001: 12) aptly described the destruction of Thailand's prehistoric sites as "a cultural catastrophe".

Ultimately, the central question is, what does Thailand seek from its past and how can its archeological resources serve contemporary society? What knowledge, educational opportunities, and social or economic benefits can emerge from the scientific study of these resources? What questions about the origins and development of Thai society can only be answered through systematic archeological research?

Moving beyond the presentation of ancient objects as merely "pots on shelves" in museums and galleries requires a broad approach that reveals past communities, social relationships, interactions, and historic developments.

[27] Also illegally excavated. See: https://traffickingculture.org/encyclopedia/case-studies/1059/ (accessed 6 August 2026).



Figure 10: School children at the Ban Chiang National Museum view a model of Burial 23 from the 1974 Penn/FAD excavation © Ban Chiang National Museum

This requires not only excavation but also the scientific and social scientific analysis of excavated materials and their contexts. When properly unearthed and thoroughly studied, Thailand's prehistoric sites constitute vast repositories of information about early agricultural and metal-age societies, not only in Thailand but across mainland Southeast Asia. Scientifically investigated archeological sites provide essential portals to Thailand's deep history.

The authors hope that this study will contribute to greater appreciation of Thailand's remaining archeological resources and encourage increased investment in their protection, as well as in their systematic scientific excavation and analysis. The importance of Thai archeological resources extends far beyond Thailand itself. The distinctive qualities of the region's prehistoric evidence provide important new perspectives of international significance for understanding human history (e.g., Dardeniz 2022). However, this potential value will only be realized if archeologists are able to identify, protect, and investigate intact, non-looted sites and study evidence in its original context. Once archeological context is destroyed, even extensive and costly scientific study cannot reconstruct the lost information. The value of intact sites therefore lies not only in the objects they contain, but even more in the relationships, associations, and historical knowledge preserved within their contexts.

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