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# HOPE IN DIRT: REPORT OF THE FORT APACHE WORKSHOP ON FORENSIC SEDIMENTOLOGY APPLICATIONS TO CULTURAL PROPERTY CRIME, OCTOBER 15-19, 2018

Conference Report for Submission to *International Journal of Cultural Property*

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## Abstract

A 2018 workshop on White Mountain Apache Tribe lands, Arizona, examined ways to enhance cultural property crime (CPC) investigations through applications of rapidly evolving methods from archaeological science. CPC (also *looting*, *graverobbing*) refers to unauthorized damage, removal, or trafficking in materials possessing blends of communal, aesthetic, and scientific values. The Fort Apache Workshop integrated four generally partitioned domains of CPC expertise: (1) theories of perpetrators' motivations and methods; (2) recommended practice in sustaining public and community opposition to CPC; (3) tactics and strategies for documenting, investigating, and prosecuting CPC; and (4) forensic sedimentology—uses of biophysical sciences to link sediments from implicated persons and objects to crime scenes. Forensic sedimentology served as the touchstone for dialogues among experts in criminology, archaeological sciences, law enforcement, and heritage stewardship. Field visits to CPC crime scenes and workshop deliberations identified pathways toward integrating CPC theory and practice with forensic sedimentology's potent battery of analytic methods.

KEYWORDS: American Southwest, Ancestral Pueblo heritage sites, Archaeological Resources Protection Act, Community stewardship, Cultural property crime, Forensic sedimentology, Graverobbing, Looting, White Mountain Apache Tribe

## Workshop Context and Rationale: The Cultural Property Crime Problem

Unauthorized damage to graves and heritage sites and the removal of ancestors and their belongings undermines scholarly pursuits, national sovereignties, and local senses of place, identity, cultural continuity, and security. Artifact collecting and commercial trade in cultural property has evolved from a socially acceptable antiquarian pastime into a shadowy aspect of transnational crime with proven ties to drug and weapon trafficking, cultural genocide, and terrorism.<sup>1</sup> Whether motivated by poverty, greed, paternalism, or perceived cultural superiority, cultural property crime (CPC) irrevocably damages inherently unique and unequivocally

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<sup>1</sup> Borgstede 2014, Snead 2018, Yates 2014.

sanctified objects, resting places, and heritage sites.<sup>2</sup> Such assaults undermine scholarly research and local and national senses of place, identity, and security. CPC is, in effect, the opposite of a victimless crime: Everybody loses, with apex antiquities dealers as the possible exceptions.

The crux of the CPC problem is that motivations (especially financial) are essentially unlimited, while the numbers of unaffected sites and objects are finite and diminishing. The funding and personnel available to detect and investigate CPC are also limited. As an example, rampant CPC in the U.S. led to the Archaeological Resource Protection Act of 1979 (ARPA). ARPA penalties include prison time, fines as high as \$250,000, and property forfeiture. ARPA is unique on a global scale because it requires coordinated incident response from both archaeologists and law enforcement officers. This requirement—powerful but ponderous—enables site-specific damage assessment and restoration but complicates prosecution unless trained personnel are readily available.<sup>3</sup> For these reasons, and because of escalating market demand for antiquities, CPC persists despite media campaigns, law enforcement initiatives, and emphatic condemnations by governments, international organizations, and disproportionately harmed descendant communities.

Despite apparent intractability, at least three promising avenues exist for thwarting CPC. First, research at anthropology-criminology interfaces confirms that CPC motivations and methods are often shaped as much by political and cultural factors as they are by financial incentives.<sup>4</sup> CPC opponents now deploy sharper and more broadly relevant conceptual tools for understanding CPC's drivers, looters' *modi operandi*, and antiquities markets' dynamics.<sup>5</sup> Related experiences and research demonstrate that collaboration among archaeologists and other cultural heritage experts, law enforcement officers, and prosecuting attorneys is key for effective apprehension, prosecution, and punishment of CPC perpetrators (e.g., Hutt et al. 1992; McManamon 1991; Waldbauer 1991).

Second, Indigenous and local communities in many world regions are reasserting sovereign responsibility for heritage.<sup>6</sup> Anti-CPC allies are forming partnerships to boost the in-situ values of cultural property, to de-legitimize CPC operations, and to build local capacities to prevent, detect, investigate and remediate CPC impacts.

Third, advances in forensic sedimentology directly applicable to CPC now enable cost-effective, high-resolution provenance assignments for “dirt.” Selective and judicious application of methods from the growing battery of analytic tools make it possible to link minute amounts of sediment from objects, tools, vehicles, and persons involved in CPC to looted sites. Unique constellations of clays, silts, and sands, as well as strands of DNA and traces of plants, insects, mollusks, and other constituents can be distinguished using complementary methods, including inductively coupled plasma mass spectrometry, neutron activation analysis, petrography, scanning electron microscopy, X-ray diffraction, and X-ray fluorescence spectrometry.<sup>7</sup> Forensic

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<sup>2</sup> Brodie and Renfrew 2005, Hart and Chilton 2015, Kersel 2007, 2017.

<sup>3</sup> McAllister and McManamon 2007.

<sup>4</sup> Hart and Chilton 2015, Kersel 2007, Mackenzie and Yates 2016, 2017, Proulx 2013.

<sup>5</sup> Campbell 2013.

<sup>6</sup> Moser et al. 2002, Silverman 2002, 2006, Skoy Woodfill 2013, Welch et al. 2009, Welch and Ferguson 2007.

<sup>7</sup> See Gilbert 2017, Pirrie et al. 2013.

sedimentology has self-evident potentials to boost CPC prosecutions but has yet to be widely deployed in CPC crime scene management.<sup>8</sup>

Sponsorship of the 2018 Fort Apache Workshop on Forensic Sedimentology Applications to Cultural Property Crime provides an apt reflection of the range of interests and perspectives required to address CPC. The primary sponsor of the workshop, the Wenner-Gren Foundation for Anthropological Research, encouraged explicit attention to cultural and intercultural dynamics underlying CPC. The secondary financial sponsor, the U.S. Bureau of Indian Affairs, is providing significant leadership in ARPA enforcement on Native American lands. Archaeology Southwest, the Arizona-based non-profit dedicated to the preservation and study of cultural heritage places, is cultivating significant staff expertise in CPC prevention, response, and remediation. Simon Fraser University's Centre for Forensic Research, an institutional bridge between archaeology, criminology, and land and resource management, affords access to diverse forensic expertise and analytic capacities. The White Mountain Apache Tribe's cultural resources director (Riley) and tribal historic preservation officer (Altaha) represent an Indigenous community committed to excluding CPC from their lands. The Fort Apache Heritage Foundation, the workshop co-host, is a tribally chartered and place-based non-profit dedicated to Fort Apache's preservation and redevelopment as a hub for White Mountain Apache community, commerce, and culture.

### **Workshop Processes and Dynamics: Crafting Transdisciplinary Problem Focus**

Driven by the ongoing threats and harms of CPC, and inspired by sponsor mandates, the Fort Apache Workshop's overall goal was to identify collaborative pathways in the effective application of criminological, community stewardship, and forensic sedimentology methods and theories to CPC prevention, investigation, prosecution, and remediation. Success in achieving this goal was premised on integrating four generally partitioned domains of knowledge and expertise:

1. The spectra of CPC drivers, modi operandi, and impacts;
2. Recommended practices in public and community engagement and outreach;
3. Seasoned tactics and strategies for documenting, investigating, and prosecuting CPC;
4. State-of-the-art analytic tools from archaeological science applicable to CPC.

In pursuit of workshop goals and the integration of these four domains, the workshop assembled CPC theorists, investigators, and prosecutors; archaeological scientists; community-based heritage stewards, and an artist/ graphic illustrator (see Table 1). Participation was contingent on subject matter expertise as well as personal commitments to collegiality and collaboration in confronting CPC, especially impacts to Indigenous and place-based communities.

**Table 1. Workshop Participants**

<b>Participants</b>	<b>Affiliations</b>	<b>Specializations</b>
Karen Adams	Crow Canyon Archaeological Center	Archaeobotany

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<sup>8</sup> Adovasio 2012, 2017.

Mark Altaha	White Mountain Apache Tribe	Apache Archaeology, Local Knowledge
Mary Barger	US Bureau of Indian Affairs, Western Region	ARPA, Interagency Collaboration
Garry Cantley	US Bureau of Indian Affairs, Western Region	ARPA, Regional Archaeology
Keith Dobney	University of Liverpool	Human Palaeoecology; Zooarchaeology
William Doelle	Archaeology Southwest	Preservation Archaeology, Public-Private-Tribal Partnerships
Sarah Herr	Desert Archaeology, Inc.	Indigenous Engagement
Morag Kersel	DePaul University	Middle Eastern Arch., Antiquities Trade
Brandi MacDonald	Archaeometry Laboratory, University of Missouri Research Reactor	Trace Element Analyses of Archaeological Materials & Soils
Frank McManamon	Center for Digital Antiquity, Arizona State University	Public Archaeology, Public Land Mgmt. Policy, ARPA Development
Barbara Mills	University of Arizona	Ceramics, Social Network Analyses
Sasha Moreno	US Department of State	Interagency Law Enforcement
Fred Nials	Archaeology Southwest	Geoarchaeology, Hydrology
Mary Ownby	Desert Archaeology, Inc.	Ceramic and Sediment Petrography
Randy Ream	Assistant US Attorney, Western District of Kentucky	Federal Law Prosecution
Mike Richards	Simon Fraser University	Isotopes & Geochronological Dating
Ramon Riley	White Mountain Apache Tribe	Cultural Heritage Stewardship
Stacy Ryan	Archaeology Southwest	Heritage Crime Damage Assessment
Monica Wapaha	Freelance Artist & Arizona State University	Knowledge Translation, Graphical Illustration
John Welch	Simon Fraser University & Archaeology Southwest	Cultural Heritage Stewardship
Dusty Whiting	BIA Criminal Investigator (Retired) & White Mountain Apache Tribe Ranger	Federal & Tribal Law Enforcement
Donna Yates	University of Glasgow	Cultural Heritage Criminology, Antiquities Trafficking

The three-and-a-half-day workshop convened—amidst upland Arizona’s first major winter storm of 2018 and a prolonged power outage—in the 1890 Commanding Officer’s quarters at the Fort Apache and Theodore Roosevelt School National Historic Landmark. Ramon Riley, the workshop co-convenor and an esteemed Apache elder provided the White Mountain Apache Tribe’s official welcome and a blessing. The power outage and absence of PowerPoint capacity

and Internet connectivity confirmed and supported the workshop plan to foster interpersonal as well as interdisciplinary dialogues. The workshop plan and agenda excluded academic presentations in favor of open discussion of problems and solutions.

The workshop location was also intentional. We wanted visiting participants to have the opportunity to understand local perspectives on the profound harms heritage crimes inflict on Indigenous people and communities. Riley's remarks, made as the Tribe's cultural resources director and as an elder, emphasized that,

“Apache culture revolves around a single essential mandate, *godíntsíh*, with the best English translation as ‘respect it!’ Our elders and medicine people tell us that those who have come before us on the land showed their respect by working closely with the natural world to make their lives and build their communities. Now it’s our turn. Our obligations to show respect mean allowing our forebears, their old graves and homes, to rest in peace. It’s the least we can do for those who gave us this beautiful world. Those who fail to show respect and especially those who dig up graves are going against the natural world as well as against Indian culture. They may not know what they are doing but I have seen the lives they have ruined. They are endangering themselves and their families. My family’s health, too, is threatened when people show disrespect and expose themselves to what’s been put away with prayer. We are all connected.”

In honor of Riley's blessing and remarks, our first and most important order of business was to explore the distinctive motivations and capacities of each of the 22 participants to address CPC. The semi-structured discussion that ensued gave participants the opportunity to grasp the notably broad range of knowledge and perspective assembled for the workshop and the resulting potential for forging real connections among CPC drivers, impacts, and responses. These discussions transitioned, in the second half of the workshop's first day, into a close examination of the background and results of a recent crime scene investigation and damage assessment process at G-Wash Pueblo, a heritage site located about 10 miles from Fort Apache.

G-Wash is an apartment-style masonry village comprised of over 100 rooms, occupied in the 1200s and 1300s by ancestors of today's Zuni and Hopi people. After an earlier visit to the region, Octavius Seowtewa, a Zuni Pueblo religious leader, said, “archaeological sites and petroglyphs provide[s] tangible reflections of the routes traveled and the many hardships endured.... These places need to be protected – they are our living history.”<sup>9</sup> Stewart Koyiyumtewa, Director of the Hopi Cultural Preservation Office, said, “archaeological resources serve as the ‘footprint’ of Hopi ancestors.... The continued looting and vandalism of these archaeological resources obliterates the Hopi people's connections to the land and hinders our abilities to be good stewards of Mother Earth.”<sup>10</sup>

Intensive ‘classroom’ discussion of the case study prepared participants to visit the G-Wash crime scene on the workshop's second day. Discussions led by officer Whiting and archaeologists Ryan, Cantley, and Barger sparked productive and critical reviews of the

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<sup>9</sup> Quoted in Welch and Ferguson 2007, p. 183.

<sup>10</sup> Personal communication to Welch, November 2018.

respective roles and potential synergies of law enforcement officials, archaeological scientists, community-based archaeologists, stewardship advocates, and CPC theorists. Randy Ream, an assistant US attorney, played pivotal roles in these discussions, especially through clarification of distinctions between scientific and legal evidence and the roles these play in prosecutorial decision making. Ream's contributions made it clear that clusters of political, financial, and juridical factors lead prosecutors to focus almost exclusively on cases characterized by clear and compelling evidence, social relevance, jury appeal, and other situational factors.

The second day's field visit to the G-Wash crime scene (Figure 1) provided a rich context for appreciating the complex interplay of historical, socio-economic, political, and legal-jurisdictional attributes affecting CPC detection, investigation, and remediation. The site visit involved group pauses at different loci impacted by criminal activity. This mode of visitation encouraged close attention by participants to contextualized commentary from those responsible for crime scene investigation, damage assessment, and physical evidence collection. We quickly learned that the technical minutia of in-field CPC incident responses materially and often irrevocably influence the options and strategies for subsequent investigation and prosecution. The rule in archaeological excavation applies equally and perhaps more consequentially to CPC crime scene processing and damage assessment: you only get one chance to do it right!

The G-Wash crime scene stimulated situation-specific contributions from subject matter experts in geology and sedimentology (Nials), sediment sampling (Ownby), ceramic identification (Mills), human remains protection (Dobney and Herr), and uses of trail cameras, site stewards, and other crime detection strategies (Whiting, Ryan, Yates, and others). The site visit further catalyzed comparisons between looting on tribal lands and in other regions of the world. Various workshop participants realized that individual looter profiles, their motivations, the types of looting, the looter networks, and the state-based and local responses were often interchangeable. The similarities were sometimes so stark it was as if we were each talking about each other's sites, even though many of those sites are thousands of miles apart.

In sum, the site visit resulted in emergent interdisciplinary consensus on (1) understanding key dimensions of variation at CPC scenes (e.g., environmental-geographical, temporal, impact types and levels, jurisdictional, etc.); (2) appreciating the range of values impacted by CPC in general and G-Wash in particular (e.g., aesthetic, community health, cultural, educational, scientific, spiritual); and (3) developing responses to CPC by law enforcement and heritage professionals that are attuned to local community interests and values, prosecutorial standards and priorities, and applicable advances in archaeological science in general and forensic sedimentology in particular.



**Figure 1. Workshop participants at G-Wash** (left to right): Dusty Whiting, Garry Cantley, Mary Barger, Bill Doelle, Barbara Mills, Karen Adams, Fred Nials, Stacy Ryan, Keith Dobney, Mary Ownby, Randy Ream, Mike Richards, Sasha Moreno, Donna Yates, Frank McManamon, Monica Wapaha, Morag Kersel, Brandi MacDonald, John Welch. Not shown: Ramon Riley, Mark Altaha. Photograph by Sarah Herr.

We dedicated the second half of the workshop, the two days following the site visit, to breakout sessions intended to allow intensive discussions focused on three sets of tools and strategies for addressing CPC: (1) archaeological science and forensic sedimentology; (2) criminal investigation and prosecution; (3) communications and public outreach. The breakouts allowed participants to brainstorm with colleagues having similar backgrounds and interests on ways to optimize deployments of existing assets and fill gaps between existing assets and anticipated needs.

The breakout sessions, as complemented by the whole-group reporting and integrating discussions that followed, prompted and ultimately revolved around a suite of interrelated questions, including:

- What should academic, heritage, and law enforcement professionals know about CPC perpetrator motivations and *modi operandi*? What techniques are available from social network analyses and other sources to define and potentially track distinctive looter methods?
- What types of training would be most useful in thwarting CPC, and how can such instruction be developed and delivered to both broad audiences of those interested in and concerned about CPC in general and, more specifically, to personnel—primarily tribal,

state, and federal government staff and contractors—responsible for detecting, investigating, and prosecuting CPC?

- What do non-specialists need to know about the advantages and limitations of analytical methods available to add new types of evidence / levels of precision to CPC investigations (e.g., archaeobotany, DNA, isotopic chemistry, neutron activation analysis, palynology, petrography, scanning electron microscopy, x-ray diffraction, x-ray fluorescence spectrometry, zooarchaeology)? How might a ‘recommended practice’ sampling strategy be developed and deployed to support most CPC investigations and most or all analytic techniques? Are there special interests and concerns relating to chain of custody and data management for analysts not affiliated with official forensic labs?
- What can and should we do to curb CPC? What are recommended practices for community and media engagement? What are the most appropriate spatial scales and media tools for community outreach campaigns? Could a community-specific stewardship and heritage campaign be effectively integrated with other efforts to improve community health and welfare? How might the disproportional impacts inflicted by CPC on Indigenous and place-based communities be transformed into comparative advantages in detecting, investigating, responding to, and ultimately extirpating CPC from culturally and jurisdictionally distinctive communities and lands?

### **Workshop Results: What We Learned**

The above-listed questions are part of what we see as indicators for a potentially paradigmatic shift away from thinking about CPC as a problem to be addressed primarily by national governments and international law enforcement and toward active and consequential participation on the part of individuals, families, communities, academic disciplines, professional organizations, tribes, community health advocates, and innumerable other entities.<sup>11</sup> Previous approaches, at least in the U.S., to expert-centered, state-based, and top-down CPC investigation and prosecution may have missed opportunities to harness context-specific, community-driven, and collaborative strategies and tactics for thwarting CPC.

Experience has now proved that legislation and law enforcement alone are unlikely to halt CPC. These are necessary, but not sufficient. The legal framework and effective enforcement actions to investigate crimes and prosecute offenders need to be coupled collaboratively with the expertise of archaeologists and/or other cultural heritage experts. Furthermore, whether on Apache tribal lands or at Jordan’s Dead Sea Plain, the incentives for CPC involve deeply entrenched practices, notions of nationalism, resistance, forces of globalism, conflicting preservation and management plans, and legacies of colonialism. CPC is not only about economics and those facing income challenges. A tangible outcome of bringing together a broad cross-section of those dedicated to cultural heritage protection were the discussions that unpacked the varied motivations for CPC. Understanding of CPC motivations and methods naturally gave rise to strategic considerations for responses by law enforcement, local communities, national and international organizations, and archaeologists.

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<sup>11</sup> Yates and Mackenzie 2018.

The Fort Apache Workshop revealed that academics in general, and archaeological scientists in particular, are willing and able, even excited, to share their subject matter expertise and other assets in pursuit of public goods—security, cultural heritage conservation, community health. One workshop participant (Cantley) observed that there appear to be “many good-hearted individuals who are responsive to the idea of getting their considerable knowledge and expertise out of the university and into society. We should anticipate that there is a large, untapped resource of individuals in the archeological sciences who would be happy and willing to contribute to combating archeological resource crime. They just need an avenue to do so.” The workshop, itself a case study in situational contingencies and schedule changes, as required to accommodate changing weather and participant travel schedules, further demonstrated that the social intelligence and level of personal commitments to collegiality contribute greatly to collective enterprises.

All workshop participants also gained awareness that criminal investigators and prosecutors have vast arrays of cases to pursue. Barring not-uncommon political interference, law enforcement professionals select the cases having the highest probabilities of successful prosecution via the lowest investments of time, money, and other scarce resources. All agreed that forensic sedimentology tools have incompletely exploited capacities to enhance CPC investigations, boost convictions, and foster vigorous and constructive communications among criminologists, scientists, and law enforcement and heritage stewardship professionals. Doelle said, “there is a vast and incompletely tapped reservoir of established, and to some extent cutting edge, scientific technology available to identify, track, and ultimately link cultural property criminals to specific crime scenes. Not all scientific evidence has applications to curbing CPC, but any evidence that is created for use in this arena must be iron clad to obtain convictions.”

### **Workshop Implications: Next Steps to Curbing CPC**

Perhaps the most important workshop outcome was shared recognition of the many promising avenues for addressing CPC. Participants agreed to continue and even expand collaborations to apply what we learned at Fort Apache. The archaeological scientists are at work on finalizing and initial testing of a recommended standard sediment sampling protocol for use in looted contexts. This is based on sediment samples collected from G-Wash that will be subject to sediment and petrographic analyses to determine variation. They will be compared to sediments from another site, Tundastusa, to assess site differences and resolution. In addition, Ownby and Nials are creating guidelines for context sampling grounded in protocols applied in environmental spill response and remediation. Towards that goal, they are coordinating with forensic science labs to better understand procedures and issues for conducting analyses creating prosecutorial evidence. This includes examination of the Department of Justice Evidence Manual section on soil samples and the Daubert standard for expert witness testimony. Context sampling of sand holds promise as a means for enabling petrographic analyses that could gather evidence for linking looted sand-tempered potsherds, including plainware sherds and other locally manufactured ceramic objects, back to their site of origin.<sup>12</sup> The completion of initial analysis of sand samples to support the sand temper research and enhance the level of confidence in linking

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<sup>12</sup> Miksa and Heidke 2001.

plainware potsherds confiscated from suspected looters back to White Mountain Apache Tribe lands is scheduled for February 2019.

Information sharing and personnel training also emerged from workshop deliberations as important follow-up initiatives. Welch, Cantley, McManamon, Ryan, Whiting, and Yates have initiated discussions with the U.S. Bureau of Land Management and submitted a funding proposal to funnel findings from the workshop into a curriculum development collaboration structured to create training for archaeologists, law enforcement officers, and tribal, federal, and state officials and land managers charged with curbing and prosecuting CPC. This professional training will take advantage of past and ongoing training developed and sponsored by public agencies in the United States and elsewhere (e.g., Federal Law Enforcement Training Center 2019; Waldbauer 1991). At least one online training module—tentatively titled “Introduction to Archaeological Resource Crime: Global Contexts, Local Impacts, ‘Glocal’ Responses”—would enable open access learning by any English language speaker (and create opportunities for translation into other languages and regional contexts). The two other envisioned modules—“Archaeological Site Damage Assessment: How to Manage and Document an Archaeological Resource Crime Scene” and “Forensic Sedimentology Applications to Archaeological Resource Crime Investigations: Analytic Rationales, Sampling Protocols, Physical Evidence Collection, and Data Management”—would be available to authorized archaeologists, law enforcement officers, and land managers via password-protected course delivery. The overall goal of the curriculum development initiative is to bring recent scientific and online learning innovations to bear on CPC investigation and prosecution and to expand tribal, federal, and state government capacities to address CPC.

Perhaps the most ambitious and far-reaching bundle of initiatives to emerge from the Fort Apache Workshop involves efforts to enlist and mobilize community support for the jurisdiction-by-jurisdiction elimination of CPC. Indigenous and place-based communities are, as mentioned, disproportionately adversely affected by CPC. Communities with values and norms grounded, literally and figuratively, in land and ancestral site stewardship are, with few exceptions, far more exposed to and affected by harms resulting from looting and grave robbing. This truth, however lamentable, also prequalifies these communities to host and lead efforts to curb CPC. The challenge involves transforming that which makes communities subject to harm into comparative advantages in curbing CPC. Meeting this challenge means inviting outsiders to recognize cultural and spiritual values embedded in cultural property on par with aesthetic, scientific, and economic values.

As initial experiments toward strategies for public and community outreach, Ryan and her colleagues at Archaeology Southwest have already published a carefully crafted article in *Outdoor Adventure*, a regional magazine for Arizona tourists and recreators (Ryan 2018). White Mountain Apache community values and interests make their beautiful Fort Apache Indian Reservation an auspicious place for expanding collaborations among law enforcement agencies, community health advocates, and political leaders. To this end, the workshop conveners have submitted a summary of the workshop for publication in the Tribe’s newspaper, *The Fort Apache*

*Scout*.<sup>13</sup> A week of intensive fieldwork to collect systematic ceramic assemblage characterization data from previously uncharacterized sites on White Mountain Apache Tribe lands is scheduled for early 2019. The April 2019 Society for American Archaeology meeting, conveniently scheduled for Albuquerque, will include an invited forum, “The End of Cultural Heritage Crime in Indian Country” that will engage many workshop participants and assist in refining plans and partners for further initiatives.

In summation, hope springing from the unlikely source of sediment analysis is driving a measured but nonetheless ambitious suite of overdue responses to the pernicious problem of cultural property crime. We think that effective response to the scourge that is CPC will likely require broad and sustained collaborations to link global-scale theorizing and advances in archaeological science to local action. We see the Fort Apache Workshop on Forensic Sedimentology Applications to Cultural Property Crime as the point of departure for collaborative, democratic, transdisciplinary marshalling of collective commitments to pushing CPC more completely and emphatically into extinction.

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### **References Cited**

Adovasio, J.M. 2012. “An ‘Outsider’ Look at Forensic Anthropology.” In *A Companion to Forensic Anthropology*, edited by Dennis C. Dirkmaat, pp. 683–689. Somerset, G.B.: Wiley Blackwell.

Adovasio, J.M. 2017. “Forensic Geoarchaeology.” In *Encyclopedia of Geoarchaeology*, edited by Allan S. Gilbert, pp. 276–285. New York: Springer.

Borgstede, Greg. 2014. “Cultural Property, the Palermo Convention, and Transnational Organized Crime.” *International Journal of Cultural Property* 21:281–290.

Brodie, Neil, and Colin Renfrew. 2005. “Looting and the World’s Archaeological Heritage: The Inadequate Response.” *Annual Review of Anthropology* 34:343–361.

Campbell, Peter B. 2013. “The Illicit Antiquities Trade as a Transnational Criminal Network: Characterizing and Anticipating Trafficking of Cultural Heritage.” *International Journal of Cultural Property* 20:113–153.

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<sup>13</sup> Welch, Riley, and Altaha 2019.

- Hart, Siobhan M., and Elizabeth S. Chilton. 2015. "Digging and Destruction: Artifact Collecting as Meaningful Social Practice." *International Journal of Heritage Studies* 21:318–335.
- Hutt, Sherry, Elwood W. Jones, and Martin E. McAllister (1992) *Archeological Resource Protection*. Preservation Press, National Trust for Historic Preservation, Washington, DC.
- Kelly, Sophia (2007) Developing and Implementing Archeological Site Stewardship Programs. *Technical Brief 22*, Archeology Program, National Park Service, Washington, DC. Digital copy at: <https://core.tdar.org/document/377136/developing-and-implementing-archeological-site-stewardship-programs>, accessed 28 March 2019, DOI: doi:10.6067/XCV89P336F.
- Kersel, Morag M. 2007. "Transcending Borders: Objects on the Move." *Archaeologies. Journal of the World Archaeological Congress* 3(2):81–98.
- Kersel, Morag M. 2017. "Myths and Facts About Looting." In *The Book of Plunder*, edited by Michal Baror, pp. 196–198. Tel Aviv: The Center for Contemporary Art.
- Mackenzie, Simon, and Donna Yates. 2016. "Trafficking Cultural Objects and Human Rights." In *The Routledge Handbook of Criminology and Human Rights*, edited by L. Weber, E. Fishwick and M. Marmo, pp. 220–229. London: Routledge.
- Mackenzie, Simon, and Donna Yates. 2017. "What is Grey about the 'Grey Market' in Antiquities?" In *The Architecture of Illegal Markets Towards an Economic Sociology of Illegality in the Economy*, edited by Jens Beckert and Matias Dewey, pp. 70–86. London: Oxford.
- McAllister, Martin E., and Francis P. McManamon. 2007. *Technical Brief 20: Archeological Resource Damage Assessment*. Washington, D.C.: Archeology Program, National Park Service.
- McManamon, Francis P. (1991) The Federal Government's Recent Response to Archaeological Looting. In *Protecting the Past*, edited by George S. Smith and John E. Ehrenhard, pp. 261-269. CRC Press, Boca Raton, FL.
- McManamon, Francis P. and Susan Morton (2000) Reducing Illegal Trafficking in Antiquities. In *Cultural Resource Management in Contemporary Society: Perspectives on Managing and Presenting the Past*, edited by Francis P. McManamon and Alf Hatton, pp. 247-275. Routledge, London and New York.
- Miksa, Elizabeth J., and James M. Heidke. 2001. "It All Comes Out in the Wash: Actualistic Petrofacies Modeling of Temper Provenance, Tonto Basin, Arizona, USA." *Geoarchaeology* 16:177–222.
- Pirrie, D., A. Ruffell, and L.A. Dawson (Editors). 2013. *Environmental and Criminal Geoforensics Geological Society Special Publications*, 384 (London).
- Proulx, Blythe Bowman. 2013. "Archaeological Site Looting in 'Glocal' Perspective: Nature, Scope, and Frequency." *American Journal of Archaeology* 117(1):111–125.
- Ryan, Stacy L. 2018. White Mountain Heritage: Understanding Your Place. *Outdoor Adventure* December 2018: 16–17.

- Silverman, Helaine (Editor). 2002. "Touring Ancient Times: The Present and Presented Past in Contemporary Peru." *American Anthropologist* 104(3):881–902.
- Silverman, Helaine (Editor). 2006. *Archaeological Site Museums in Latin America*. Gainesville: University Press of Florida.
- Snead, James E. 2018. *Relic Hunters: Archaeology and the Public in 19th Century America*. New York: Oxford University Press.
- Skoy Woodfill, Brent K. 2013. "Community Development and Collaboration at Salinas de Los Nueve Cerros, Guatemala: Accomplishments, Failures, and Lessons Learned Conducting Publically-Engaged Archaeology." *Advances in Archaeological Practice* 1:105–120.
- Swain, Todd. 2007. "How Do You Manage Your Resources if They are being Stolen and Sold at the Swap Meet?" *Proceedings of the George Wright Society*, 2007.
- U.S. Government Accountability Office. 1987. "Cultural Resources: Problems Protecting and Preserving Federal Archeological Resources." Washington, D.C.: GAO/RCED-88-3.
- Vaitkus, Robert. 2017. Letter to Jamie Meuwissen, U.S. Government Accountability Office, September 15, 2017, U.S. Bureau of Land Management, Arizona State Office, Phoenix.
- Waldbauer, Richard C. (1991) Archaeological Resource Protection Training. In *Protecting the Past*, edited by George S. Smith and John E. Ehrenhard, pp. 201-205. CRC Press, Boca Raton, FL
- Welch, John R., Mark Altaha, Karl Hoerig, and Ramon Riley. 2009. "Best Cultural Heritage Stewardship Practices by and for the White Mountain Apache Tribe." *Conservation and Management of Archaeological Sites* 11(2):48–160.
- Welch, John R., and T.J. Ferguson. 2007. "Putting Patria into Repatriation: Cultural Affiliations of White Mountain Apache Tribe Lands." *Journal of Social Archaeology* 7:171–198.
- Welch, John R., Ramon Riley, and Mark Altaha. 2019. "BIA, Fort Apache Heritage Foundation, THPO, and Archaeology Southwest Hold Workshop to Curb Looting." *Fort Apache Scout*, in press, March 2019.
- Yates, Donna. 2014. "Displacement, Deforestation, and Drugs: Antiquities Trafficking and the Narcotics Support Economies of Guatemala." In *Cultural Property Crime*, edited by Joris D. Kila and Marc Balcells, pp. 23–36. Leiden: Brill.
- Yates, Donna and Simon Mackenzie. 2018. "Heritage, Crisis, and Community Crime Prevention in Nepal." *International Journal of Cultural Property* 25:203–221.