

HOW TO BUILD A DAM AND SAVE CULTURAL HERITAGE

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ABSTRACT:

The impact of each dam on cultural heritage is enormous, affecting hundreds or even thousands of sites. Dams are required, however, to offset water shortages and provide electricity for a rising global population. This short paper describes the initial outcomes of a new project, the aim of which is the production of a practical set of guidelines for cultural heritage management before and after dam construction, aimed at developers, foreign contractors, and policy-makers.

1. INTRODUCTION

1.1 A Call for Action

The conference, How to Build a Dam and Save Cultural Heritage, was conceived in response to a one-day conference held at Durham University in the spring of 2011. The conference “Iraq: Archaeology, Cultural Heritage and Conflict” brought together experts from law, archaeology, and cultural heritage, including a key advisor to the military on cultural heritage protection. Over the course of the day, however, it became clear that the primary source of damage to cultural heritage there is not the conflict but development. The discussion session that followed highlighted an urgent situation.

In the audience that day was a developer who had just been awarded a contract in the Middle East with an impact area of about 5,000 sites. Concerned about the impact his development project would have on the sites, he travelled to the conference with a specific question in mind: How do I choose which sites to save? In a room of experts, no one could give him specific, practical advice. Shockingly, in 2011 there were no guidelines to refer to or best practices to follow, only calls to write them.

How can we criticize developers whose projects destroy sites, if we are not prepared to help those who care?

1.2 The Foundation of How to Build a Dam and Save Cultural Heritage

“Cultural Heritage is an expression of the ways of living developed by a community and passed on from generation to generation, including customs, practices, places, objects, artistic expressions and values...As part of human activity Cultural Heritage produces tangible representations of the value systems, beliefs, traditions and lifestyles.” (Culture in Development, n.d.)

Moreover,

“A sense of place, purpose, and belonging tend to be good for us psychologically.... far from being “just another” factor that impinges upon the health of individuals, social identities—and the notions of “us-ness” that they both embody and help create—are central to health and well-being” (Haslam et al., 2009: 2-3).

Yet the population is increasing – the UN estimates the population will reach 10 billion people by the turn of the next century – and these people have a right to water, food and power, too. The majority of large dams are built for irrigation – current estimates suggest 30 – 40% of irrigated land now relies on dams (Niasse and Wallace, 2002). The majority of major dams are built for hydropower; dams generate nearly a fifth of the world’s electricity. There are over 800 000 dams globally, of which more than 40 000 are large dams, and 300 are major dams (>150m tall, with a particularly large reservoir). So far, over 400 000km² of land has been flooded according to International Rivers (2007). Is there a way forward, and if so, what is it?

This project must also nod towards another source of inspiration – a workshop held in Corinth more than a decade ago, which considered the nature of threats to sites in the Mediterranean, and began to consider a framework in which to move forward. The workshop took as its starting point that conservation efforts are usually focused on material decay, but in the last decade it has become increasingly clear “that threats to the survival of this heritage come from a vast array of sources, but most of them are linked to the way modern societies are developing” (Palumbo 2002: 3). Acknowledged then and still true now, there is little consensus on the nature of that heritage – it is not a ‘universal’ concept, nor is preservation, or even of audience for which something may be preserved, and these areas are still hotly contested (for examples, see Meskill, 2009). What is preserved, why, and who for, are all questions that this project must deal with, to which no easy answers are available.

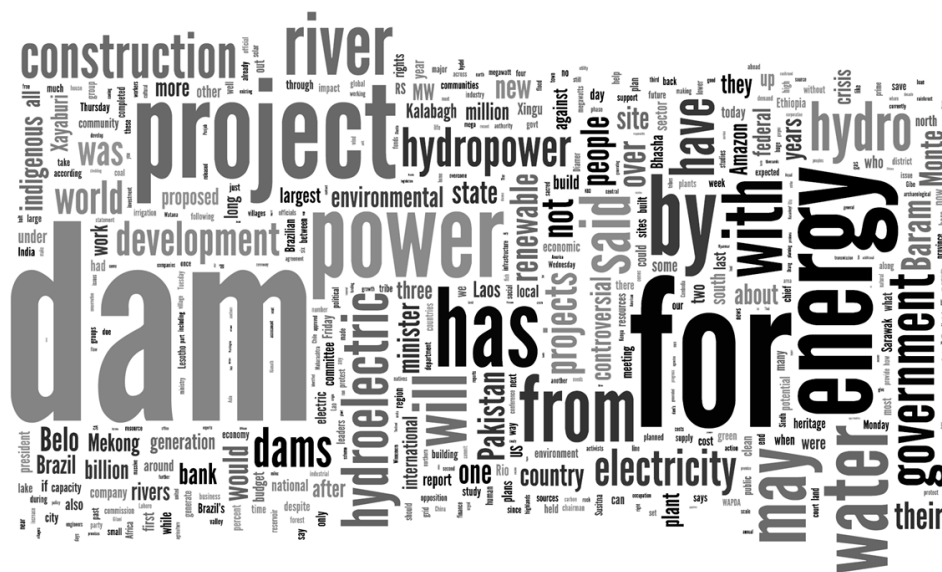


Figure 1: Word cloud displaying the relative frequency (through font size) of words in news article titles and summaries relating to dams and cultural heritage between April 1st and July 31st.

Less than a year later, the project *How to Build a Dam and Save Cultural Heritage* launched with funding from a grant offered by the Durham University Department of Archaeology. Further sponsors of the project include AAG Archaeology, Arch Points, Institute of Hazard and Risk Research, the Centre for the Ancient Mediterranean and Near East, and CARD (all of Durham University), Tally Fox and The Water Network, to whom we are extremely grateful. The project is run jointly with Edinburgh University School of History, Classics and Archaeology, sharing practical expertise on the effects of dam projects.

We have chosen to focus initially on dam development due to the current global issues of increasing demand for water and electricity on a planet whose population continues to increase. We note, however, that it is estimated that 40 – 80 million people have been displaced by dam projects, and many more are at risk from current projects (International Rivers, 2007). A decision was made at the outset of this project that we cannot and should not ignore the social impact of dams, and nor would we want to, as heritage is created by and used by people. However, our intent is to focus on the impact on cultural heritage.

The danger in choosing to take a global approach is the risk of losing the individual site, of overlooking something unique in the attempt to provide unified guidelines. Furthermore, every dam is unique, designed specifically for its purpose and context. Yet, however unique these sites are, they share common threats, designed by organisations with similar goals supporting people with similar needs, and it is these similarities we hope will offer a way forward.

1.2 Aims and Objectives

Although based in the UK, the ultimate aim of *How to Build a Dam and Save Cultural Heritage* is the publication of a practical set of international guidelines for cultural heritage management before and after dam construction aimed at developers, foreign contractors, and policy-makers. In order to achieve this in a way that has real impact in the world, it is crucial that experts from

all relevant fields, and from different perspectives, are represented from the beginning. Inclusiveness both between different fields within academia, but also between academia and industry/practitioners, is a key objective that is seen as vital to the project's success, combining in depth study with real, practical experience.

In these early stages, however, a key aim is to identify these issues in order to construct a platform from which to proceed, identifying the main areas in which guidelines are required. This is an ongoing activity, managed through the project website: <https://sites.google.com/site/saveculturalheritage/>

2. WHAT PEOPLE WRITE ABOUT

Vital to this is the capture of information. To truly deal with the issues on a global scale in any way that remains meaningful at the level of an individual dam project, information must be current, it must be relevant, and it must be shared. Every day, this project website is updated with the latest news from around the world regarding new and ongoing dam and hydropower projects, new hydropower technologies, the impacts of dam and hydropower projects on culture and cultural heritage, and new legislation on dams and hydropower.

Over the three month period between April 1st and July 31st of this year, this has resulted in 579 unique articles about dam projects around the world and the impact dams are having on cultural heritage. To try to convey the trends in what people write about when they write about dams, figure 1 is a word cloud using words that appear five or more times in the titles and article summaries in at least one month of this four month time period.

While the words (frequency in brackets) “archaeological” (13), “cultural” (12), and “heritage” (27) do appear, other issues like “energy” (263), “water” (183), and even the “environment” (27) or being “environmental” (56) take precedence in the dialogue about dams. Encouragingly, “indigenous” (62) appears strongly

with 47/62 mentions occurring during or after the Rio+20 conference held in late June.

3. THREATS TO SITES?

3.1 Current research in the field

The threats sites face during dam construction are poorly documented, and even more poorly understood by both archaeologists and developers. In a working paper submitted to the World Dams Commission, Brandt and Hassan (2000) discuss numerous issues affecting cultural heritage management and dam development, not least of which was a lack of adequate training amongst personnel, and poorly enforced / implemented legislation.

Even when these are not an issue, the risks to sites are still assumptive. Notable pre-construction impacts (assuming an environmental assessment of heritage takes place) include the lack of information regarding site location, and site registration – if sites are not registered then there is no-one to say dams are affecting them. Given the ongoing taphonomic process at work in the landscape, archaeologists should not expect a complete record of sites to ever exist, but many areas are un-surveyed and the work is hampered by a lack of consensus about what even constitutes a site (Wilkinson, 2003). This has led to an over-focus on larger sites at the expense of landscape features, such as roads, field systems, water management, and other elements of landscape use. The proliferation of articles discussing the discovery of many hundreds of new sites using satellite imagery in the last decade attest to the fact that many new discoveries remain: the true damage caused by dams is almost certainly under-estimated. Other threats include the obvious and ever present bulldozer utilized in the creation of the infrastructure, but even here, the nature of damage is an assumption. Destruction is assumed to be total, but evidence suggests that changes in ground level can preserve several meters of site below the ground (Wilkinson and Tucker, 1995). Research is also only just beginning on the disturbance caused to these buried deposits (Cunliffe, unpublished), and on the effects of sites that are only partially damaged.

Once the dam is built, and the reservoir area is inundated, there is also a lack of information about what happens next. The actual damage is the subject of many incorrect assumptions: there is surprisingly little fact, but a great deal of work is carried out as if the facts were known. Most studies are limited in nature. Some (e.g. White, 2000) have examined impacts to shoreline sites, and others (eg Norr and Faught, 2000) have examined certain site types exposed when reservoir levels have dropped. Lenihan (1981) conducted the most comprehensive study, detailed in section 3.2. The team dived on inundated sites in northern America reservoirs, and assessed the various impacts (physical, chemical, and biological) on sites and the wider archaeological landscape within different areas of the dam. One particular finding contested the “certainty” that burying an exposed site under sand before inundation will preserve it, seen recently, for example at the Roman baths at Allianoi, Turkey (Global Heritage Fund 2010), showing that it is not always an appropriate course of action. Lenihan also evaluated the appropriateness of the traditional response of the archaeological community to the threat of inundation: in particular he criticized the large site-specific rescue excavations often conducted on ‘important’ sites, chosen on spurious criteria. It is sad to see that more than thirty years later, this

approach is still common, and this study has not been repeated elsewhere on such a scale.

It also appears widely believed that once the dam is built, nothing more will happen to the heritage of the area, and nothing more can be done - another fallacy. Erosion on sites continues, particularly to those on the shoreline, but also to those in areas of higher water flow rates (Lenihan, 1981, Stammitti, unpublished). Post-inundation managerial action can act to mitigate some damage, but is rarely implemented. Impacts downstream of the dam, where the river will doubtless change, are not always considered, and nor are the peripheral infrastructure results from the building of the dam. Dams lead to increases in urban development, in the supporting infrastructure (roads, cables, etc), in arable land, in intensification of exploitation of existing land, and in the building of large irrigation projects that could potentially be more destructive to sites than the dam (Wilkinson and Tucker, 1995; Wilkinson and Cunliffe, 2012).

3.2 Previous Projects: The National Reservoir Inundation Study

Prior to Stammitti’s research, the only other project of a similar nature was the aforementioned study by Lenihan and his team in North America. Like this Project, their survey arose from an effort to “find practical and demonstrable solutions, at the field level, to commonly shared problems faced by field managers in the conservation management of inundated cultural resources” and sought to answer the question “how should we manage the long-term preservation of inundated archaeological resources?” (Scovill in Lenihan 1981: v). The study acknowledged the crux of the debate: to excavate sites prior to inundation and thus ‘save’ them, or to bury them for the future? There was little to no data to support either viewpoint.

The study took place over five years and involved a comprehensive literature review, and ground-breaking new research by both the core team and a series of contracted reports on certain specialist topics, diving on dams and scientifically analyzing the results.

(Very) briefly summarized, they came to the following conclusions.

- The overall effects of reservoir inundation on archaeological resources are detrimental, resulting in large scale destruction of the resource, therefore the inundation process should not be viewed as a means of creating a data bank.
- The traditional response of the archaeological community to the threat of inundation is “ill-conceived and parochial” (1981: 5), ignoring the inter-site record, such as environmental remains, in favour of large sites, and assuming inundation affects all remains equally, which it does not.
- Site protection is only a viable alternative to excavation in very specific circumstances. Preservation is not an answer in and of itself, as some elements of a site will always be lost over time. Therefore it should be considered together with (at least) partial excavation. Indefinite commitments to site protection are not always possible.
- The effects of different reservoir zones on sites is poorly understood, and rarely taken account of.
- Post-inundation managerial action should play a much larger part in mitigation. Responsibility does not stop with inundation.

- There is a need for great communication between reservoir planning and construction personnel, and archaeologists. “There are points in the reservoir construction process where increased dialogue and commitments may result in increased protection of resources at reduced expense” (1981: 6-7).

The report concludes that whilst a vast amount of hard data was generated to support some conclusions, in other cases concluding statements were only weakly justified and open to considerable controversy. Furthermore, they noted that due to the unique nature of most reservoirs, there would probably be new variables they had not considered.

The conclusions of the report are still valid today, but the report was never widely circulated – most archaeologists, and even fewer engineers, have not even heard of it, although many of its recommendations (particularly the last one) ring as true today as they did thirty years ago. However, the study was undertaken in only one country, dealing with only one legal framework, and with one main intended audience agency – the National Park Service of the U.S. Department of the Interior. There is no mention of whose heritage the archaeologists are dealing with, or of working with local communities in the key recommendations. Many more reservoirs have been built, with new unique situations. Furthermore, technology has moved on since this study was carried out, and much more data could potentially be gathered. Lenihan’s study forms an excellent basis for this project, considering many of the key issues, but there is an undeniable need for more work to be done, and on a global scale. However, the crucial first step is to assess the state of the problem, thirty years on.

4. THE WORKSHOP

July 6-7, 2012, a workshop was held in Durham with live streams to Edinburgh and Istanbul to help set the foundation and framework of the project and to identify key issues surrounding cultural heritage before, during, and after dam construction. The workshop was well attended, with representatives from The British Dam Society, URS Infrastructure and Environment, the British Museum, NG Archaeology Services, and members of staff and postgraduates from the Universities of Durham, Edinburgh, Oxford, Newcastle, UCL, Ulster (N. Ireland), Kyoto (Japan), Pennsylvania (USA), Shah Abdul Latif (Pakistan). Talks covered every continent, giving a truly international perspective. Nonetheless, some common issues emerged.

Archaeologists, as caretakers of the past, protect and study its remains through recording. Excavation is a destructive process and the artifacts that result from either excavation or survey are stored for safe keeping, often at least partially in the archaeologists’ home country.

The prioritization of sites to record is based on scientific value and the requests of the funding body. Often, this can favor older sites such as, for example, Egyptian tombs and temples or Mesopotamian sites over ‘modern’ Islamic remains (with histories extending back more than a millennium). In this example, the priorities of the archaeologist and the local community are opposed. In predominantly Muslim countries of the Middle East, it is common to teach Arabic history starting only from the spread of Islam. In the processes of caring for the past, the desires and values of the local community and their relationships to the heritage are rarely considered. Beyond

leaving communities feeling that their heritage is not valued, this practice can also have damaging effects on the local cultures.

Cultural heritage often plays a key role in a culture’s identity and ideology through active roles in traditions. The removal of cultural heritage either through physical relocation or rendering it inaccessible by some means (inundation, for example) can still result in a loss for the local community and destruction of cultural heritage – even if it has been properly recorded and/or conserved in a museum.

A current example of this gap between archaeological caretaking and protecting the cultural heritage of a local community is currently taking place in California. There, the Native American tribe Winnemem Wintu is engaged in an active fight with the state of California to stop the raising of the Shasta Dam in order to preserve the last puberty rock still above water. The rock plays an instrumental role in their women’s coming of age ceremony. One of the final activities of the ceremony is a swim across the river by the girl to this rock where instruction on womanhood and transformation to womanhood takes place. An ancient site, it has been properly recorded archaeologically. Scientifically speaking, it is ready for inundation from the proposed raising of the Shasta dam without loss of data. Practically, however, the flooding of the last rock will result in the destruction of cultural heritage and the mandatory end of a traditional transformation of girls to women.

The problem can be summarized as:

Cultural Heritage = Tangible Heritage + Intangible Heritage

Archaeologists are often only formally trained in recording and analysis of tangible heritage, objects and sites, but there is no neat line between past and present. The past is constructed, used, and reused continuously. A particularly famous example of past, present, solid and intangible intertwining are the Aboriginal dreamscapes of Australia. UNESCO has defined a term, cultural landscape, to describe the values of such locations as Aboriginal dreamscapes or the landscape of the Winnemem Wintu ceremony (1992, revised 2008).

“Cultural landscapes -- cultivated terraces on lofty mountains, gardens, sacred places ... -- testify to the creative genius, social development and the imaginative and spiritual vitality of humanity. They are part of our collective identity.” (UNESCO, 2012)

Addressing this issue is a challenge. Already so-called rescue archaeology is operated on tight deadlines that cause the prioritization of sites, which would otherwise not take place. There is little time for consultation with local communities, much less the hiring of a cultural anthropologist to understand the intangible side of a community’s cultural heritage.

Archaeology is usually classified as a ‘soft’ issue. As a result, archaeologists are only involved after a dam has been planned, designed, a contractor hired, and construction is almost ready to begin. The consequences are that small changes in design, such as the raising of a dam to ensure a site is located in the anaerobic zone of a reservoir or the slight shifting of a spillway, become prohibitively expensive and sites are lost.

The need for data was also emphasized at the workshop. If we are to change the nature of our involvement, becoming involved sooner, and even becoming part of the design process, data is required. We need to know exactly the kind of damage that occurs to sites and materials in different situations and what conditions can be created to mitigate that damage. We need to know what to ask for, why it is necessary, and be able to provide data that engineers and developers can work with to create the desired outcomes. At present, such data does not yet exist.

Emily Stammitti, a director of this project, is expected to complete her Ph.D. studying exactly what happens to sites post-inundation by the end of the year. Stammitti's work represents the first attempt to expand Lenihan's study to other site types in other countries. Just as every dam is unique, so is every archaeological site, but it may be possible to create a typology based on the construction materials of sites that can be used as a basis for finding solutions.

Some of the requisite data could come from the development firms themselves. Many engineering companies acquire satellite imagery and aerial photographs of the impact areas of their projects, constructing 3D models of the terrain. This same data can be used by archaeologists for remote sensing purposes to map sites and features in their contexts, expanding the known archaeological resource, and enabling better planning of salvage work.

Finally, the dominant issue raised at the workshop is the need for dialogue and greater involvement between all participants, from governments and international bodies to affected local communities. All parties have a role to play in the construction of a practical set of guidelines and the protection of cultural heritage before, during, and after dam construction.

5. DISCUSSION

As archaeologists, we are extremely aware both of the importance of cultural heritage and the dangers it faces, especially from large development projects – dam projects included. Stammitti's practical underwater works (*in press*) in reservoirs throughout Scotland has produced new data about site conditions, typological categories, and the means to mitigate the effects of reservoir currents and sedimentation. The work, which investigated a cross-section of reservoirs and contained archaeological sites, was carried out with the cooperation of the Biggar Archaeology Group, using nonintrusive underwater survey techniques. Cunliffe's work (*in press*) using satellite imagery to monitor change to archaeological sites in Syria has demonstrated the extreme magnitude of the impact development has on archaeological sites. A study in the region of Tell Beydar, just north of the West Hasseke dam, demonstrated that cultivation expanded, urban development increased, and sites noticeably degraded. The intensification of agriculture as a result of the increased availability of irrigation water is a rarely considered impact. As the land is already given over to agriculture, it is discounted in impact assessment. However, increasing irrigation allows greater crop rotation and encourages greater exploitation of the land, with consequently detrimental effects on the sites within that land. Nonetheless, the world's growing population requires access to safe drinking water, irrigation to grow crops, and homes safe from floods, along with equal access to electricity and the benefits it brings. We do not seek to sacrifice the future for the sake of the past, but nor do we wish the past to be lost in the search for the future.

Lenihan (1981), ICOMOS (Niasse and Wallace, 2002), and even the World Dams Commission (2000), amongst others, have all made recommendations for ways to preserve cultural heritage whilst still recognizing the need for hydropower projects, yet these recommendations remain largely unknown. We must seek dialogue to move this issue from the impasse in which it now languishes.

The creation and use of dams is about more than just power, food and people. Water has many symbolic meanings, and these meanings affect patterns of use and attitudes to water conservation (Strang, 2004). Perceptions of dams, and of water, are complex, and influence us more than we realize, with underlying issues of power and ownership at play. This dialogue must acknowledge these influences, and the popular misconceptions present on both sides. Dams are not just about 'crisis' and 'solutions', but about people - past, present and future.

6. WHAT IS NEXT?

As *How to Build a Dam and Save Cultural Heritage* moves forward, we are seeking funding to become a full-time project for the next three years. During this time, we intend to:

- Investigate key questions regarding the connection between cultural heritage and identity and the effects of separation from cultural heritage by destruction, inaccessibility, removal to distant museums, etc.
- Build a body of data on the effects of dams on cultural heritage over time through remote sensing and field investigations, including continued work by director Emily Stammitti diving on reservoir sites to record the effects of inundation at different depths.
- Work with engineers and developers to gather data and information about dam construction and the types of design changes that are practical.
- Work with engineers, policy-makers, and developers to raise awareness of the importance of cultural heritage and the value of changing when cultural heritage becomes involved in a project timeline.
- As we move forward, those involved need to recognize that in such an interdisciplinary effort, terminologies are bound to conflict or be misunderstood. It is key that everyone involved can be understood, and that terminologies are inclusive and clearly-defined. For example, a large dam is not merely a big dam, or a humungous dam: it is a formal engineering term. Likewise, the term "soft" issue is used in development contexts to indicate a non-physical process (ie non-construction / development / engineering), but can be seen as a derogatory term in the social sciences.
- We must continue a dialogue about cultural heritage and dams with experts from all relevant backgrounds through participation at regional and international conferences, the organization of further workshops, and regular correspondence and discussion aided by a discussion forum open to all without registration at our website: <https://sites.google.com/site/saveculturalheritage>.

Although only in its formative stages, the need for this project is already clear. Cultural heritage is threatened on a scale never before seen as global crises loom and urgent solutions are sought. We must make sure that those organisations and individuals in a position to act are aware of this urgent need and can influence international agendas in order to save cultural heritage.

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