

## DATA PAPER

# Settlement Dynamics on the Banks of the Upper Tigris, Iraq: The Mosul Dam Reservoir Survey (1980)

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The paper describes a dataset of archaeological sites and villages now partially covered by the water of the Mosul Dam Reservoir. For the first time the dataset offers digitized information on c.150 archaeological sites detected during a survey carried out by the Iraqi State Organization for Antiquities and Heritage in the 1980s. Knowledge of the map of these sites will have a substantial impact on interpretation of Tigridian settlement dynamics.

**Keywords:** Upper Mesopotamia; GIS; Landscape Archaeology; Settlement System; Survey

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## 1. Overview/Context

Between 1981 and 1988 a large dam was built on the River Tigris in Iraq, just upstream from the village of Eski Mosul (Balad). The dam project originally took its name from this village but was later dubbed the ‘Saddam Dam’ or simply ‘Mosul Dam’.

This project was part of a vast program of engineering undertakings involving the damming of rivers and the realization of artificial basins that has involved the whole Middle East and regions of Africa from the second half of the 20<sup>th</sup> century onwards. It was commissioned by Saddam Hussein to provide hydro-electrical power for his country, water for downstream irrigation and industry, promote tourism, and enhance his personal prestige, as well as that of his government and nation.

However, the construction of the dam and the resulting upstream flooding raised a great concern since it threatened a large number of archaeological and historical sites located along the banks of the Tigris.

Before the project started, the Iraqi State Organization for Antiquities and Heritage (hereafter SOAH) therefore invited both foreign and local archaeological teams to join the Organization’s own personnel in a large rescue excavation enterprise that involved all those sites that were to be submerged. The building of the dam lasted 4 years (1981–1985); the final flooding occurred in 1988 and produced a lake stretching about 50 km NW-SE along the Tigris Valley (**Figure 1**).

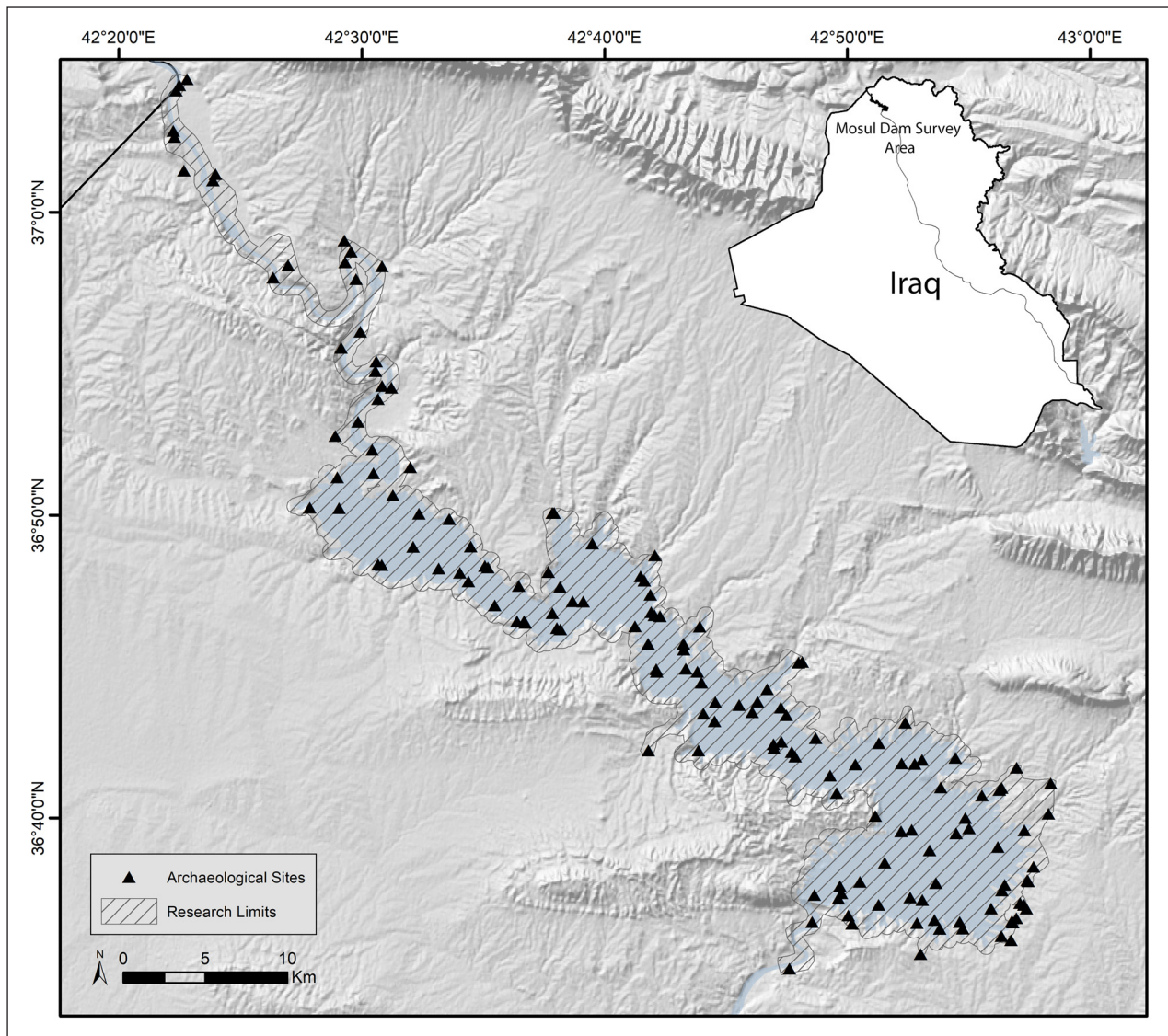
As had already become compulsory at that time, proper excavations were preceded by a general survey, that was promptly organized by the SOAH archaeologists. The work was conducted in 1980 and led to the preparation of a

detailed hand-drawn map, in which all the newly recognized archaeological sites (149 in total) were numbered, named in both Arabic and English and recorded according to their periods of occupation based on the collection of surface finds. Unfortunately, the names of the Iraqi colleagues who took part to the field mission and prepared the map are not known.

The invitation by the SOAH to participate in the salvage excavation project was issued in 1981 at a conference in Baghdad [1] and the above-mentioned map – distributed to all participants – was the basis on which the sites to investigate were chosen. Over a period of about 6 years more than 60 sites were excavated, including 21 sites which were not originally identified during the survey [2]. The occupation periods of these sites spanned from Palaeolithic to Late Islamic and enhanced the knowledge of an area that had been considered for a long time as the mere periphery of major empires. The Mosul Dam salvage project resulted in 5 final publications and more than 50 preliminary reports [3, 4].

In these reports, the Mosul survey map is often mentioned [5] but, unfortunately, it was published in a scale too small to be read properly [6]. In the following years, then, it was used often, in its integrity or in parts, in various contributions.

The recent increase of archaeological investigations that since 2011 have been conducted on the eastern bank of Lake Mosul, now part of the territory of the Kurdistan Regional Government [7], has renewed the interest in the Lake Mosul region’s settlement history. Therefore, the full publication of this map has become ever more urgent.



**Figure 1:** Map of the Upper Tigris, Iraq, with boundary of the survey project area and recorded sites (Map Sconzo-Simi 2019).

After a lengthy search in Fall 2019, the two authors were granted one of the few surviving paper copies of the map of the Mosul Dam Reservoir survey by Prof. Elena Rova, active member at that time of the salvage excavation at the site of Tell Karrana. Hence, the decision of digitizing the data to make them available to the wider public. The procedures followed are described in the section 'Methods' below.

The map, in scale 1:60,000, illustrates the Tigris floodplain from a few kilometres upstream of the town of Eski Mosul up to the Syrian border. The area is about 60 km long with a maximum width of 11 km and corresponds largely to the Tigris Valley, though on the eastern bank it also covers (to a minimal extent) the first level of river terraces, set higher up the alluvium (especially in the area of Wadi Baqaq).

The map features 149 archaeological sites named both in Arabic and Roman alphabets. They are subdivided into 'pristine' (marked by a triangle) and 'covered by modern graveyards' (drawn as unfilled polygons). External information includes 75 villages, a similar number of 'not archaeological' modern cemeteries, main roads and

*wadis*. Villages are represented by solid black polygons, the dimensions of which change according to the form and size by this time, with Arabic names given directly on the map. Cemeteries are shown by unfilled polygons; no names are provided.

The upper section of the river is more cursorily presented, as it was clear from the beginning that it would not have been directly affected by inundation. Most archaeological sites ( $n = 107$ ) are located on the eastern bank of the river and the remaining ones ( $n = 42$ ) to the west. As for the survey methodology adopted, it cannot be ascertained whether all the mapped sites were actually visited, since there is no mention of the fieldwork carried out in any publication. What is clear from a cross-check with the dataset of the maps of the Atlas of Archaeological Sites, published a few years earlier in 1976 [8], is that most of the sites mapped in the 1980s survey were previously unknown. Only 21 correspondences were clearly defined. On the other hand, not all the sites mentioned in the Atlas appear in the 1981 map. Periods of occupation for each site are said to have been established on the basis of surface finds collection. According to the map legend,

the designation of the periods (I to XVIII) follows those used in the 'The Archaeological Map of Iraq', issued by the SOAH in 1967 (see dataset description) [9].

### Spatial Coverage

- Description: Duhok (governorate) and Tell Afar-Ninawa (province); Iraq (country); Middle East (macro-region).
- Geographic Coordinate system: World Geodetic System (WGS) 1984.
- Datum: World Geodetic System (WGS) 1984.
- Northern boundary: 37.07516 N 42.38052 E (dd)
- Southern boundary: 36.59388 N 42.80803 E (dd)
- Eastern boundary: 36.69911 N 42.98357 E (dd)
- Western boundary: 36.84117 N 42.47261 E (dd)

### Temporal Range

- Start date: c. 6000 BC
- End date: c. 1900 AD

## 2. Methods

The dataset presented here is based on the hand-drawn survey map, which seems to be quite accurate. The work consisted of the following steps: 1) georeferencing the hand-drawn map; 2) initial approximate positioning of each archaeological site based on the map and compilation of a geo-database; 3) further refinement of the location of each site. The third stage was achieved by checking the information provided by the map itself (distance from the Tigris, *wadis* and villages) against available cartography (mainly declassified NGIA maps [10]) and various sets of satellite images. Primarily, we made use of GeoEye (2004 and 2010, available via GoogleEarth), DigitalGlobe (2010, available on the Bingmaps website) and declassified CORONA imagery (all ortho-rectified and freely accessible through the 'CORONA Atlas of the Middle East' of the University of Arkansas (<http://corona.cast.uark.edu>). The photointerpretation of the latter turned out to be crucial for the localization of all the sites which were submerged, as the images predate the flooding of the Mosul Dam Reservoir. Two CORONA missions, namely mission 1102 (Dec 11, 1967) and mission 1104 (Aug 16, 1968), covered our research area.

Following this procedure was not always simple because of the map's small scale, and its sketchy appearance as well as the intrinsic nature of the Mosul Basin landscape which is quite rugged and deeply cut by several *wadis*. While artificial mounds and sites covered by modern villages and/or cemeteries were easily recognisable, hill-top and bluff-top sites, that gave no clear signs in the satellite images, were sometimes more challenging to locate. In addition, since the area is densely packed with archaeological sites, many more than those detected by the Iraqi survey team, in the case of clusters of sites it was sometimes difficult to assess which one among several mounds was actually mapped. Because of this problem, a field regarding the evaluation of location accuracy was added to the geo-database (see data-set description below).

About a fifth of the surveyed sites were lately excavated. For all those sites, the exact location was further cross-checked by means of contour maps, photographs and descriptions contained in preliminary reports and final publications. The

compilation of the modern villages was much easier as they were easily visible in the CORONA images.

### Quality Control

All published data have been checked in detail and correspond to those sketched in the original hand-drawn map.

### Constraints

Various constraints apply to the data presented here.

### Periods of occupation

The first constraint is related to the intrinsic quality of the original dataset. One of the major limitations regards the evaluation of the periods of occupation of each site, as featured on the original map. Periods were established on the basis of surface finds collection, and – inevitably – reflect the knowledge of pottery that existed at that time. They may therefore not always be reliable in comparison to modern standards. Most sites, for example, were recognised as being exclusively Sasanian or Islamic in date, even though the excavations that followed showed a much wide-ranging stratification.

### Toponyms

A second minor issue is related to toponyms. Later excavation reports reveal that some sites were given names differing from those used by the local population [11, 12].

### Map accuracy

A third issue concerns the positioning of the sites on the original map; in a few very clear cases (such as for Tell Rijim and Tell Shelgyyah) the archaeological site was undeniably positioned at some distance from its true location.

## 3. Dataset Description

The dataset includes two different sets of files, namely Mosul Dam archaeological sites, henceforth **MDS\_sites** and Mosul Dam villages, **MDS\_villages**.

Each set contains a shapefile and associated files to be opened with a GIS software, and a .csv file (UTF-8).

The sites points were located approximately at the centroid of the archaeological site as visible on the satellite images.

The village polygons were largely created according to the shape of the villages as shown in the CORONA images. The villages which were not visible were drawn according to the representation in the hand-drawn map.

### Object Name

1. **MDS\_sites**: a set of two files (.shp and associated files, .csv UTF-8)

We provide below the description of the fields of the dataset files.

*Site\_No.*: Number assigned to the site by the Iraqi surveyor (as shown on the map).

*Name\_1*: Name of the site in its original transliteration from Arabic (as shown on the map).

*Name\_2*: Name of the site in Arabic (as shown on the map).

**Dating:** Periods of occupation attested (as shown on the map).

I: Palaeolithic; II: Jarmo; III: Hassuna; IV: Halaf; V: Ubaid; VI: Uruk; VII: Protoliterate; VIII: Early Dynasty; IX: Akkadian and Neo-Sumerian; X: Old Babylonian (Isin and Larsa); XI: Kassite and Old Assyrian; XII: Assyrian Empire; XIII: Chaldean (Neo-Babylonian); XIV: Achaemenian; XV: Seleucid; XVI: Parthian; XVII: Sassanian; XVIII: Islamic.

**Bank:** left or right, the field determines whether the site is located on the left or right bank of the River Tigris River (added by the authors).

**Excavated:** yes or no, refers to whether the site has been recently excavated as part of the salvage project or not (added by the authors).

**Certainty:** 1 = high, 2 = medium or 3 = low, scale of reliability of the site's position as shown on the map (added by the authors).

**x:** x coordinates/longitude of the sites (added by the authors).

**y:** y coordinates/latitude of the sites (added by the authors).

2. **MDS\_villages:** a set of two files (.shp and associated files, .csv UTF-8)

We provide below the description of the fields of the dataset files

**Id:** identification number assigned by the authors.

**Name:** Name of the village in Arabic (as shown on the map).

#### Data Type

Primary data/processed data

#### Format Names and Versions

.shp, .csv

#### Creation Dates

The dataset was created between September and December 2019.

#### Dataset Creators

Paola Sconzo, Francesca Simi

#### Repository Location

<https://doi.org/10.7910/DVN/DPNEXP>

#### Publication Date

09-03-2020

#### Language

English, Arabic

#### License

CC0

## 4. Reuse Potential

A complete new archaeological dataset was made available by the digitization of the sites and villages of the Mosul Dam Reservoir archaeological survey map. This will

have an important impact on preserving and making significant data available to the scientific community.

This dataset constitutes an important source for scholars dealing with the settlement history of the Upper Iraqi Tigris basin. It provides locations and basic data for archaeological sites and modern villages in a region now almost completely under water and therefore no longer available for inspection. It is important not only for purely archaeological reasons, but also for the better historical understanding of the geopolitics of an area that has long been subject to political turmoil.

The dataset is complementary to those very recently constructed in connection with the archaeological investigations currently under way in the surrounding region (in particular the survey work conducted by the Eastern Habur Archaeological survey-EHAS and the Land of Nineveh project-LoNAP) and provides a far wider overview of the landscape history of Northern Iraq as a whole.

The digitization of the map and the release of this stemming dataset are part of a broader research on the archaeological landscape of the Mosul Dam region that will be published in the near future.

Lastly, it furnishes important information for the assessment of the impact of the Mosul Dam's construction on Iraqi cultural heritage.

#### Acknowledgements

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#### Competing Interests

The authors have no competing interests to declare.

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