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Bethany Beyond the Jordan Site of Jesus Baptism: A Threatened Site

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ABSTRACT The discovery of the Baptism Site is considered as a major step in field of archaeology and cultural heritage in Jordan Valley on the eastern bank of Jordan River. The ecology of the site played a vital role in the events occurred during the early history of the site during Roman and Byzantine period. The article has discussed the major threats to the ecology, heritage and eco-tourism at the component of the site, and the possible mitigations measures in order to sustain the site for future generations. The proposed procedures to protect the identified sites includes enhancement the restoration and preservation of the components in order to reduce the negative impacts and strengthen coordination between the Conservation section of the baptism site by creating an architectural conservation staff formed exclusively by professionals according to the Venice Charter regulations. A well established conservation process is needed to minimize these effects, and to protect the archeological and heritage sites in Bethany beyond the Jordan.

INTRODUCTION

The Baptism site (Bethany beyond Jordan) and its immediate surroundings include the lower stretches of the Jordan River. The two- kilometer- long Wadi el-Kharrar perennial stream flows into the river from the east, and the plains and foothills along the north-east coast of the Dead Sea. This area was in the region of Perea and was known as the Plains of Moab.

It is located just half an hour by car from the modern Jordanian capital Amman, alongside the direct route between Jerusalem and Amman.

"Bethany beyond Jordan" also called "Bethabara" in other ancient texts, has always been the geographical and spiritual pivot of this area. It anchored a succession of miraculous and divine events in the holy text that has captured the full prophetic spirit and timeline of God's salvation mission for humankind.

This is the only place in the Holy Land that was touched by Abraham, Jacob, Moses, Joshua, Elijah, Elisha, John the Baptist, and Jesus Christ, and where their collective legacies still converge.

This is why a personal pilgrimage to the Baptism site in Jordan is such a moving and meaningful experience for Christians, and Muslims, all of whom can appreciate the richness of the land's salvation history and its memory of so many patriarchs, prophets, and divinely inspired messengers.

Bethany beyond Jordan in the Jordan River Valley is the place where John's baptism of Jesus marked the start of the Messiah's public ministry, in many ways the place where Christianity started from once Jesus had been baptized, affirmed by God, and started to touch the lives of ordinary people (Fig.1).

Bethany beyond Jordan joins Nazareth, Bethlehem, and Jerusalem as non-native and blessed place in Christian salvation history the place where the Trinity appeared, God anointed Jesus as the Messiah, John the Baptist witnessed Jesus as the Savior and foretold his sacrifice for humankind as "the Lamb of God", and where the first disciples and believers followed Jesus and thus initiated the Christian movement and faith.

The same hill that forms the heart of modern Tell-Kharrar and Roman – Byzantine Bethany beyond the Jordan has also long been identified (since the 4th century AD) as the spot where the prophet Elijah lived (Waheeb 1998, 1999).

The unique and rather exciting ecology of the site may have played a role in giving it a spiritual dimension in antiquity, so its proper protection and appropriate management is a must (Fig. 2).

The site of Wadi el-Kharrar is located in an area called Ghor al-Kafrein and bordered from north by Wadi Nimrin and from south by Wadi Gharaba, from east by the modern village al-Kafrein, while the Jordan River is the site's western border.

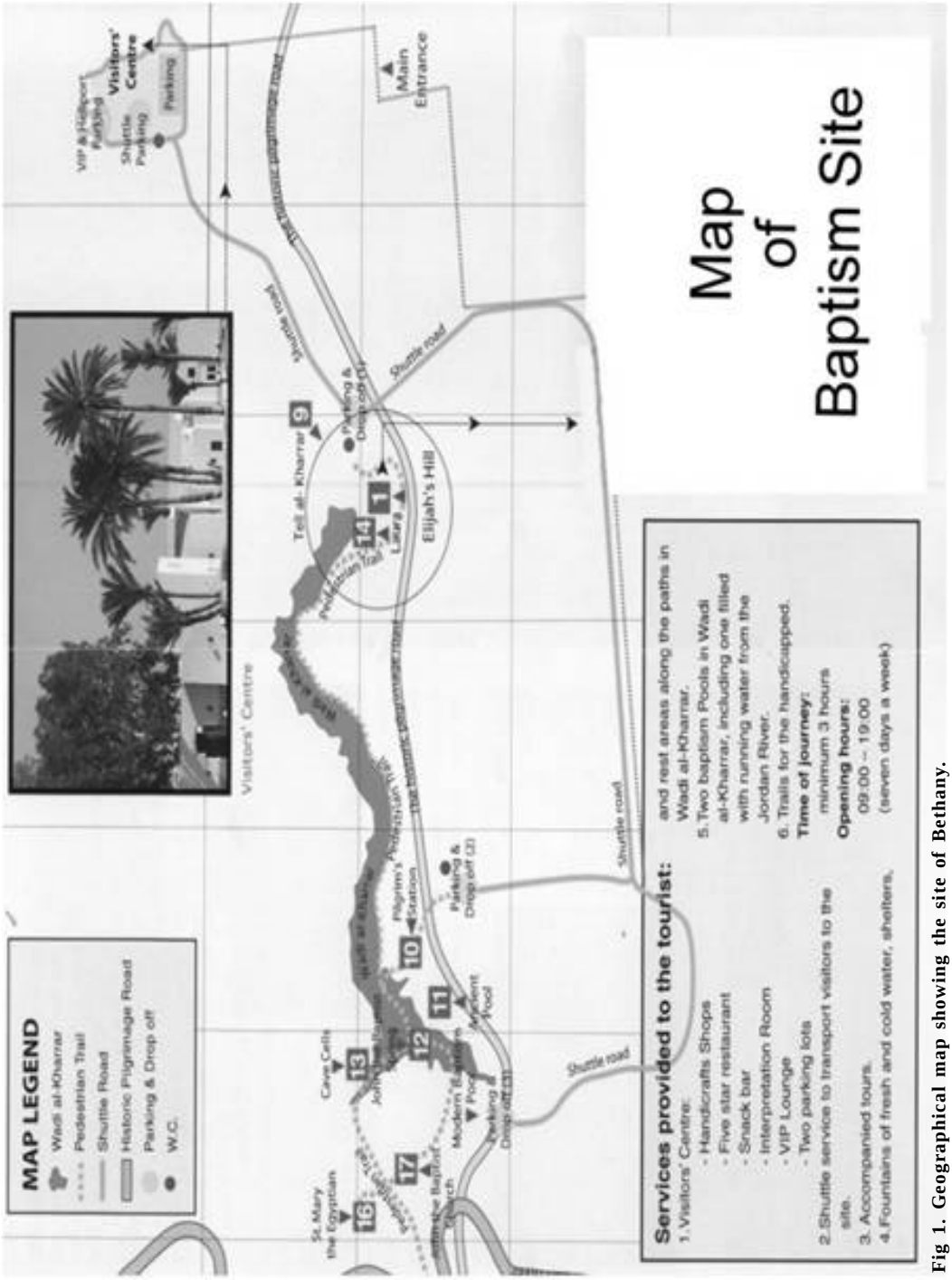

Fig 1. Geographical map showing the site of Bethany.

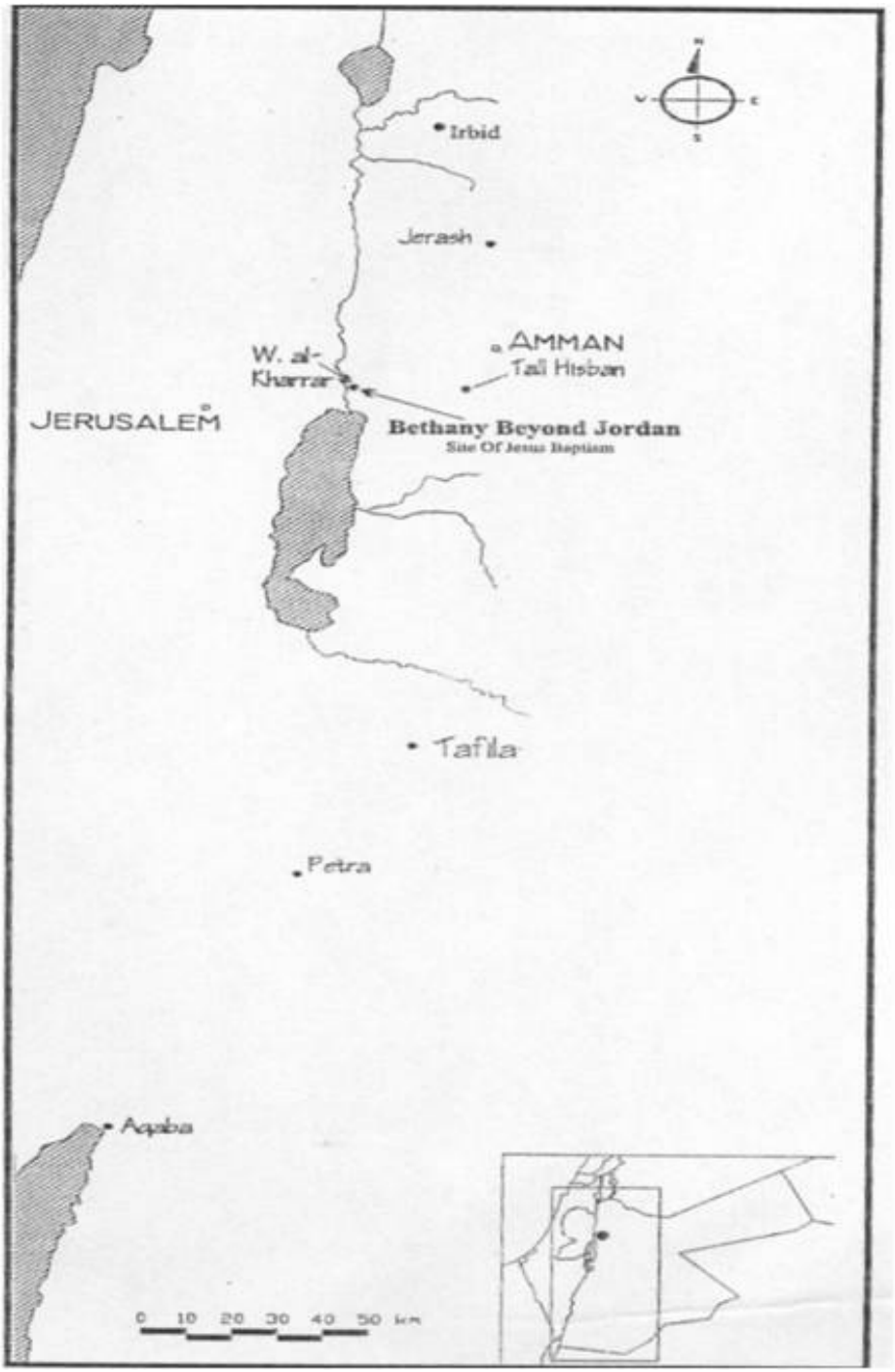

Fig. 2. A detailed plan of the site components.

Objectives of the Study

This study aims to diagnose most of stone decay features (natural or human) in the site of Bethany beyond the Jordan and defining a mechanism of decay by which a suitable treatment for conservation of stone (cleaning, consolidation and protection) could be suggested. The study also aims to focus on very different eco-systems that blend together into this unique natural environment which include the fertile Jordan Valley plain, the deep gorge of the Jordan River and its flanking belts of dense vegetation (the jungle of Jordan), narrow strips of stark, parched marl wasteland (the "wilderness" or "desert of Jesus"), the gentle foothills along the Dead Sea's north-east coastal plain and, linking together these diverse- regions into an integrated whole, the lush perennial stream and thickets of Wadi el-Kharrar, which flows for two kilometers from the Jordan Valley plain into the Jordan River.

Geology

The rock of Baptism Site consists of lissan marl with thin alternating layers of chalk, clay, sand, and pebbles. The soil was formed partly out of lissan marl and partly from the large amounts of erosive material carried along the riverbeds from the western and eastern beds; these fertile alluvial soils are utilized for various agricultural crops.

The site is located in a valley flowing east as one of the Jordan River tributaries. The Wadi itself is a narrow, shallow valley with a perennial stream flowing from a spring two kilometers towards the west before inflowing the Jordan River, lying to the north of the Dead Sea. The site is located on the lowest spot in Jordan.

Climate

The site is classified as a very hot area in relation with the Mediterranean climate prevailing in Jordan. However, the mean annual temperature over a long period of time is a bout 20^0 C. Nevertheless, the lowest temperature is usually about 10^0 C, and in some years it reaches as low as 0^0 C. while the highest temperature is about 40^0 C but winter seasons are mild and warm.

KEY OF THREATS OF BETHANY BEYOND THE JORDAN

Conservation is defined as a group of direct and indirect actions, curative and preventive, to save the physical fabric, significant architectural features and values from natural and its human causes of decay, it is important to discuss all causes of decay, whether natural or human, from the planning level to direct actions.

Depending on the field study conducted in Wadi el-Kharrar and the surrounding area, the deterioration and decay effects on the discovered archeological sites could be classified as:

1. Natural
2. Human

Each of these two factors affects the remains into three types:

1. Mechanical
2. Biological
3. Chemical

A well established conservation process is needed to minimize these effects, and to protect the archeological and heritage sites in Bethany beyond the Jordan.

Natural Causes

Natural causes were categorized by Fielden (1994) as follows

1) Natural Disasters Including

Earthquakes

Floods

The flood of Jordan River and frequent flash-flood occur during the rainy season in the site area and this represents a threat to the safety of discovered archaeological sites such as John the Baptist Church and the nearby staircase (Massari 1977).

Land Slide

Bethany Beyond the Jordan site is fragile and consist mainly of lissan marl formation, the development activities and high number of visitors may adversely impact on geological properties and may support land slide especially in Elijah's Hill.

Fires

The area distinguished by the River Jordan, the existence of green converge of tamarisk trees on the eastern bank of Jordan River and along the length of Wadi el-Kharrar. In addition to that 15 specious of trees and plants existed in the

area around the archeological sites, more over the restoration activities depend on building shelters by using wood. More measures to protect this area from threats of fire are urgently needed. Woodcutting and burning affects the plant population and the fauna depending on such vegetation.

2) Climatic and Environmental

Sunshine

Bethany Beyond the Jordan is classified as a very hot area in relation to the Mediterranean climate prevailing in Jordan. The highest temperature is about 45^0 C. This effects the whole archaeological sites especially during summer season. Building wooden shelters such as shelter of John the Baptist Church may reduce the effect of sunshine (Stambolov et al. 1976).

Rain

Fresh and brackish water flow from underground and adjacent mountains into the major Wadi el-Kharrar. The movement of water is east-west towards the Dead Sea. The rainfall in the site does not exceed 100mm annually. However, the water table of the site is very shallow due to its low altitude.

Limited effects of rain are expected on the buildings, due to the limited annual rainfall, building shelters may reduce this effect to the minimum scale (Scott 2002).

Salt

Deep water in the lower cretaceous aquifer is salty and under artesian conditions and it steeps upwards through the recent sediments to the surface forming saline springs as Wadi el-Kharrar. The salt affect the soil, the artifacts and even the foundations of the building which cause more destruction to the stones and form white salty spots on the surface of mosaic floors and the stones. By using modern cements (without salts) and other chemical materials in restoration will reduce the effects of salts on the buildings. While saline soil is characterized by having high concentration of salt that forms often a soil crust of salt due to evaporation of water (Torraca 2000).

Water

The feeding waters of the Wadi el-Kharrar has been declining in the past few years, due to agricultural acts as a new source of water, to keep the circulating water in the wetland, maintain its natural features and preserve the ecological features of the site against any possible drying in the future (Figs. 3 and 4).

The conversion of the feature of water running under some sites near Wadi el-Kharrar from being pure natural to polluted water mixed with the waste outcome of factories, black water full of chemical agents and organic salts all cause a very critical and serious problem to the foundations and lower parts of stone walls.

If the foundations of the buildings are not insulated from damp ground, water is drawn into the structure by the permeability. The height that water can actually reach in a structure is influenced mainly by the balance between the underground water and the evaporation from the

Fig. 3. The small church close to the Jordan River

Fig. 4. Spring of John the Baptist in the heat of Bethany Beyond the Jordan

wall surface. As the inside raising water depends on the thickness of the wall, the height of rise is greater for thicker walls. The influence of gravity, opposing the rise, appears to be negligible with respect to the effect of evaporation. Air circulation near the surface accelerates evaporation and causes a reduction of the moisture level.

In the long run, soluble salts also play a role in the evaporation surfaces. Besides causing damage when they crystallize, salts attract water by osmosis and can determine a further rise of the water level. As accumulation of salt never stops, it is likely that a stable equilibrium is never reached. The best example for this case is John the Baptist church near Jordan River (Figs.5 and 6).

Winds

Due to the fact that part of the site especially the eastern part (Elijah's Hill and surrounding area) is a barren land and affected by daily erosion caused by wind, which resulted in demolishing the foundations of the archaeological sites. In addition, dust is generated by winds and surrounding environmental activities of various reasons such as ploughing of agricultural land and construction activities around the site.

Air Pollution

The expected density of traffic in this area will witness much polluted air that increases the Sulphur dioxide SO_2 ratio and the carbon dioxide CO_2 present in the atmosphere (Van Grieken 2010; Grzywacs 2006).

Chemical Damage

Chemical reactions always require the presence of water; therefore chemical corrosion is possible only when building materials are wet. The rainwater is always slightly acidic because air contains carbon dioxide, which forms carbonic acid when dissolved in water:

$CO_2 + H_2O \rightarrow H_2CO_3$(Carbonic acid).

Under such conditions, carbonates of calcium and magnesium can be transformed into bicarbonates and slowly dissolved.

Polluted atmospheres inside or near urban centers contain variable amounts of sulphur dioxide produced by the burning of sulphur-containing fuels (Muller 1999).

$SO_2 + H_2O + O \rightarrow H_2SO_4$ (Sulphuric acid) is a strong acid that can cause the deterioration of stone facades, which transfer the limestone into Gypsum, for example the area of the caves and Elijah's Hill;

$H_2S + CaCO_3 \rightarrow CaSO_4 + H_2O + CO_2$

Sulphuric acid + calcium carbonate (limestone) → Calcium sulphate (Gypsum) + water + carbon + dioxide (Ashurst and Dimes 2001).

Biological Damage

Bacteria and Fungi

Several strains of bacteria draw the energy necessary for their vital activities from inorganic chemical reactions of reduction or oxidation which they have the ability to produce. Such reactions can result in the formation of acids,

Fig. 5. The ecology of Bethany Beyond the Jordan and John the Baptist church.

Fig. 6. The traditional spot of Baptism (Jordan river)

both strong and weak, and can corrode building materials that are sensitive to acids. Other types of bacteria of the nitrogen cycle produce nitric acid. There are other types of bacteria and fungi draw their energy from the oxidation of organic materials and yield organic acids, as the final product of the reaction, one of such acids is oxalate among the materials present in surface crusts on ancient stones (Thomson 1986).

Algae

The algae attack on masonry materials is frequent in very damp atmospheres or caves, the more frequent is the superficial damage caused by algae vegetation which is particularly noxious in the case of panted or craved surfaces (Roberts 2004).

Lichens

Lichens are formed by the association of fungi and algae. Development of lichens over masonry materials is widespread on external surfaces. White crustaceous lichens extend their growth several millimeters inside the material and decompose it to some extent by means of the production of organic acids (oxalic acid) (Krus et al. 2007).

Moss

Moss can exert a definite disruptive action on the surface of building materials and up to a depth of centimeter or more. It appears that its development is favored on alkaline surfaces, such as cement concrete or lime mortars, and occasionally it has been noted to take place on stone surfaces located near areas where cement concrete was used for consolidation (Roberts 2004).

Higher Plants

Roots of weeds, bushes or trees can cause disruption of masonry materials even at some distance from the plant, for example site No.2 of St. Mary the Egyptian.

- Other deterioration caused by animals.

Mechanical Damage

- External Stress Caused by Overloading Structure

The working stone techniques, thermal expansion, wind erosion and the traffic vibration. Mechanical stresses induced in a building material by its environment can lead to damage, particularly in the case of tensile stresses towards which the resistance of brittle materials is low. Even if actual macroscopic breaking does not occur, stress can be the cause of permanent deformation and microscopic cracks, resulting in an overall acceleration of the weathering rate. There are several mechanisms that can general localized high stresses in building materials (Fig.7) (Lazzarini and Tabasso 1998).

Load

In every structure some parts receive higher stresses than others: Columns, lintels, pillars, for instance. The design of buildings, in general, aims to minimize tensile stresses and allow materials to work mainly under compression. Nevertheless, roofing systems, asymmetrical loads, side thrusts and so on, inevitably cause some tensile stress. It is frequently noted in buildings that parts under particular stress deteriorate more quickly.

Thermal Expansion

Materials in buildings are subjected to daily and seasonal temperature cycles. Such cycles are important sources of stress because materials expand on heating and contract on cooling. Stresses arise even inside a homogeneous piece of material, between the surface, which is directly exposed to the environment and undergoes a greater temperature change, and the inner part, where the temperature variation is smaller (Cigic et al. 2004).

Stress Caused by Working Techniques

Mechanical abuse of the surface of building materials can take place in the course of preparation for use or of mechanical cleaning. This has particular importance in the case of stone which might be fissured when it is quarried or when its surface is carved, cleaning methods like grit blasting or scratch brushing can also cause mechanical damage on the surfaces. An increase in the number of microscopic cracks always produces acceleration of weathering rates. In all masonry materials, deterioration rates depend strongly upon the condition of their surface (Brokerhof 2007).

Internal Stress Caused by Salt Crystallization

Large stresses can arise inside porous materials when water evaporates leaving behind crystals of dissolved materials (salt crystallization). The growing crystals exert a stress which is balanced by the resistance to compression of the material around them. Near the surface, however, a thin section of material will be subject to a thrust from inside which is equivalent to a tensile stress pulling from outside, a situation in which a brittle material can easily break (Giorgio 1982).

Fig. 7. The caves of the monks dug in the natural lissan marl

The natural threats on the discovered buildings of Bethany Beyond the Jordan could be classified as two types:

- *Immediate and drastic effects by natural disasters*
- *Slow and cumulative damage by climatic and environmental threats*

Human Causes

Man made causes of decay come from negligence and ignorance of archaeological and heritage sites, coupled with vandalism and fires, here five causes classified as major man made causes of destruction of the archeological and heritage site in Bethany Beyond the Jordan.

Negligence and Ignorance

That led to the lack of annual or regular maintenance which naturally caused more types of destructive forces to be more active. Since the late Byzantine period the archeological and heritage sites in Bethany were affected by indirect ignorance, the withdrawal of the Byzantines from the area led to more difficulties in maintenance of the sites due to the new political and economic situation.

Development

Such as paths, roads, shelters, benches, on-site used new designs, instead of traditional designs, especially the footpath which connects Elijah's Hill with Jordan River, while the construction of roads represents a direct harmony to the site.

- Economic pressures and forces of investment building new facilities for commercial and other purposes. Facilities were constructed in Bethany Beyond the Jordan are as follow:

A. Visitor Center Including

- Guesthouse
- Ticket office
- Five star restaurant
- Three star east food outlet
- Souvenir shops
- A heliport
- Separated building for (VIP) arrivals

B. Other Facilities On-site as Follow

- Sites to carrying out Baptism
- Waste water treatment plant
- R.O unit
- Building two view point courtyards

The design of some on-site and visitor center buildings did not consider the traditional architectural styles and partly not built below the ground level.

1. Local Community Involvement

There has been a general lack of local community involvement in consultation regarding the site development to the present time.

2. Law Enforcement

Better law enforcement and regulation is required concerning activities of the archaeological and tourism sector particularly in respect of the status of the site as both an archaeological and natural park and potentially as a UNESCO World Heritage Site.

RECOMMENDATIONS

Encouraging the Ministry of Tourism / Department of Antiquities to effectively collaborate with related parties to integrate the archaeological site within the environmental development plans.

Appropriate conservation measures needed for the site should be adopted.

Degree of pollution effects on the site should be analyzed and identified properly.

Assessment results of previous conservation work conducted on the site must be reexamined and evaluated before conducting more restoration in the site.

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