Protected Areas and Cultural Resources Management in Jordan "Natural-Cultural Integrated Approach with GIS"

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Abstract: *Reserves based tourism is getting more attention recently as a support to urban heritage based tourism. This results from people tendency to travel to natural places far from urbanization activities. Environmental planners have a great responsibility to manage and preserve such natural and cultural heritage. Jordan is a rich country in terms of natural reserves including a diversity of landscapes. Reserves in Jordan are established recently with many of them are in need of development projects. This paper focuses on designing a cultural-natural integrated approach for a better sustainable management of protected areas. The methodology starts with a complete documentation of protected areas in Jordan. Strategies for managing their cultural and natural resources are proposed. Major threats to the biodiversity system in such protected areas are highlighted. The work in this paper paves the road for using Geographic Information System (GIS), Ajloun natural reserve as a case study, to develop a complete database for protected areas in Jordan. This database will help environmental modelers and reserve mangers to monitor and manage the reserve features. Results indicate that reserves in Jordan need more effort to efficiently manage the existing resources with sufficient protection from external threats. The case study of Ajloun GIS system provides a new management tool for reserves resources. The need for a GIS system covering all protected areas in Jordan is urgent and will orient the direction of our future work.Key words: Protected Areas; Tourism; Cultural Resources Management; GIS.*

INTRODUCTION

Jordan has a diverse environmental system in terms of natural resources ranging from the vigorous mount ridges, fertile lands to desert landscapes (RSCN, 2006). Its diverse topographical features created a homeland of various types of fauna and flora (RSCN, 2006). The Great Rift Valley is part of Jordan, with its significant environmental, archaeological, religious, and economic legacies since the Paleolithic times and is associated with much of the domestication of plants and animals (Khouri, 1985:28-35). The diversity of such a land should accord it the highest priority possible; it further enjoys a unique geographical features like the Dead Sea and Wadi Rum, the vigorous cultural heritage of Petra and Decapolis cities, and the rare kinds of fauna and flora like the Arabian Oryx (Oryx leucoryx) and the black iris (Iris Negrecans). A protected area as defined by the World Conservation Union (IUCN) is an area of land and/or sea especially dedicated to the protection and maintenance of biological diversity, and of natural and associated cultural resources, and managed through legal or other effective means (Beltran, 2000). Cultural resources, part of them exist within protected areas, are widely spread all over Jordan at different places, many with significant land use history or other cultural values. Cultural resources include the valleys where our ancestors settled and farmed, as well as the current protected areas that were once largely occupied by several generations of birds, animals and humans. Therefore, this indicates

that the heritage of all those inhabitants has the right to be sustained.

McNeely and Thorsell (1989: 29-39) suggest that we have to be more dynamic in managing such rich environment by adopting a more scientific work, field practice and modern information technologies in order to handle all the problems facing such resources. In this context, this paper aims to a) assess the major threats affecting the Protected Areas with natural and cultural resources, b) suggest recommendations for a better management to produce sustainable tourism units and c) present a case study using GIS as a tool for documenting, monitoring and evaluating the reserve condition and its interaction with the surrounding environment over time. After all, GIS databases are the approximations of real geographical variations with very limited exceptions (Goodchild et al., 1992: 87-104).

Protected Areas

Protected Areas or natural reserves are locations which receive protection because of their environmental, cultural or similar value (Keefe, 1993). Different types of Protected Areas exist which vary according to level of protection and the enforceable laws of each country or rules of the international organization (Beltran, 2000). A Protected Area as defined by the World Conservation Union (IUCN) is an area of land and/or sea especially dedicated to the protection and maintenance of biological diversity, and of natural and associated cultural resources, and managed through legal or other effective means (Graefe, 1990: 213-234).

The Iucn Specifies Six Categories of Protected Areas:

I. Strict nature reserve/wilderness area: protected area managed mainly for science/ and for wilderness protection.

II. National park: protected area managed mainly for ecosystem protection and recreation.

III. Natural monument: protected area managed mainly for conservation of specific natural features.

IV. Habitat/SpeciesManagementArea:protected area managed mainly for conservation through management intervention.

V. Protected Landscape/Seascape: protected area managed mainly for landscape/seascape conservation and recreation.

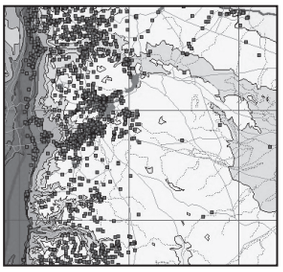
VI. Managed Resource Protected Area: protected area managed mainly for the sustainable use of natural ecosystems.

Realms of Protected Areas in Jordan

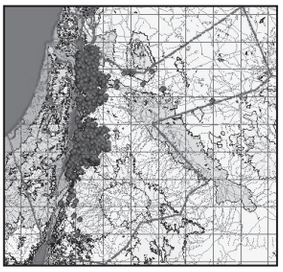
Ecosystems in Jordan

Studying the protected areas in Jordan is part of studying the physical aspects that form the variations in the land, in what is called the ecosystems. Jordan is quite distinct in its diverse ecosystems; it has about seven different ecosystems (RSCN, 2006). This diversity was the trigger for past generations to take the decision of settling in specific places within the region. It is important to know where the protected areas exist today with respect to those regions and their relationship to nearby cultural heritage sites. The ecological as well as the geographical systems are responsible for shaping the characteristics of the cultural groups, as those found in Jordan. One should know that the cultural heritage in Jordan is so rich, comprising 8000 registered archaeological sites scattered all over the country (Figure 1). The seven categories of the Jordanian ecosystems, of which we have first to be aware in order to understand the formation of the ancient environment, include (RSCN, 2006): Desert Ecosystem (a gently undulating plateau

with an elevation of 500 to 900 m that presents a continuation of the Arabian Desert); Scarp and Highland Ecosystems (consists of escarpments and mountains, hills, and undulating plateaus that extend from Irbid in the North to Ras Al-Naqab in the South, and from the Rift Valley region in the West to the Badia region in the East, (McNeely, 1993; RSCN, 2006); Sub-tropical Ecosystem (extends in the Rift Valley from Dier Alla area [mid south] and down to Aqaba areas [south]); Dead Sea Basin (Dead Sea shores and the oasis in its vicinity preserve a rare blend of desert biota and biogeographic relics, which have survived in the isolation of the surrounding desert); The Jordan River Basin (an important wetland area in the Middle East as it maintains many globally valuable species such as the brown fish owl, the common otter, Arabian leopard, rock hyrax, fresh water turtle, several endemic fresh water fish, fresh water snake and many other endangered species (McNeely, 1993; RSCN, 2006); The Gulf of Aqaba (The coastline of Jordan extends for 27 km along the northeastern section of the Gulf of Aqaba, a long narrow and very deep arm of the Red Sea. It consists of a series of embayment. In each, a comparatively similar and wide range of communities is present, including: rocky shore, reef flat, reef face, fore reef, sandy shore, sandy bottom and sea grass ecosystems. (Sandwith et al., 2001; James, 1999: 15-26)); and Freshwater Ecosystems/Wetlands (Apart from the famous Azraq Oasis [Ramsar site], there is no major large wetland in Jordan; nevertheless, there are smaller wetland areas that are important for the migrating or over wintering waterfowl. These occur in five main areas: Northern, Middle and Southern parts of Jordan Valley; Seasonal marshes and mud flats of the eastern desert such as Disi area, Qaa Khana, Qaa Burqu [permanent pond] and Jafer; Gulf of Aqaba).



The Late Classical Period sites near and north of the Dead Sea



The Early Bronze Age sites in Jordan

Figure 1. Spatial distribution of archaeological sites in Jordan (Source: JADIS [Jordan Antiquities Database & Information System])

Categories	Ia	Ib	II	III	IV	V	VI	No category	Subtotal IUCN I-VI	Total
Number of Protected Areas					7	5		24	12	36
Area Protected (Hectares)					90,100	827,200		56,103	917,300	973,403
Percentage of terrestrial area in Jordan					1.01%	9.27%		0.63%	10.28%	10.91%
Percentage of terrestrial and sea area in Jordan					1.01%	9.26%		0.63%	10.27%	10.90%

Terrestrial area 89,210 km2

Territorial Sea area (up to 12nm limit) 87 km2

Total Territorial area 89,297 km2

Table 1: Categories of protected areas in Jordan according to IUCN classification[1]:

Protected Areas in Jordan

Jordan has benefited from the experience of western countries (as in Hall, 1998; Harmon, 1994) and reached an advanced stage in managing the natural resources. This is achieved through establishing Protected Areas represented in the wild reserves all over the Kingdom and the work is in progress to establish more reserves in the future. The number of Protected Areas in Jordan is shown in Table 1. It includes those classified by the IUCN and other kinds as well. Examining the total number of Protected Areas and the portions of protected lands in Jordan, from an analytical point of view, one could see the huge percentage that Jordan has compared to all North Africa and Middle East countries according to IUCN (Earth Trends, 2003) (see Figure 2).

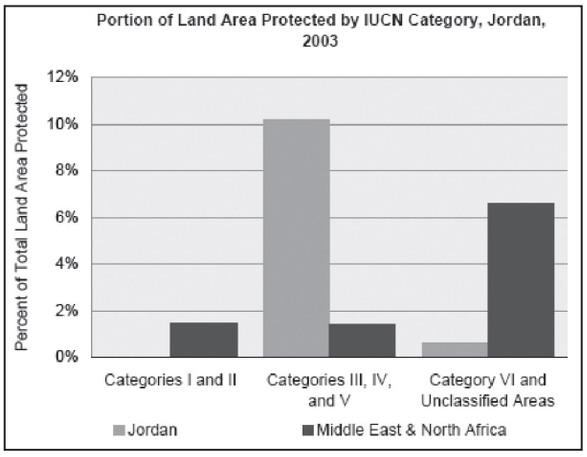


Figure 2. Biodiversity and Protected Areas - Jordan, © Earth Trends 2003.

The Royal Society for the Conservation of Nature (RSCN)

RSCN was established in 1966 with the mission of protecting and managing the natural resources of Jordan; its responsibilities include setting up protected areas to safeguard wildlife and scenic areas, breeding endangered species to save them from extinction, enforcing government laws for the protection of wildlife, controlling of illegal hunting, raising awareness of environmental issues through education programs, and promoting the sustainable use of natural resources. RSCN established seven Protected Areas (see Table 2) and over nine hundred Nature Conservation Clubs in schools. RSCN has pioneered managing wildlife areas and is in charge of the protection and management of RAMSAR site in Jordan.

Reviewing Cultural Resources Within Protected Areas

This research focuses on the importance of examining and exploring the existing or anticipated cultural resources within the realms

NAME	TYPE	SIZE (hectares)	YEAR established
Dana	UNESCO-MAB Biosphere Reserve/ IUCN-IV	30,800	1965
Azraq Oasis	Ramsar site	7,372	1977
Wadi Rum	IUCN - V	720,000	1965
Ajloun	IUCN - IV	1,200	1988
Dibeen Forest	IUCN-IV	8,490	2004
Mujib	IUCN-IV	20,500	1985
Shaumari	IUCN - IV	2,200	1975

Table 2: Protected areas in Jordan managed by RSCN(1)

of the Protected Areas in Jordan whether those be established or planned protected areas (similar to the work of Tasmania, 2000). Both cultural and natural resources that exist in the Protected Areas are of high significance but not fully exploited in the right way (Banning, 2002). Thus, there is a need to find ways to successfully integrate this understanding into management. Although many tools and guidelines for managing Protected Areas now exist, effective integration of natural resources management with the cultural ones in Protected Areas remains a challenge.

Protected Areas are relatively developed in Jordan, but they are not yet widely understood beyond the circle of professional management. Their management is justly and highly appreciated for the biological diversity these areas maintained. However, the question remains: why is the public intentionally kept ignorant of the rich cultural resources that exist within these areas? One should understand that the cultural resources in these areas are highly threatened by the natural factors of decay such as water, humidity, and erosion. A need exists to establish an integrated approach for managing our natural and cultural resources as a whole instead of concentrating on one part. These areas have ecological systems that provide habitat for wildlife, retain biodiversity, purify air and water, and provide a place for recreation. We have also to know that most of these areas have an important periodic or long-term human occupation as many of these regions have a history of land use that has significantly influenced the current ecosystem. This is well confirmed by the archeological remains excavated in or near those areas.

Jordan now is more concerned for establishing more Protected Areas all over the kingdom (see Table 3), and most of them have important archaeological sites with marvelous cultural resources. Therefore, before establishing those protected areas we have to conduct a regional archaeological survey in order to document and safeguard the existing archaeological sites. This will help such sites to be listed in an inventory model for conservation and preservation purposes, and they will enrich the protected areas of natural significance.

Natural Reserve	Present Situation	Area (km2)
AL Shaumari	Established	22.0
AL Azraq	Established	16.0
Mujib	Established	215.0
Dana	Established	308.0
Wadi Rum	Established	560.0
Ajloun & Zobia	Established	24.0
Dibbeen	Established	10.0
Burqa	Proposed	744.0
Aqaba	Proposed	60.0
Rayer	Proposed	900.0
Bayer	Proposed	460.0
Jabal Masa'adeh	Proposed	300.0
Abu Rakbeh	Proposed	190.0
Yarmouk River	Under Planning	30.0
Fifa	Under Planning	30.0
Qattar	Under Planning	7.0

Table 3: Status & Area (km2) of Natural Reserves in Jordan[1]

Designation of Cultural Resources

The need today is to conduct a designation study for the protected areas in Jordan, through which we can implement a non-destructive approach of surveying protected areas to examine the existing cultural resources. However, this study can be a preliminary effort for starting such an approach. We do believe that if we can exploit and raise the importance of

cultural resources in these areas, we will be able to stimulate and corroborate the preservation of the natural and cultural resources together. On the other hand, the integrated management approach will improve and standardize the existing management system of the protected areas, which meet the international principles of preserving, managing, and sustaining natural and cultural resources. Such system will help achieve a number of research objectives. These include

- Improving the management of a single "natural" resource, and turning it through the integrated approach into a "natural-cultural" resource.
- Highlighting the regional character and identity shaped by both cultural and natural values.
- Enhancement of the importance of the protected areas.
- Recreating a multidisciplinary study for protected areas, including scientists from fields of sociology, archaeology, anthropology, ecology, etc.
- Improving the eco-tourism industry.

Threats Facing The Cultural Resources In Protected Areas

Lack of information (indirect threat)

This is the basic threat for cultural and natural resources, which leads to the lack of knowledge about the existing resources: their status, distribution, and risks surrounding them. This consequently leads to adapting inefficient measures to conserve these resources. The need here calls for implementing an effective method for collecting the data essential for conserving such resources. However, we need to undertake an intensive literature review including all the records that may exist and define these resources. What is really needed here is carrying out a comprehensive survey that covers the whole country which leads to the archaeological and natural map of Jordan. The efforts in this step should be coordinated among the different responsible authorities including the RSCN, the Department of Antiquities, and Ministry of Environment. This is essential in order to define a sound strategy for this step.

Degradation and destruction (Cleere, 1993; ICOMOS, 1999)

Since Jordan has a large number of archaeological sites and immense amount of archaeological remains spatially distributed all over the country; most of them are facing several natural and human threats of decay and degradation. Such threats include looting, erosion and destruction. Activities causing this threat have led to the loss of a large number of archaeological records; a case in point is the looters' disturbance of thousands of Bronze Age tombs in the Lisan area of the Dead Sea. This resulted in the loss of important records and archaeological remains for understanding the occupational levels and the history in the region. Uncontrolled urban expansion, launching of national roads, the increase in Jordan's population, and industrial development have all caused the destruction of many archaeological sites.

Weak enforcement of laws

Weak enforcement of laws is one of the most controversial issues among the government officials and archaeologists. Some points regarding the protection of the cultural resources need to be reviewed to increase the protection levels as well as to support the management of such resources within the protected areas.

Lack of public awareness

The lack of public awareness towards

the significance of both natural and cultural heritage represents a vital threat. This results in considerable loss and degradation of important heritage as people are not aware of the importance of cultural and natural heritage. Specialized programs and media productions need to be designed to increase the role of public in preserving and protecting such resources.

Cultural Resources Needs In Protected Areas

The protection of cultural heritage must be based upon effective collaboration between professionals from many disciplines (UNESCO, 1972). It also requires the co-operation of Government and the General Public. The archaeological heritage whether located in or outside protected areas constitutes the basic record of past human activities. Its protection and proper management is therefore essential to enable archaeologists and other scholars to study and interpret it for the benefit of present and future generations. The main needs of such heritage include developing a handbook for managers of protected areas with important natural and cultural resource values, listing all the existing cultural resources, documentation, conservation and maintenance, and designing an integrated GIS database for recording and monitoring the natural-cultural resources (Cleere,1993:402-405; ICOMOS, 1999).

Main Issues Regarding Protected Areas

Human values and local communities

To be of greatest benefit to society, protected areas must address the full spectrum of human values (McManamon and Hatton, 2002). Over the past decade, Jordan has paid much attention to the value of protected areas for the conservation of their biodiversity. Protected areas whether established or planned should also be valued as spiritual, cultural, and aesthetic landscapes that inspire and move. The varied expressions of nature found in protected areas lead many to develop a deep personal understanding that all is related. That essential understanding is basic to economics, ecology, physics and spirituality, and many other human pursuits (Beltran, 2000).

Establishing new protected areas in Jordan means that large numbers of family groups and locals will be affected in their life styles since there are many regulations and guidelines to be followed within and near those areas. Therefore, investment in those local people is necessary in order to succeed and ensure the sustainability through the active participation of the local people in managing those areas.

Areas of archaeological potential

The proposed protected areas in Jordan is highly seen as areas of archaeological potential or areas of high cultural resources potential; in other words, those areas are potential places for undiscovered archaeological sites and remains. Thus, we need a comprehensive plan to recover those resources in the future and ensure that buried remains survive. Therefore, those areas should be marked out on GIS databases for continuous monitoring. Establishing Protected Areas in an area of archaeological potential is likely to require archaeological evaluation and possible mitigation work prior to establishing protected areas.

Areas around Protected Areas

Protected Areas are not isolated units. Ecologically, economically, politically and culturally, they are linked to the areas around them (Buckley, 2001). For that reason, the planning and management of protected areas must be incorporated within regional planning, and supported by the policies adopted for wider areas. For the purpose of applying the categories

system for two areas, where one area is used to 'buffer' or surround the other one, both of their categories should be separately identified and recorded.

Interdisciplinary Approach of Management

Protected Areas of different categories are often contiguous; sometimes one category 'nests' within another. However, we have seen from the definition of IUCN that the Protected Areas aim to protect not only the natural resources but the cultural resources as well (Davey, 1998). In Jordan most of the Protected Areas exist within the category IV and V, which may indicate that those categories focused more on the protection of natural resources than they focused on the protection of cultural ones. The Protected Areas in Jordan are totally managed by the Royal Society for the Conservation of Nature (RSCN). Having a one party for managing those areas is entirely consistent. Although there are obvious benefits in having the entire area within the responsibility of one management authority, this may not always be appropriate; in such cases of having potential cultural resources within those areas, close cooperation between authorities will be essential. In addition, an interdisciplinary approach of management and research in those cases is more effective.

STUDY METHODOLOGY

This section outlines the proposed natural-cultural integrated approach for studying and documenting Protected Areas in Jordan and their integration with cultural resources within their boundaries. This section also presents the general strategy proposed for developing a complete digital system for archiving these areas to prepare a data bank system for continuous monitoring and evaluation.

1. Tools and Approaches

The designated approach for managing the cultural and natural resources within the borders of protected areas can be summarized by the following methodological steps:

a. Literature Review

A literature review for the cultural resources, archaeological excavations, and related fields is significant in order to identify all the existing and potential archaeological sites within the boundary of protected areas.

b. Collecting and Utilizing Information

Adequate knowledge of the archaeological sites is critical for the information-based decision-making. Required knowledge includes identification and understanding of the cultural resources, archaeological sites, and historic evolution that have shaped the region existing today, including the cultural resources that represent landforms, land uses, and human activities over time. This will be an important stage for effective establishment and management of the proposed protected areas.

c. Surveying and Documentation

There is a real need for conducting an intensive surveying work for the proposed protected areas in order to document significant archaeological sites and other remains. Therefore, it is important to conduct fieldwork documentation and excavation for some areas by teams of archaeologists through short-term projects. The teams should record significant archaeological sites through measured and interpretive drawings, large format photography, written narratives, GPS surveying and other documentation techniques.

d. Needs Assessment

In addition to surveying and documentation, conservationists should conduct assessment to measure the deterioration in the examined archaeological sites, reporting their status, and

suggesting the best solutions for protection and preservation. Moreover, we could suggest more actions and activities for future projects (Eagles et. al., 2000: 62-76; 2001). This includes as well assessing the reserve needs as a whole in terms of infrastructure services.

e. Geographic Information Systems Database

Geographic Information Systems (GIS) mapping can be used to spatially georeference the existing archaeological sites and to monitor them over time, and to use this system for the natural resources at the same level as well. Another use of GIS is to map resources and compare overlays of natural and cultural resources existing within the protected area of interest. These natural resources might include soils, wetlands, vegetation types, and wildlife habitats. Cultural resources might include historic structures and archaeological sites. Colored maps and buffers can be used to highlight resources of highest priority for protection. By creating natural-cultural GIS maps, we will be able to identify areas where natural and cultural resources might be managed in concert, and where there are potential conflicts that will need to be resolved.

2. Implementation and Assessment of the Proposed Approach

The suggested integrated approach has to adopt both the integrated protection policy and the site management program as mentioned by ICOMOS (see Cleere, 1993 the charter for the protection and management of archaeological heritage antiquity 67: 402-405). The proposed methodology adopted is mainly based on both literature review and field investigation, where the study team needs to investigate, diagnose and map registration all archaeological sites and natural resources located within the protected area. This approach serves as the basis for the impacts assessment of the human-related activities on natural and cultural heritage resources, and as a framework of requirements to be reviewed by the concerned parties involved in this work. This approach is suggested to be applied to a number of protected areas in Jordan following the methodological outline:

1. Survey of the study area. The survey will be conducted on foot, with survey members walking at a distance of 20-30 meters from each other. Samples will be taken at all sites and site features will be recorded.
2. Registration of the surveyed sites on a suitable registration form.
3. Mapping of all sites located inside the protected areas on 1-25,000 or 1-50,000 scale series k737 maps.
4. Definition of the mitigation measures necessary to avoid/minimize the threats/ impacts to the national/local archaeological and cultural resources.
5. Providing cost estimates (needed for project budgeting purpose) of the proposed mitigation measures and the cultural resources management framework likely to be required for those resources located within the study area.
6. Developing a suitable implementation framework for the management of the cultural resources located within the protected area.
7. Production of GIS maps, spatial and statistical analysis reports, and other mapping products studying the inter-relationships between different geometric and non-geometric factors within the protected area boundary.

The proposed plan presents means to reduce the negative impacts on the archaeological sites discovered during the course of the study. This is done through defining site-specific protective

measures and a management framework necessary to minimize damage to the cultural resources located within protected area for each specific site. Strong coordination with the Ministry of Tourism and the Department of Antiquities is necessary during the study phase and the project implementation phase.

Here, suffice it to say that each time we are informed of a public project being in the design or pre-feasibility study phase involving a protected area, we conduct a preliminary inspection of the project area, after having completed library research on the presence of archaeological sites (being much facilitated by "JADIS," a computerized job base of sites within the limits of given coordinates). After investigating the proposed protected areas, a preliminary Cultural Resources Impact Assessment is prepared which informs the development agency (RSCN) and the consultant about the presence of archaeological sites within or in the vicinity of the protected area.

The assessment also includes the results of field investigations and suggestions for the protection of either threatened or unthreatened archaeological sites, which are found within the area. Any development project within the protected area requires also a detailed environmental and social impact study. This includes preparing an analytic report that provides a description of the main archaeological and cultural heritage sites and other issues related to the protected area's facilities along the project locations. Further assessment of the identified locations, anticipated impacts, proposed mitigation measures and estimated cost implications of recommended actions are to be delivered as part of the ESA Report and the Environmental Management Plan.

3. Cultural Resources Management Project (Definition)

Cultural Resources Management (CRM) is a term created in the (USA) in the seventies of the last century to describe a variety of procedures and techniques used for the protection of the archaeological heritage from destruction due to development and other causes (Banning, 2002). CRM –in a way– is practiced all over the world, but not necessarily under this label (Banning, 2002). Protection of cultural heritage includes both salvage excavations and more effective management measures. While salvage is conducted to minimize damage to cultural resources during construction and development, coordination between developers and antiquities services during the design and feasibility study of new projects limits the need for salvage excavation during construction. Coordination is the only approach under which cultural heritage can be properly protected.

In brief, cultural resources are "all cultural materials, including cultural landscapes that have survived from the past and have some potential value or use in the present or future." In Jordan, however, some technical issues have to be considered: the Antiquities law protects only those monuments and remains – whether above or below ground – which predated the year AD 1700 (in Department of Antiquities Documents). This leaves unprotected the last three hundred years of human activity and architecture in the country, which only recently has become the focus of legislative and research-oriented initiatives. The CRM project, however, does not apply a rigid distinction between "archaeological" and "traditional" heritage. Finally, the word "management" needs clarification. In our view, "management of cultural resources" includes:

a) Preservation of the archaeological heritage with careful restoration or "soft approaches" (for example the inclusion of an endangered site as part of a green area);

b) Protection of this heritage in the short and long terms by planning for the creation of archaeological parks;

c) The organization of archaeological projects rescue carried out ahead of new constructions with the aim of reducing the risk of needless destruction to the archaeological resources;

d) The organization of a computerized national inventory of known archaeological resources, and the proper integration of these resources into Jordan's community life;

e) Adequate coordination with all governmental and private agencies involved in development, in order to reduce threats to cultural heritages sites.

For each of these aspects there was the attempt to advance it to a point where the protection and enjoyment of cultural heritage become an obligation and a right not only for the Department of Antiquities of Jordan, but for every citizen.

4. Management Practices in Protected Areas

Recent studies show that the protection of cultural and natural resources goes hand-in-hand: both involve the protection and conservation of limited, nonrenewable resources. UNESCO and the World Bank do not distinguish between natural and cultural resources: both are part of our common heritage and both require the same level of thoughtful attention and expertise (UNESCO, 1972). Recent projects adapt this vision such as the National Environment Strategy for Jordan. The CRM team concentrated on the protection of cultural resources (including what we called "cultural landscapes"; i.e., the integration of natural and human-modified environments) because of the nature and constraints of our experience such as the Royal Society for the Conservation of Nature. In order to manage our cultural heritage within protected areas we have first to categorize them according to the threat levels they are facing (similar to the classification system used by the IUCN to evaluate the status of the species):

a) Critically Endangered (High Significance): includes sites facing an extremely high risk of destruction in the immediate future.

b) Endangered (Medium Significance): includes sites that are not "Critically Endangered" but are facing a very high risk of destruction in the near future

c) Vulnerable (Low Significance): includes sites facing a high risk of destruction in the medium to far future.

This classification system will help direct rescue and maintenance efforts to the sites with urgent needs of rehabilitation.

Reviewing the management practices adopted in Jordan for managing protected areas and their cultural and natural resources reveals the following general remarks:

- Except Yarmouk River proposed reserve, the rest of the proposed protected areas are located in Southern Ghors in Jordan Valley; those are Baptism site, Mujib reserve, Qattar, Aqaba Mountains and Jebel Masuda. This indicates that other important areas suitable for reserve projects are still unusable. Table 4 shows a short list of important reserves along with proposed management actions.
- The selected Protected Areas mostly located between or near major wadis like Wadi Yarmouk for Yarmouk reserve, Wadi Kharrar and Wadi Hesban for Baptism reserve, Wadi Mujib for Mujib reserve, etc.
- The selected areas could be divided into two parts:

A. Protected areas in low lands such as Yarmouk, Baptism, Qattar and Mujib.

B. Protected areas in high lands such as Aqaba Mountains and Jebel Masuda.

- There is a lack of coordination between governmental and non-governmental agencies in the field of Tourism, archaeology and heritage. Only limited excavations were conducted in Mujib reserve. RSCN concentrates on eco-tourism only, while built environment tourism is neglected.
- Lack of promotion of such reserves through media, internet and other communication systems is a problem that needs to be solved to increase the tourism movement to such sites.
- The establishment of four new protected areas along the rift valley corridor represents a major step toward a comprehensive development of natural, archaeological and possibly bird watch tourism.
- The involvement of the private sector in the management of archaeological and touristic sites is noticeable. However, more efforts are still needed in producing a strong partnership between the public and private sectors for establishing large scale investment projects in these areas.

5. Cultural Resources Management within Protected Areas

We have recognized how important it is to save our cultural heritage within the protected areas. We have to know first that the protected areas do not mean the protection of cultural heritage. As a result, we have to develop a management plan for the cultural resources within these areas. The need is crucial now for establishing ways of finding the integration and balancing between the management of the natural and cultural resources in protected areas and eliminating the disparity between them in terms of management. Both are significant for the humanity. Moreover, saving them from degradation and destruction is our mission and objective here.

Therefore, the new proposed protected areas should be recognized and counted as cultural landscapes, which means they are the result of human interaction with the land, and thus encompass a range of natural and cultural values. This multidisciplinary aspect challenges the traditional discipline-oriented approach of

No.	Protected Area	Proposed Action
1	Yarmouk River Candidate Area	- Field survey, cultural resources impact assessment, Recommendations. - No previous work known in the area.
2	Baptism Site	- Site was surveyed, excavated and developed, assessment, was carried out, two books and more than 100 articles were published. - Still needs more restoration and could be used as IBAs.
3	Qattar (Wadi Araba)	- Field survey, CRIA, and recommendations are needed. - No previous work registered in the area.
4	Aqaba Mountain	- Field survey, CRIA and recommendations are needed. - No previous work conducted in the area.
5	Jebel Masuda	- Field survey, CRIA and recommendations are needed. - No previous work conducted in the area.
6	Wadi Mujib	- Limited survey was conducted by Dr. Waheeb and Mo'tah University. Some excavated materials were published. - Comprehensive and final stage survey is needed. - Restoration is urgently needed for the Byzantine remains.

Table 4: Reserves' field requirements

resource management that has proven to be a barrier for developing an integrated approach for protected areas management.

Recognizing the need to develop a more comprehensive approach for cultural landscape management of protected areas will necessitate the initiation of a handbook of natural-cultural resources management within protected areas; its authorship will include the RSCN, who will primarily manage the proposed protected areas, the Department of antiquities of Jordan, concerned governmental bodies, planning engineers, and archaeological scientists. This handbook will target particularly the superintendents, site managers, resource managers, and other professional staff working in the protected areas. It is better to be published as a web site to serve as a living manual that can be added to as new information is compiled. The handbook has to include an overview of cultural resources preservation, a description of the study's methodology, an in-depth discussion of the findings, several case studies, and a bibliography for further reference. As new case studies, tools, and approaches are compiled, the web site will expand.

Four main areas should be considered as a key to the effective integrated management of protected areas with natural-cultural values:

- Collection and use of high quality information provides the foundation for successful management. Useful information includes both site-specific documentation, such as a GIS database or a cultural resources inventory, and the use of expert panels to gather professional expertise from other organizations, other parts of the country, or other disciplines not represented among site staff such as the need for the existence of personnel with good archaeological knowledge.
- Timely and consistent communication helps staff to work together more effectively by providing a mechanism to share information and discuss options. A decision-making process that brings all responsible staff together at an early stage facilitates a team approach.
- A comprehensive planning approach allows planners and managers to build a comprehensive picture or perspective, and understand the interrelationships among projects. When evaluation is integral to the planning process, a learning experience is the result.
- Involvement of the public and others outside site staff recognizes that people's views and values are relevant, important, and not usually homogeneous. Exploration of innovative ways for the public to participate in the planning and decision-making process can build common understanding of decisions and create a supportive community.

Tourism Industry Versus Protected Areas

Tourism is an important source of income in various countries throughout the world (Bosselman et al, 1999) as is the case in Jordan where several governmental and non-governmental agencies depend on this sector. The first recorded recommendations for the establishment of a network of protected areas in Jordan were made in 1963 by a British expedition. Major tourism infrastructure development projects are noticeable within and nearby protected areas. Several international hotels, new highways, resorts and other facilities are being constructed. Several factors encouraged the government and private sector to invest in tourism in these areas, among them is the presence of unique landscapes such as the Dead Sea, Jordan River, the eastern escarpment (high lands), the archaeological and historical

sites and protected areas that contribute in different ways to a comprehensive development of the whole area.

Depending on the results of previous explorations in Jordan Valley, many valuable historic and archaeological sites have been recognized. Still, many of these need urgent development. The development of these sites (Baptism site as a model) will make Jordan Valley a focal point for tourism in the Middle East, and will become a model for most of the Arab countries that will benefit from this experiment (see Ceballos, 1996).

Ajloun Reserve Gis Based Digital System Forward

This section presents the initial efforts for developing a GIS based digital mapping system for protected areas in Jordan and their natural and cultural resources. This system upon completion will represent a complete digital handout for all parties interested in protected areas business for assessment, evaluation and monitoring. All related information about the existing natural and cultural resources along with landscape infrastructure existing within the protected area borders will be documented. This will be represented as information layers in GIS where each spatial layer will contain specific geometric or non-geometric data about certain landscape features in the reserve. This will enable the users of the digital GIS system, besides viewing the most updated reserve information, to perform different spatial queries to answer the research problem at hand. To accomplish this task, a real support from governmental and non-governmental organizations in terms of administrative and funding support is needed to collect up-to-date information about Jordanian protected areas.

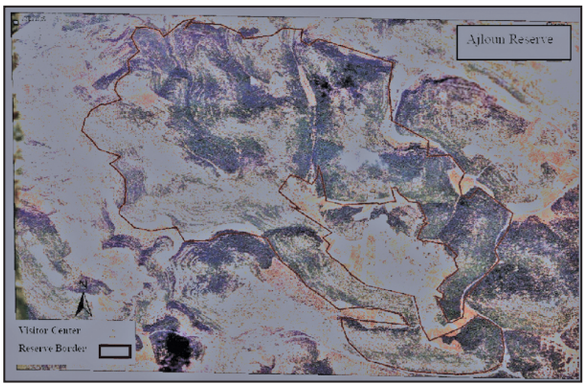


Figure 3. An aerial view of Ajloun reserve Source: Ajloun reserve department

Ajloun Natural Reserve

Ajloun reserve (Figure 3) is one of the Jordanian reserves administrated by the Royal Society for the Conservation of Nature (RSCN). It was established in 1989 with a total area of 12000000 m2. It is located about eight kilometers north-west of Ajloun city. The topography in the reserve is mountainous with heights ranging between 700 and 1500 m above sea level. The vegetation cover in the reserve is permanent all year round with large variety of forest and grass species growing in fertile soil and limestone bedrocks.

The reserve is a rich biodiversity system; examples of its rich environment include:

- 200 species of wild plants and flowers
- 30 species of medical plants.
- 8 species of wild animals such as the wolf and red fox.
- 60 species of birds such as the falcon.
- Different species of rare plants in the world that need urgent protection.

The reserve contains a number of modern tourist services and accommodations that support the tourism movement in the area:

1. Visitor Center (Figure 4): the center is provided with different tourist services including training room, tour guides office,

Figure 4. A view of the visitor center in Ajloun reserve Source: Ajloun reserve department

Figure 5. Part of the tourist camp Source: Ajloun reserve department

reception, services room, kitchen, restaurant and rest rooms.

2. A tourist Camp (Figure 5): contains 10 shelters with a capacity of up to 40 persons.
3. Short and long tourist paths for relax walking.

A GIS Mapping System for Ajloun Reserve

According to the available information sources within the reserve management board and within the extent of the limited budget, a small GIS system is developed for Ajloun reserve (Figure 6). The GIS system is composed of the following spatial information layers of different landscape features within the reserve borders:

- Ajloun reserve layer (reserve-shapefile): the layer shows the extent of the reserve and its location within Ajloun governorate.
- Road layer: includes the road network that connects the reserve with surrounding towns and cities.
- Vegetation cover (Diversity of vegetation-shapefile): represents the regions with dense vegetation cover within the reserve that represents a home for most animals in the reserve.

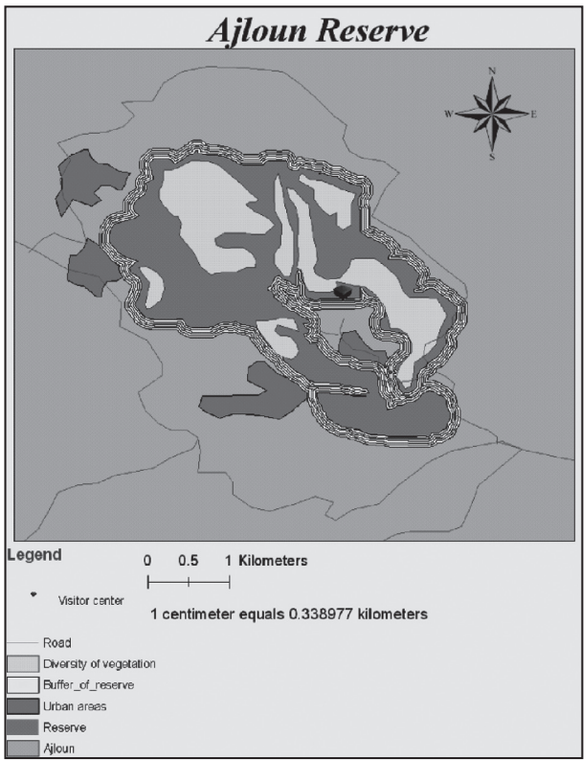


Figure 6. GIS-system layout map of Ajloun reserve

- Urban areas: This layer shows the urbanization activities (mainly residential) near the reserve. This presents the threat facing the reserve owing to the increasing unplanned urban activities that may soon lead, if not controlled, to the reserve degradation.
- Visitor center layer: shows the location of

the center within the reserve.

- Buffer-of-reserve layer: this layer presents the protection area around the reserve identified by RSCN where activities are forbidden.

Concluding Remarks

This paper highlights an important growing tourism sector in Jordan: the protected areas and reserves. An integral approach is suggested where conservation of natural resources goes hand in hand with cultural resources management to achieve sustainability of these areas. The article emphasizes the need to establish a comprehensive management system for protected areas in Jordan to better improve their protection against the increasing threats they are facing. A strong partnership between the public and private sectors concerning policy-making and funding levels is needed to ensure sustainability of protected areas. Geographic Information Systems, as supported by sufficient information collection techniques, prove to be suitable management tools for protected areas. Through GIS, the spatial information layers ensure a strong monitoring system for the reserve condition as well as a query system for problem solving. The next step in our research will focus on building a complete digital GIS system for all protected areas in Jordan, including their natural and cultural resources, as a digital book. This will be done through using the designated cultural-natural approach discussed in this article. A complete environmental assessment is anticipated to be performed for each of these protected areas to prepare dynamic planning strategies.

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ملخص: حظيت حديثا السياحة المعتمدة على المحميات باهتمام كبير، بوصفها مساعدا لسياحة الموروث الحضري؛ نتيجة ميل الإنسان نحو ريادة المناطق الطبيعية، البعيدة عن نشاطات الحواضر. والمسؤولية العظمى لمخططي البيئة تتمحور حول إدارة مثل هذه الموروثات الطبيعية والثقافية وحمايتها. والأردن غني بالمحميات الطبيعية وتباين مشاهدها؛ وقد تأسست المحميات فيه حديثاً، وأكثرها يحتاج مشاريع تطويرية. يركّز هذا البحث على تطوير مقاربة مدمجة للطبيعي والثقافي، من أجل إدارة أفضل ومستدامة للمناطق المحمية. وتنطلق المنهجية من توثيق كامل للمحميات في الأردن؛ كما يوصي باعتماد إستراتيجيات إدارة مصادرها الثقافية والطبيعية؛ وكذلك يضئ المخاطر الرئيسة التي تحيق بنظام التعدد الأحيائي في تلك المحميات. ويمهّد البحث أيضاً الطريق لاستخدام نظام المعلومات الجغرافي، متخذاً من محمية عجلون الطبيعية حالة دراسة لبناء قاعدة معلومات مكتملة للمحميات في الأردن. وسوف تساعد قاعدة البيانات هذه مصممي البيئة ومديري المحميات على مراقبة وإدارة مظاهر المحمية. فالنتائج تشير إلى أن المحميات القائمة في الأردن تحتاج مضاعفة الجهد لحمايتها من المخاطر الخارجية. وحالة دراسة عجلون، بمساعدة نظام المعلومات الجغرافي تمدنا بأداة إدارية جديدة تخدم مصادر المحميات. والحاجة إلى نظام معلومات جغرافي يغطي كافة المناطق المحمية في الأردن حاجة ملحة، يتوقع منها أن تغير توجّه عملنا المستقبلي.

Notes:

(1) Source: World Commission on Protected Areas (WCPA), from the World Database on Protected Areas.

(2) Source: United Nations Environment Program- World Conservation Monitoring Centre (UNEP-WCMC). World Database on Protected Areas (WDPA) Version 6. Compiled by the World Database on Protected Areas Consortium. Cambridge, U.K., August 2003.

(3) Source: Royal Society for the Conservation of Nature

(4) Source: Royal Society for the Conservation of Nature.

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