

**ARAB STATES**

## **WADI RUM PROTECTED AREA**

**JORDAN**



# WORLD HERITAGE NOMINATION – IUCN TECHNICAL EVALUATION

## WADI RUM PROTECTED AREA (JORDAN) – ID No. 1377

### IUCN RECOMMENDATION TO 35<sup>th</sup> SESSION: Refer back the nomination of the property

#### Key paragraphs of Operational Guidelines:

77: Property meets one or more World Heritage criteria.

78: Property does not fully meet conditions of integrity or protection and management requirements.

## 1. DOCUMENTATION

**a) Date nomination received by IUCN:** 15 March 2010.

**b) Additional information officially requested from and provided by the State Party:** IUCN requested supplementary information following the meeting of its World Heritage Panel in December 2010. A response from the State Party was received on 28<sup>th</sup> February 2011.

**c) Additional Literature Consulted:** Abdelhamid, G. (1990) **The Geology of the Jabal Umm Ishrin Area (Wadi Rum) Map Sheet No. 3049 II**, Geology Directorate Geological Mapping Division Bulletin 14, Ministry of Energy and Mineral Resources, Natural Resources Authority, Amman. Bendor, F. (1974) **Geology of Jordan**, Berlin. Cooper, G.A., 1976, **Lower Cambrian brachiopods from the Rift Valley (Israel and Jordan)**, Journal of Paleontology, v. 50, p. 59-75. Howard, T. (2007) **Treks and climbs in Wadi Rum**, Cicerone Press; Masri, A., **Geology of Jordan**, Geological Mapping Division, Natural Resources Authority. Osborn, G. Duford, J.M. (1981) **Geomorphological processes in the inselberg region of SW Jordan**. Palestine Exploration Quarterly, p. 1-16. Powell, J.H. (1989) **Stratigraphy and sedimentation of the Phanerozoic rocks in central and south Jordan. Part A: Ram and Khreim groups**. Bull. No. 11, Geology Dir., Natural Resources Authority, Jordan. Selley, R.C. (1970) **Ichnology of Palaeozoic sandstones in the southern desert of Jordan; a study of trace fossils in their sedimentologic context**. In: Crimes, T.P. Harper, J.C. (eds.), Geological Society of London Special Report No. 9, p. 477-488. Selley, R.C. (1972) **Diagnosis of marine and non-marine environments from the Cambro-Ordovician sandstones of Jordan**. Journal of Geological Society of London, v. 128, p. 135-150; Smith, B.J. (2009) **Weathering Processes and Forms**. In: Parsons, A.J. and Abrahams, A.D. (eds.) **Geomorphology of Desert Environments**, Springer Science+Business Media. Viles, H.A. Goudie, A.S. (2004) **Biofilms and case hardening on sandstones**. Earth Surface Processes and Landforms, v. 29, p. 1473-1485; Wray, R.A.L. (1997) **A global review of solutional weathering forms on quartz**. Earth-Science Reviews, v. 42, p. 137-160; Young, R.W., Wray, R.A.L. and Young, A.R.M. (2009) **Sandstone Landforms**, Cambridge University Press,

Melbourne; Goudie, A. and Seely, M. (2011) **World Heritage Desert Landscapes**. IUCN, Gland.

**d) Consultations:** Nine external reviewers consulted. Extensive consultations were conducted during the field mission with approximately 80 stakeholders in 12 separate meetings.

**e) Field Visit:** Kyung Sik Woo and Zoë Wilkinson, September 2010 (joint mission with ICOMOS).

**f) Date of IUCN approval of this report:** 29 April 2011.

## 2. SUMMARY OF NATURAL VALUES

Wadi Rum Protected Area (WRPA) is nominated as a mixed World Heritage property and is located in the southern part of Jordan close to the border with Saudi Arabia, around 290 km south of Amman and 60 km northeast of the coastal city of Aqaba. The evaluation below by IUCN concerns the natural values of the property, whilst the cultural aspects of the nomination will be evaluated in parallel by ICOMOS.

The total area of WRPA is 74,200ha. The property extends approximately 42km from north to south and approximately 33km from east to west. A buffer zone of c.5km in width, with some excepted areas, surrounds the nominated area and is stated as having a total area of 60,000 ha.

Wadi Rum is a major feature within the Hisma desert lying to the East of the Jordan Rift Valley and south of the steep escarpment of the central Jordanian plateau. Its natural values include desert landforms developed within continental sandstones. These landforms have been developed under the influence of a combination of various controlling factors such as lithology, tectonic activities (including rapid uplift, numerous faults and joints) and surface processes (including various types of weathering & erosion associated with desert climate as well as humid climates in the past), representing million years of ongoing landscape evolution.

Lithologically, Wadi Rum is dominated by two main formations: the lowest and oldest basement complex of Precambrian granitoid rocks and a great thickness of

Lower Cambrian to Middle Ordovician quartz sandstones, separated by the unconformity. In addition, Quaternary sediments are represented by alluvium and wadi sediments such as alluvial fans, alluvium sands and sand dunes and mudflats. Sands cover extensive areas along most of the wadis where they form distinctive sandy plains, sometimes with sand dunes.

The area is well known for its spectacular landforms presenting an exceptional combination of features resulting from drainage incision, severe weathering by salt, biological, and other processes, and the undermining of steep sandstone cliffs by these weathering processes. The resulting landscape contains a range of narrow gorges, natural arches, towering cliffs, ramps, massive landslides, and dramatic cavernous weathering forms.

This highly varied desert landscape is the result of the interplay between complex geological controls that have fluctuated considerably over a long period. The area has been uplifted and exposed in a tectonically active region. The area as a whole is still rising, and generally, the long-term average uplift (around 70mm/1000 years) is greater than the rate of erosion. Concentrated erosion along fault lines has cut through an excess of 700m of sandstone to create an exceptional network of corridors and canyons. Deep exploitation of fault lines has produced the wide and straight wadis, which in many instances several hundred meters wide, and are blanketed with loose sand sheets and dunes of various colours.

Each rock formation displays its own distinctive morphology depending upon lithology, susceptibility to tectonic forces and types of cements. The Salib Formation is typified by relatively gentle slopes littered with debris, due to its close spaced joints. It shows a characteristic step-like morphology. The Umm Ishrin Formation is typified by rock falls of large masses along widely spaced vertical joints making it the major cliff former. It is characterized by spectacular towers of varying heights and width. Colour variation on the surface (rust red to yellow to almost pure white) is also caused by dissolution of internal calcite cements and secondary mineralization such as calcites and iron-hydroxides. Grain by grain weathering has produced tafoni on some cliffs. The extremely friable Disi Formation is characterized by smooth dome-like rounded weathered surfaces which were developed mainly due to exfoliation along pressure-relief joints. In this formation, there are several examples of natural rock arches. The Umm Sahm Formation, highly fractured and jointed, forms distinctive pyramidal caps with step-like morphology similar to the Salib Formation.

### 3. COMPARISONS WITH OTHER AREAS

The natural values of the property have been nominated under natural criteria (vii) and (viii), alongside cultural criteria that are considered in the evaluation by ICOMOS.

The comparative analysis presented in the nomination was regarded as inadequate by many reviewers, and

IUCN has requested and received additional comparative analysis from the State Party. IUCN has also augmented the comparative analysis with input from a range of global reviewers, and in collaboration with reviewers identified with the International Association of Geomorphologists (IAG) and the International Union of Geological Sciences (IUGS).

In relation to its natural beauty, Wadi Rum is recognised globally as a superlative desert landscape. The desert scenery of Wadi Rum can be regarded as iconic, and illustrates a series of dramatic and varied landforms that are excellent examples of the various components of desert geomorphic systems. Key attributes of the aesthetic values of the property include the diversity and sheer size of its landforms, together with the mosaic of colours, vistas into both narrow canyons and very large wadis, and the scale of the cliffs within the property. Its associations with the writings of T.E. Lawrence, stressed strongly in the nomination, have ensured a high profile for the property and have reinforced its reputation of the area as a classic desert landscape both globally, and within the Arab States.

Reviewers note that there are other pleasing landscapes which display similar landscape features in a number of locations across northern Africa, and the Middle East. Close analogues of the nominated property are to be found in the Central Sahara in Gebel Acacus (Libya) and in the inscribed property of Tassili n'Ajjer (Algeria), though the tectonic setting in these cases is very different. There are similar landscapes in adjacent areas of Saudi Arabia, but these have to date been little studied. The sandstone landscapes of the Colorado Plateau in the USA, displaying large cliffs, natural arches and groundwater sapping features are equally well known global examples of desert landscapes. The dramatic niche and columnar weathering in Rum is however not present to anything like the same extent in these properties. The sandstone landscapes of China are not comparable in terms of lithology and, especially, climatic conditions, and present very different aesthetic values. IUCN also notes that the cultural values of the property are cited by a number of IUCN reviewers as a significant element of its landscape importance. Those values are part of the assessment of the area as a nominated cultural landscape, which is undertaken by ICOMOS. On balance IUCN considers that there is a case for the application of criterion (vii) to the property.

Comparisons in relation to criterion (viii) have some parallels to the consideration of criterion (vii) regarding comparable areas. A number of reviewers are supportive of inscription under this criterion, as well as criterion (vii), although on the basis of a significant global review it is also stated that the rock, landscapes and other geomorphic processes of Wadi Rum, whilst impressive and good examples, are not necessarily unique or the best examples in the world, and other examples either duplicate or may surpass the values of the nominated property. The most recent comparative study in relation to criterion (viii) is a study commissioned by IUCN on World

Heritage Desert Landscapes, which has been completed in parallel with the present nomination. This study selects Wadi Rum as one of the 15 most significant desert properties currently included on the Tentative Lists of States Parties to the Convention, in relation to the potential to demonstrate Outstanding Universal Value, noting the importance of its sandstone mountains and valleys with remarkable natural arches, the world's most spectacular networks of honeycomb weathering features and very large landslide features caused by undercutting of slopes by groundwater sapping and salt weathering as key features. Other noted sites include Band-E-Amir (Afghanistan), Las Parinas (Argentina), Les Lacs d'Ounianga (Chad) and San Pedro de Atacama (Chile) as possible gap sites in relation to the World Heritage List when viewed in relation to deserts globally. The study also notes 9 sites that are not included on tentative lists in the USA, United Arab Emirates, Pakistan, Australia, Chad and China that also have high potential for recognition of their earth science values.

IUCN sought further information from the State Party regarding the comparative analysis of the property during its evaluation process. Comparative material on the geological rock succession of the area was provided which indicates regional significance in this regard. However the information that has been provided on the geomorphological values in the nomination and supplementary information is mostly descriptive material, with little analysis of the significant geomorphological features of the property. IUCN therefore considers that the case for the application of criterion (viii) is more finely balanced than that for criterion (vii), and is not yet fully convincing. Arguably the internationally renowned geomorphological values of the property are also appropriately recognised under criterion (vii), embracing the diversity, and aesthetic aspects of the property, that combine with the particular concentration of geomorphological values within a protected landscape setting.

## 4. INTEGRITY, PROTECTION AND MANAGEMENT

### 4.1 Protection

WRPA was first established as a protected area in 1997 in response to a report by IUCN and the Jordanian Royal Society for the Conservation of Nature (RSCN) that proposed a network of protected areas to conserve the desert landforms and ecosystems along with their associated cultural values.

The nominated property lies within the Aqaba Special Economic Zone (ASEZA) which is part of the greater Aqaba Governorate. Created in 2001 as economic development initiative for Jordan, ASEZA is a liberalised low tax duty free and multi-sector development zone that is financially and administratively autonomous. WRPA was designated as a Special Regulations Area in perpetuity in two phases. In 1997 54,000 ha were designated and in 2002 a further 18,000 ha were added.

The entirety of the nominated property falls within the jurisdiction of Regulation No. 24 for the Development of the Wadi Rum Area (2001). This legislation is focused preserving the natural and cultural heritage, allied with development of tourism. This legislation prohibits construction (with the exception of within the existing boundaries of Rum village) mining and extraction activities, hunting, introduction of alien species, driving off designated roads, habitat destruction, pollution and timbering. The regulations provide an outline of governance arrangements including the composition and role of the Wadi Rum Area Committee. The regulations also specify that the requirement for an environmental management plan for Wadi Rum and an outline of items to be included in this, which is reportedly a unique and helpful situation in Jordan. The regulations for Wadi Rum allow for sustainable use of natural resources for the local people.

It is also important to note the traditional ownership of the area now defined as Wadi Rum by the local Bedouin. Long established traditional boundaries cross Wadi Rum and are well known and their validity is respected by both the Bedouin and the current management team of the nominated property (although this has not always been the case). From the evidence presented to the evaluation mission it seems that these two approaches to land ownership, tribal and legal, are currently co-existing without major issues.

A buffer zone of 5km surrounding the nominated area has been defined with a total area of 60,000ha. The buffer zone is not included within the nominated area. The buffer zone abuts the Saudi Arabian border for approximately 3km. Regulation of activities within the buffer zone falls under Regulation 21 for the Protection of the Environment in the Aqaba Special Economic Zone (2001) which includes provisions for Environmental Impact Assessments.

IUCN considers the protection status of the nominated property meets the requirements set out in the Operational Guidelines

### 4.2 Boundaries

The boundaries of the nominated property have been clearly defined. The boundaries set out in the initial nomination align with those of the Wadi Rum with the exception of a linear exclusion running North - South from the village of Shakriyeh to the village of Rum. IUCN requested further information from the State Party on this excision of part of WRPA from the nominated area. In response the State Party notes that the boundary of the nominated area has been "re-adjusted to include the full size of the protected areas as defined in the Wadi Rum protected area by-law and without the exclusion of the land strip from the visitor centre to Rum village." A revised map has been submitted and noted by the World Heritage Centre.

The buffer zone to the nominated property appears to be adequately configured to address threats to the nominated area arising from outside its boundaries. Jebel Burdah is one notable massif that lies outside the property and is included within the buffer zone. This area could be considered as a possible future extension of the nominated property, notably to protect a well-known rock arch.

IUCN considers that the boundaries of the nominated property meet the requirements set out in the Operational Guidelines.

### 4.3 Management

The primary plan guiding the management and development program of WRPA is the ASEZA land use plan which covers the whole governorate of Aqaba.

In 1998 the Ministry for Tourism and Antiquities (MTA) delegated management of Wadi Rum to the RSCN. MTA however retains responsibility for cultural assets within the property. Management authority for Wadi Rum was transferred from the RSCN to the newly created ASEZA in 2001. The Wadi Rum Area Management Unit within ASEZA has the sole authority for implementation and enforcement of the regulatory framework.

In 2010 a new national committee was established, headed by Jordan's Minister for the Environment, and has been tasked with both the nomination and the preparation of a new management plan for the property. This Committee establishes national oversight of the management of the property.

To date one management plan has been produced for the property by the previous managers RSCN using IUCN guidelines. This plan was established covering the period of 2003 to 2007 and was later extended to 2010. IUCN requested further information from the State Party on the status of the new plan. The State Party response indicates that a full draft including in relation to associated tourism development and visitor management plans is expected to be complete by the end of March 2011, and the plan is expected to be finalized by the end of June 2011. The management plan will include a specific conservation plan for both the natural and cultural heritage of the area, and will be integral to the annual budgetary allocation of ASEZA. The State Party also commits that a special business plan for the area will be developed as part of the management planning process. Covering the costs of the implementation of the management will be primarily the responsibility of ASEZA, supported by its national and international partners and donors agencies.

Support to the development of management capacity has been provided from both national agencies, and international support, including via a significant aid project supported by the USA. There are approximately 75 staff in the management team for the property, the majority of whom are local Bedouin people. Whilst few have tertiary

qualifications, however a fairly good level of technical capacity amongst the staff has been built up through on the job training. With local people as staff, local stakeholder participation is well facilitated. Law enforcement is carried out by Ranger patrols operating both within Wadi Rum and outside it in the buffer zone. An earth scientist position is recommended to be added to the staff team given the natural values of the property.

WRPA receives significant financial support for its management (operational budget reported at c.USD1.3million in 2009) and is stated to be the best funded protected area in Jordan. A special Wadi Rum Development Fund was established in 2001 with the aim of ensuring financial and institutional sustainability. Currently income from the property goes to the national treasury and then is reimbursed to the ASEZA in the form of an annual budget. IUCN understands from discussions during the evaluation mission that this situation is proposed to be changed to enable Wadi Rum to achieve more autonomy and sustainable financing for its operations. With tourism numbers growing over the past few years to around 300,000 visitors annually currently entrance fee income is fairly secure.

In response to a request from IUCN for further information on the buffer zone, the State Party noted that a special review of the Wadi Rum Protected Area bylaw and associated regulations is expected to be finalized and legally endorsed by the end of June 2011. The State Party notes this will include a set of new and amended regulations and articles to ensure the enhanced control and the minimal impacts of the development activities currently taking place or planned for the future.

IUCN notes that past efforts at monitoring the property have been carried out but that impacts were limited due to staff capacity. It is recommended that a new pragmatic and targeted Research and Monitoring plan is developed to include monitoring and research programs for the earth science values of the property. Research partnerships with universities within Jordan and internationally could assist this process.

IUCN considers the management of the nominated property comes close to the requirements in the Operational Guidelines, but notes that the management plan for the property has not been completed and therefore has not been reviewed during the evaluation process. IUCN notes the importance of the completion of the revised management plan and buffer zone regulations in providing the necessary framework for the future management of the property.

### 4.4 Threats

Low population density and lack of development impacts have helped maintain WRPA in relatively pristine condition. Nevertheless there are a number of significant threats which require careful and increased attention.



### Visitor pressure and car tracks

As tourism grows, visitor pressure will continue to be a pressure in the future. Jeep safaris are of particular concern and appear to be having the biggest impact on the values of the property. Although a lot of progress has been made through improving vehicle quality and licensing tour operators, the overall level of vehicles (estimated between 500 to 1000 operating in the area) exceeds safe limits. A single track network has been designed between the main visitor sites but is virtually impossible to enforce. The visual impact of the jeep tracks is significant, with additional impacts on vegetation and on cultural values. Disturbance of wildlife by excessive jeep safaris is a significant issue. The managers are aware of the magnitude of the issue and are committed to tackling it in the new management plan. Specialist advice on reducing erosion effects is also being sought. Reducing jeep numbers has to occur combined with promotion of more sustainable tourism activities such as camel trekking, walking and rock climbing.

### Rum Village and other accommodation

Encroachment of the Village of Rum within the Wadi Rum is a minor problem but requires vigilance. Two recent incursions where houses were being built beyond the agreed zone have been stopped and legal cases are underway. Major tourism developments within WRPA are not permitted. Current accommodation outside of Rum Village is limited to desert camps run by local Bedouin in conjunction with the Wadi Rum management team. These camps aim to be as sustainable as possible. A limited amount of self guided tourists also sleep out in the desert but with limited impact. A local consultation process has just started for a major new luxury “eco-camp” to the north of the property.

### Visitor safety issues

There is no emergency management plan for visitor safety at Wadi Rum. This is a serious concern particularly for rescue of climbing tourists from cliffs which currently relies on the goodwill of the very few local Bedouin people who are trained in rescue techniques, who use their own equipment. Rescue arrangements need formalisation with adequate training and dedicated rescue equipment. A rescue post could logically be combined with an office location for climbing and walking promotion within the redeveloped fort complex. Additional training and accreditation for the provision of climbing guiding tourism services is also required, and would benefit from international assistance.

### Groundwater exploitation

Extensive and growing extraction from the fossil aquifer of Disi has the potential to lower the water table threatening natural springs in the property. Monitoring of water tables as well as water quality via a series of bores should be established as soon as possible.

### Firewood collection

Local people gather firewood and carry out some limited grazing. Monitoring of this should continue in order to ensure the use remains low level and sustainable by local

communities only, and to evaluate alternatives with these communities for fuel.

In summary, IUCN considers the nominated property meets the conditions of integrity as outlined in the Operational Guidelines, the need to both complete the management plan and regulations for the buffer zone, and to act on key threats, notably the off-road vehicles that are significant areas of concern.

## 5. ADDITIONAL COMMENTS

Although the evaluation of cultural values of this mixed nomination will be carried out by ICOMOS, IUCN notes that the interwoven natural and cultural attributes in a lived-in desert environment are an important contributor to its aesthetic values. Human occupation has also been influenced by natural changes, being closely related to palaeoclimate, and the availability of water, including from one of Jordans largest aquifers – the Southern Desert Disi ground water basin. The Bedouin tradition of climbing certain mountains for hunting is also an important aspect of the cultural history of the property. Although hunting is now banned, the Bedouin still follow the old climbing routes. Provision of climbing tourism services offers an opportunity for this knowledge to be translated into opportunities for sustainable livelihoods.

## 6. APPLICATION OF CRITERIA

Wadi Rum Protected Area has been nominated under natural criteria (vii), (viii), as well as in relation to cultural criteria.

### Criterion (vii): Superlative natural phenomena and aesthetic importance

Wadi Rum is recognised globally as an iconic desert landscape, renowned for its spectacular series of sandstone mountains and valleys, natural arches, and the range of narrow gorges, towering cliffs, massive landslides, and dramatic cavernous weathering forms displayed. Key attributes of the aesthetic values of the property include the diversity and sheer size of its landforms, together with the mosaic of colours, vistas into both narrow canyons and very large wadis, and the scale of the cliffs within the property. The property displays, in a protected setting, an exceptional combination of landforms resulting from drainage incision, severe weathering by salt, biological, and other processes, and the undermining of steep sandstone cliffs by these weathering processes, together with the world’s most spectacular networks of honeycomb weathering features.

IUCN considers that the nominated property meets this criterion.

### Criterion (viii): Earth’s history and geological features

Wadi Rum is one of the best known desert landscapes, and provides an internationally well known demonstration of a wide range of desert processes and landforms. Its

landforms include many examples of the components of desert geomorphic systems, resulting from the interplay of changing environmental conditions, varied lithology, uplift, faulting, weathering and erosion over tens of millions of years. The landscapes and other geomorphic processes of Wadi Rum, whilst impressive and good examples, are not necessarily unique or the best examples in the world and other examples either duplicate or may surpass the values of the nominated property. Comparative analysis has not provided a compelling case for inscription under this criterion, and further consideration of this criterion is required by the State Party.

IUCN considers that the nominated property may have potential to meet this criterion, but this has not been fully demonstrated at the present time.

## 7. RECOMMENDATIONS

IUCN recommends that the World Heritage Committee adopt the following draft decision:

The World Heritage Committee,

1. Having examined Documents WHC-11/35.COM/8B and WHC-11/35.COM/INF.8B2,
2. Refers back the nomination of the Wadi Rum Protected Area to the World Heritage List, in order to allow the State

Party to strengthen the comparative analysis of the nomination in relation to criterion (viii), and to address issues related to protection and management of the property referred to below.

3. Requests the State Party to finalise the revision of the management plan for the property, and the revised and strengthened regulations for its buffer zone as soon as possible, in order to assure the protection of its values;

4. Also requests the State Party to ensure that the new management plan provides effective policies, backed by the necessary staff and financial resources, to enable effective management of the property and its buffer zone, including the regulation of development activities, tourism infrastructure and facilities, and the regulation and management of vehicles within the property;

5. Recommends the State Party to also include within the revised management plan provision for additional and appropriately trained staff within the management unit for the property focused on research, protection and presentation of the geological and geomorphological values of the property, engagement of national and international research institutions in the management system for the property, and the establishment of effective monitoring of its values.

Map 1: Revised map provided during the evaluation mission

