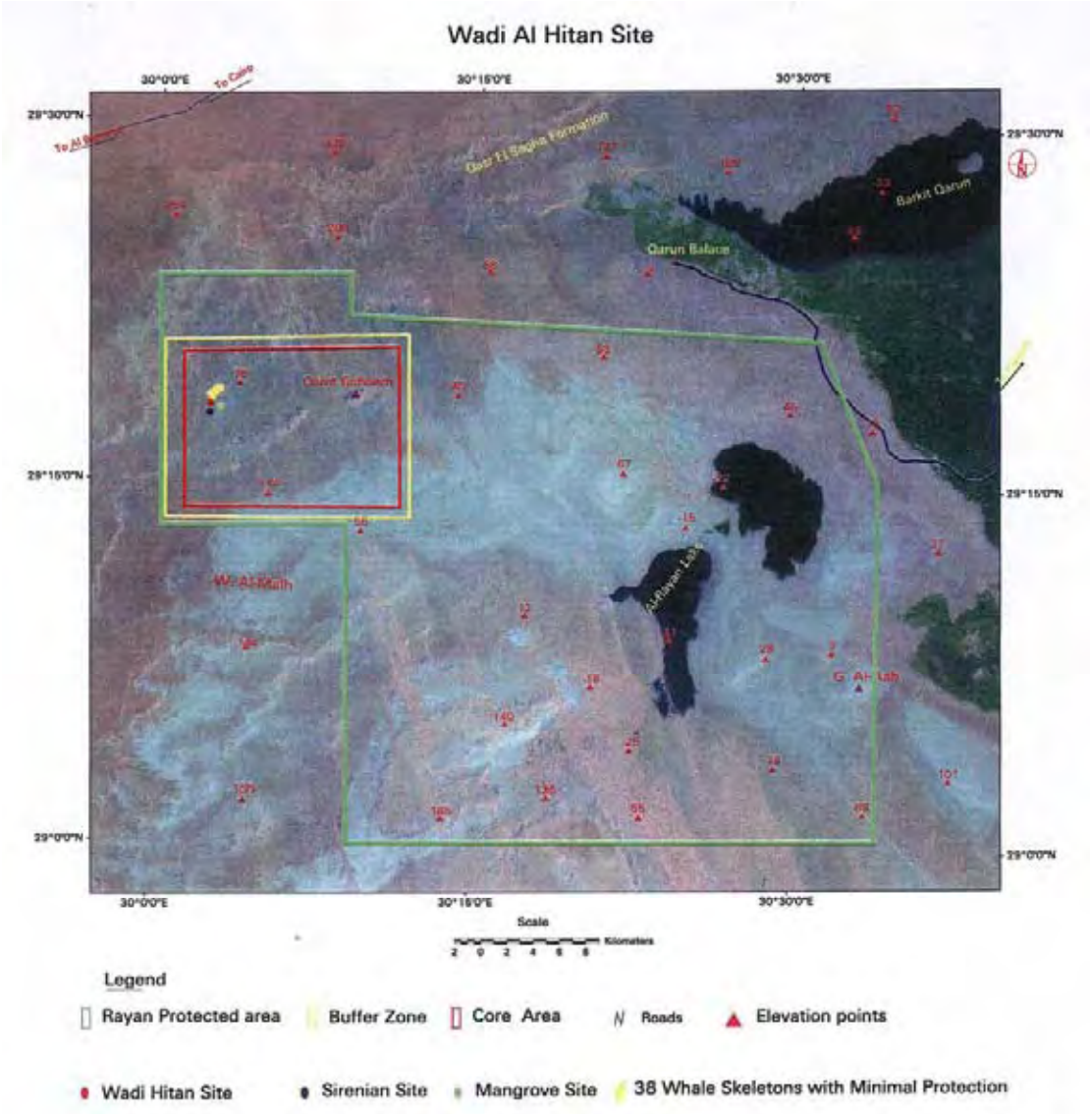


Fig. 1 – Map produced of satellite image of Wadi Al-Hitan (Whale Valley), Wadi El-Rayan Protected Area, Faiyum Governorate, proposed World Heritage Site showing approved boundaries of core area (red rectangle) and buffer zone (yellow rectangle). The boundaries of the Wadi Al-Rayan Protected Area (WRPA) are shown by a green line. Scale of A4 reduction: ~ 1:579,000. Map prepared by EGSMA (Egyptian Geological Survey and Minerals Authority).

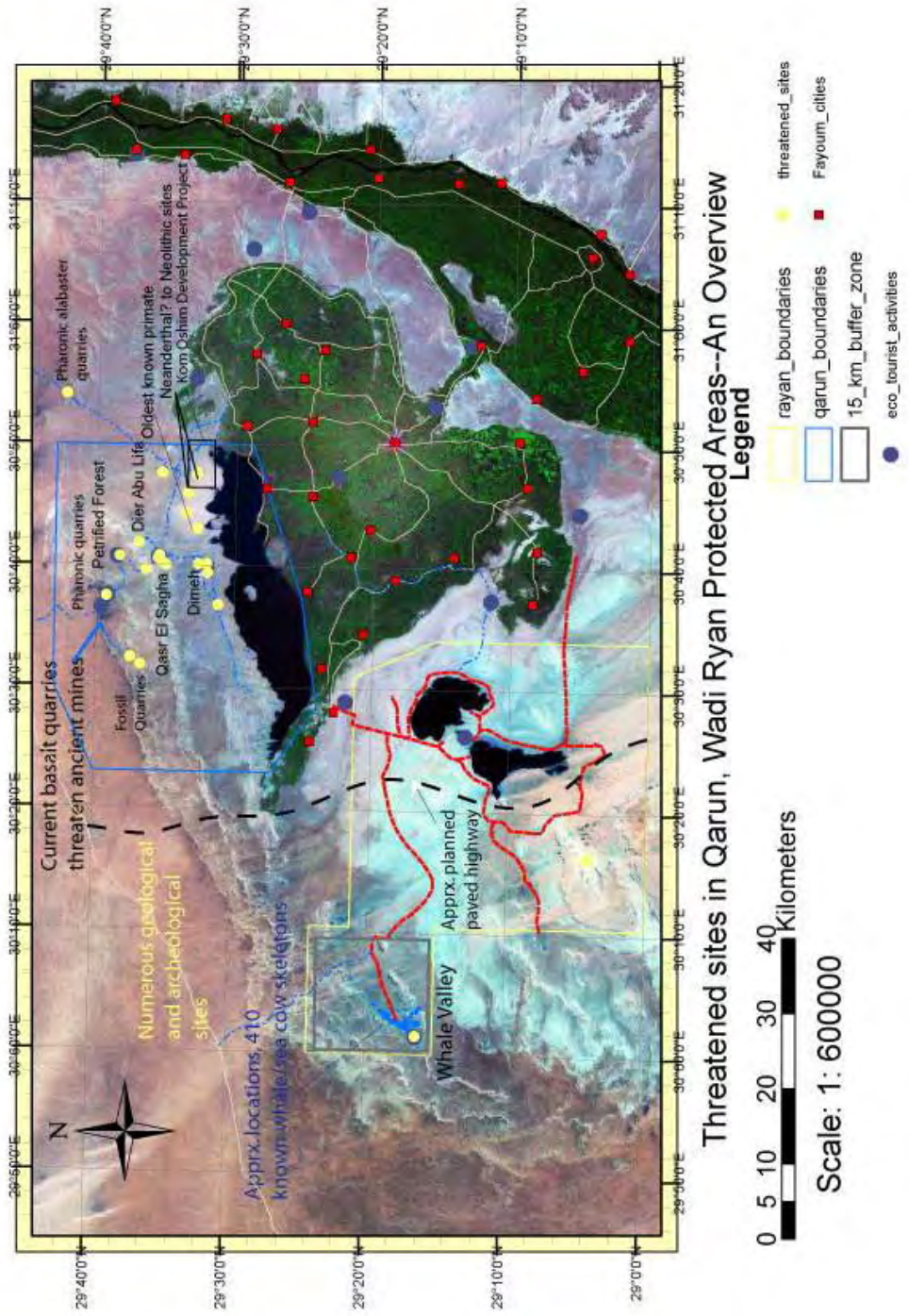


Fig. 3a –Satellite image of Wadi Al-Hitan (Whale Valley) within a 15x15 km area in WRPA. Scale; 1:600,000, showing some of the threatened sites and a 15x15 km area where whale fossils are concentrated (courtesy of Mr. J. Dolson). This area *is not* the proposed area for the World Heritage Site.

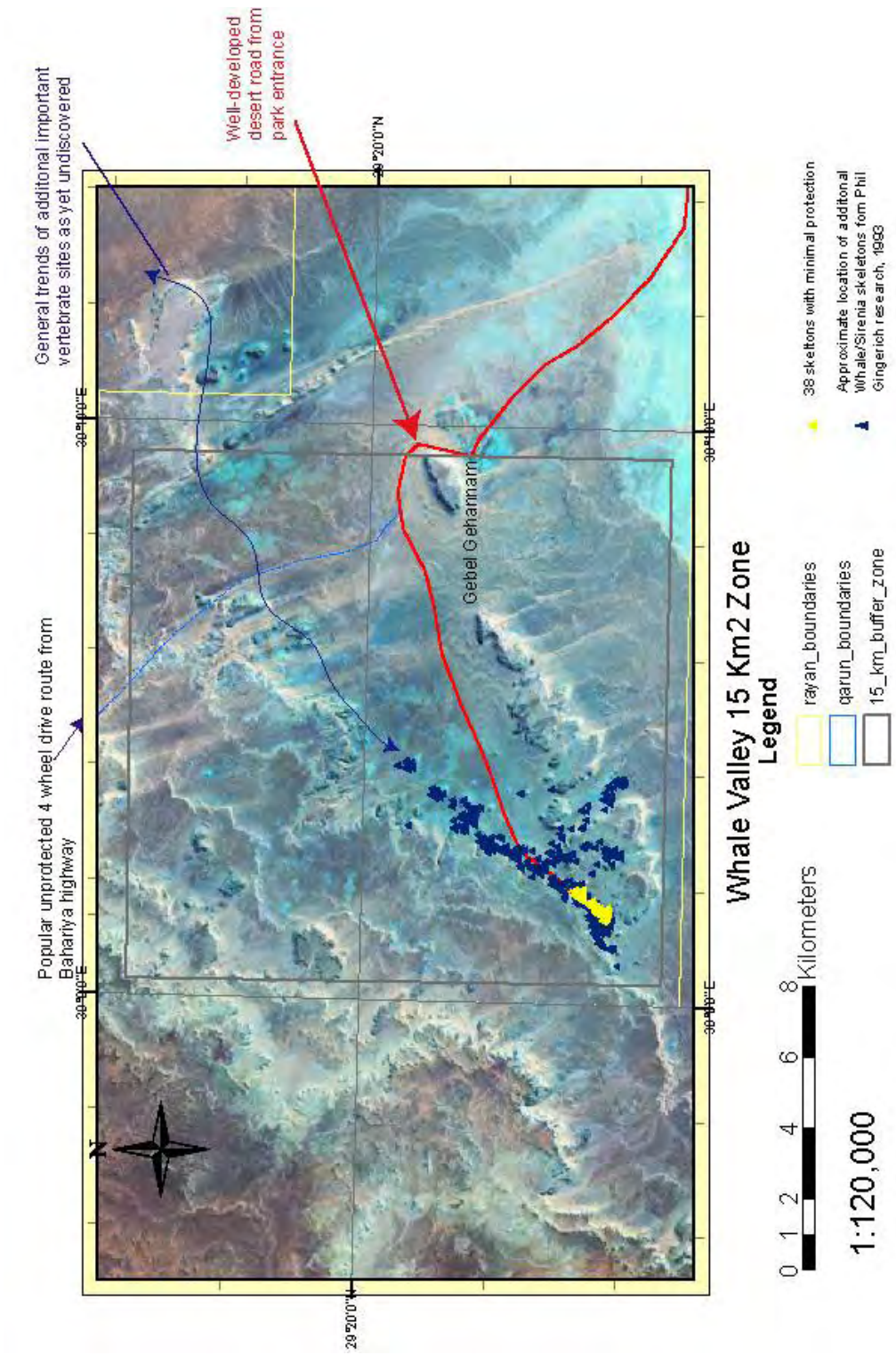


Fig. 3b – Enlarged part of previous map, scale 1:120,000, showing the well developed desert road from park entrance past Gebel Gahannam, position of some whale skeletons, and approximate location of whale and sirenian (sea cows) skeletons (courtesy Mr. J. Dolson).

Fig. 4 – Location of Wadi Al-Hitan in relation to Cairo (courtesy Mr. J. Dolson).

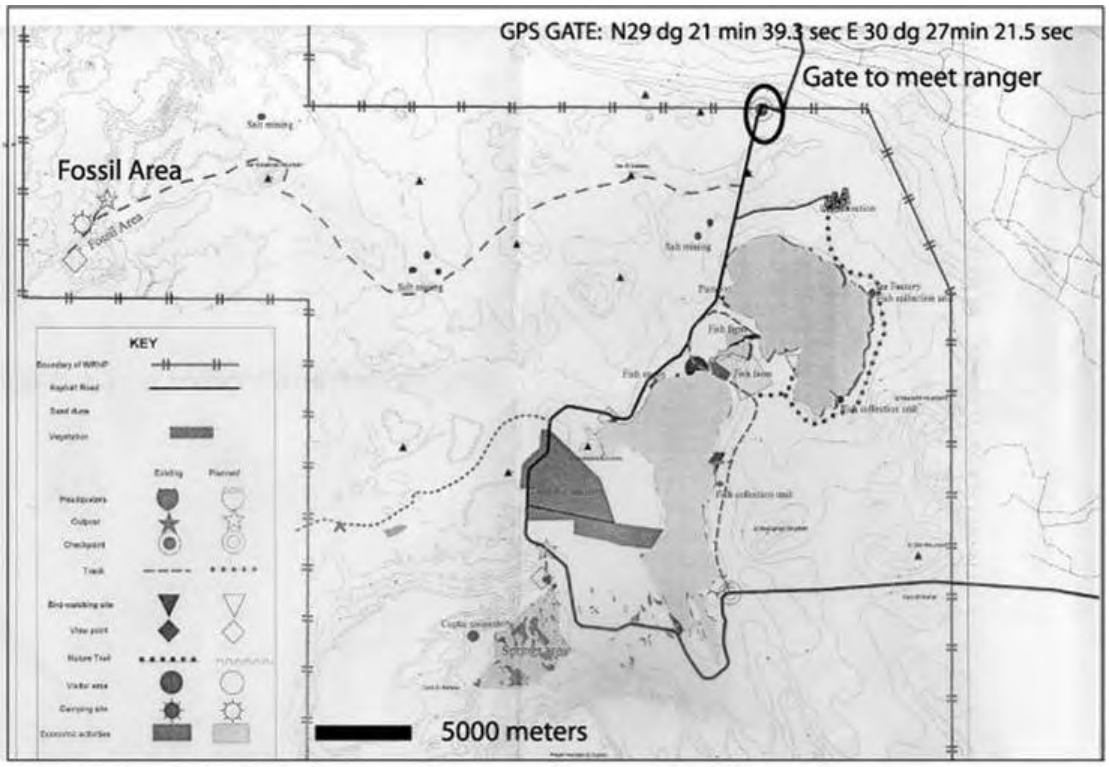


Fig. 5 – Map of WRPA. The fossil whale area shown is apprixametely 35 km west of the entrance to the park, but the road winds for about 45 km (courtesy Egyptian-Italian Environmental Programme, EIEP).

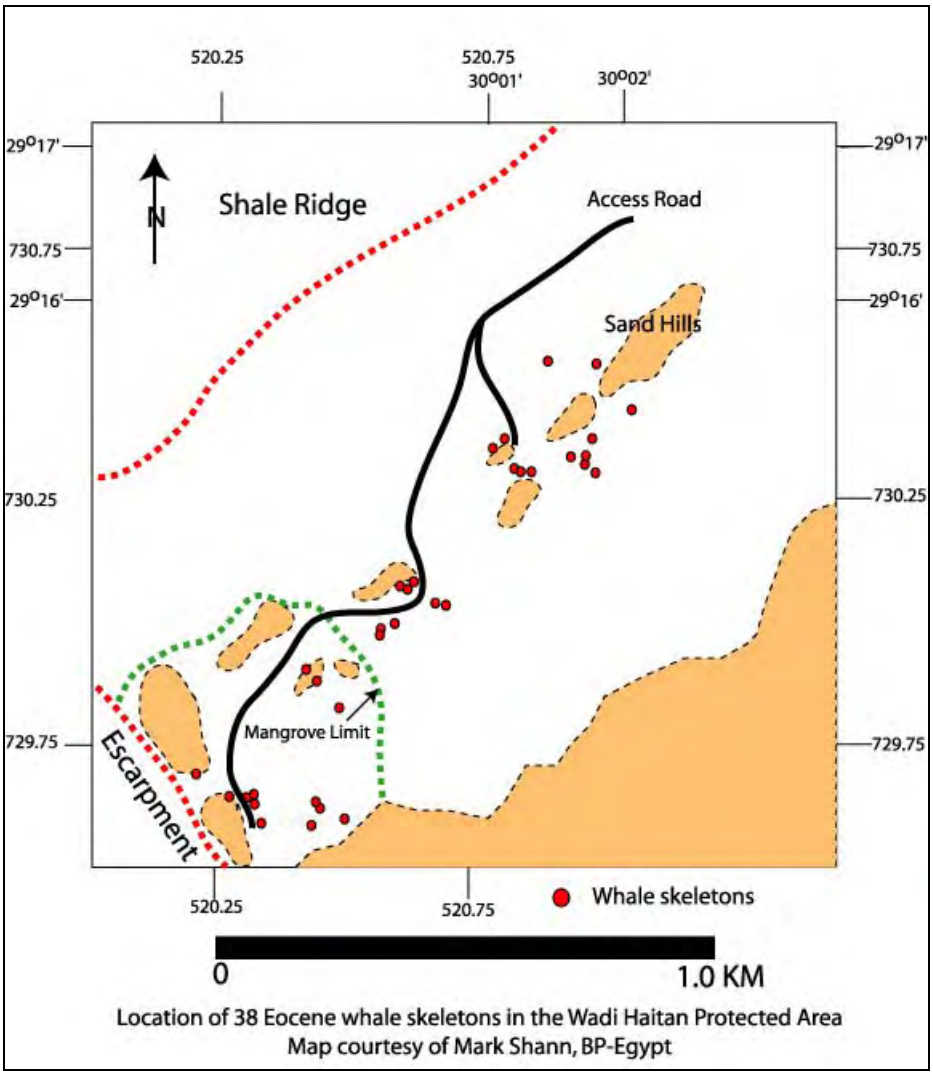


Fig. 6 – Map of 38 whale skeletons and location of heavily mangrove rooted ancient shoreline within the core area. Numbers for location are eastings and northings in meters (after Dolson *et al*. 2002).

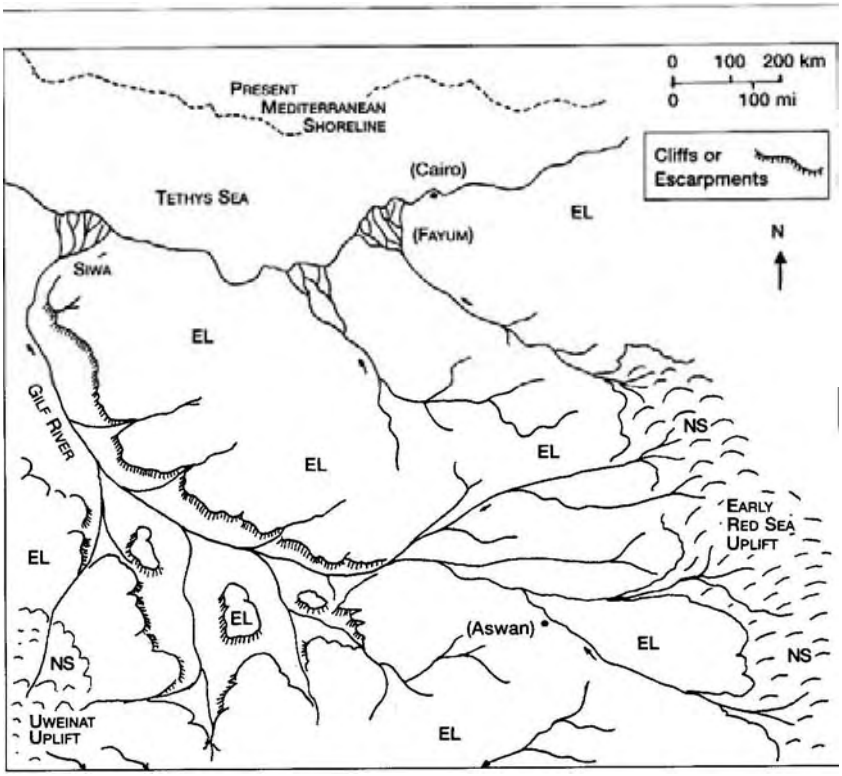


Fig. 7 – The proposed Gilf [Radar] River system of the Oligocene Epoch. Arrows indicate direction of flow in the channels. Rock layers at the surface: EL = Eocene limestone, NS = Nubia sandstone. Note the deltaic systems at present day Fayoum, Bahariya and Siwa (after Sampsell 2003, with kind permission of B. Issawi).

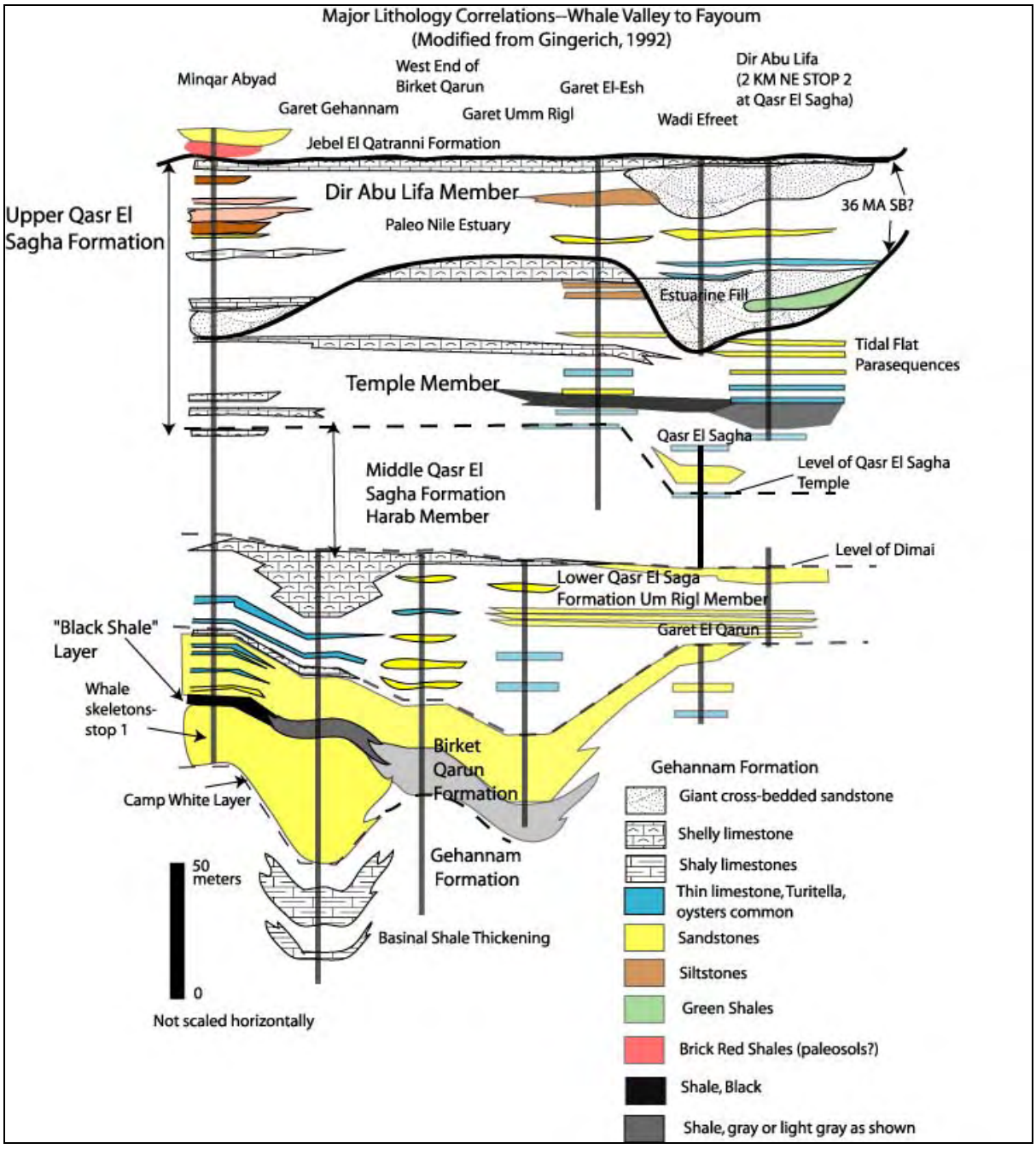
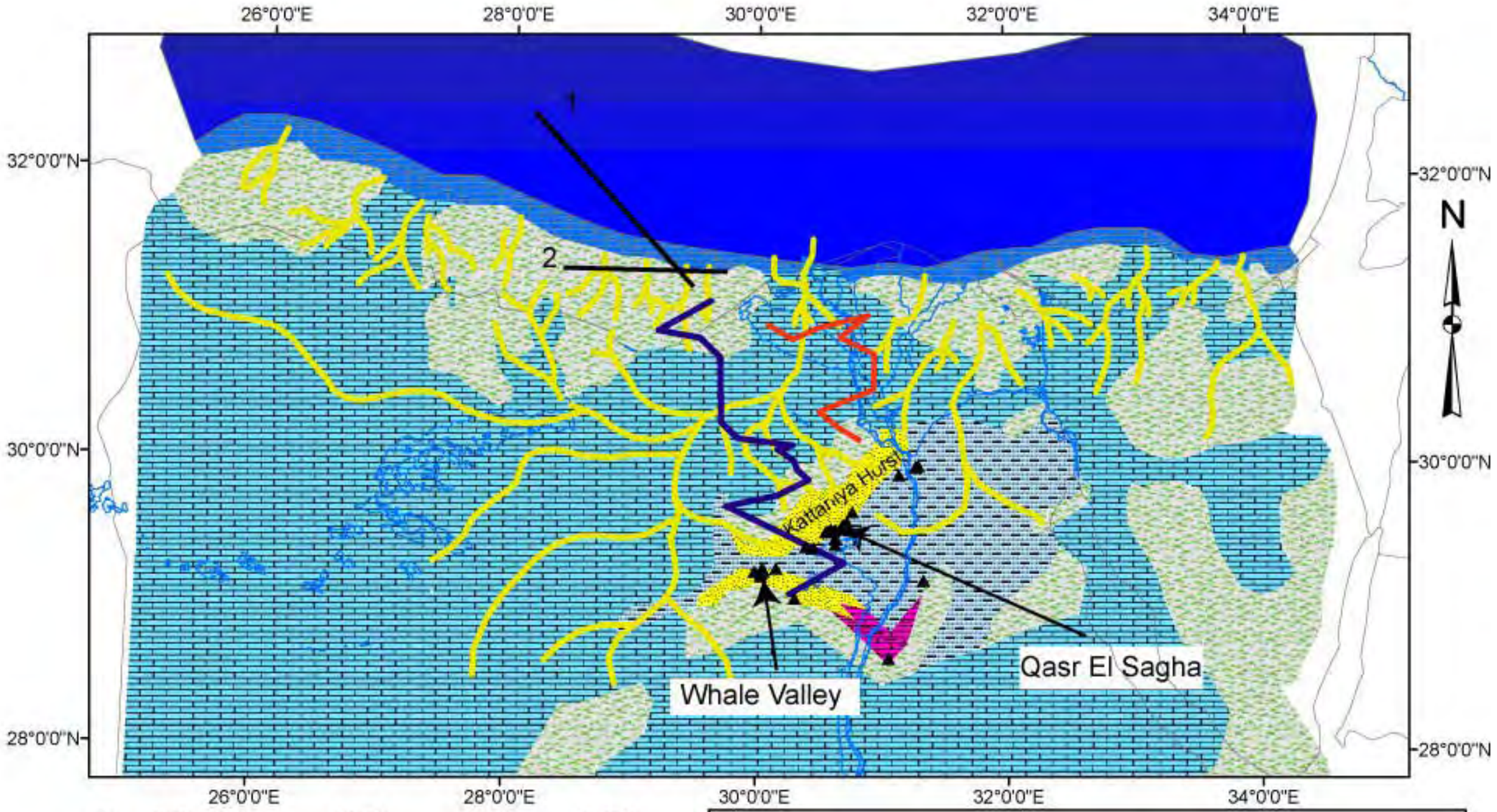


Fig. 8 - Semi-regional outcrop-based correlation of facies and environments, Whale Valley to Qasr El Sagha (after Dolson *et al*. 2002). The black shale layer shown on the left side extends to Wadi Al-Hitan.

Late Eocene Paleogeography



0 30 60 120 180 240 Miles

1, 2 Seismic sections in text

Legend

- Regional section 2
- Regional section 1
- Eocene outctrops
- Oligocene drainages
- Modern rivers
- Country Boundaries

Eocene environments

- land
- restricted marine
- coastal reefs
- shallow marine
- deep marine
- shoreline
- supratidal

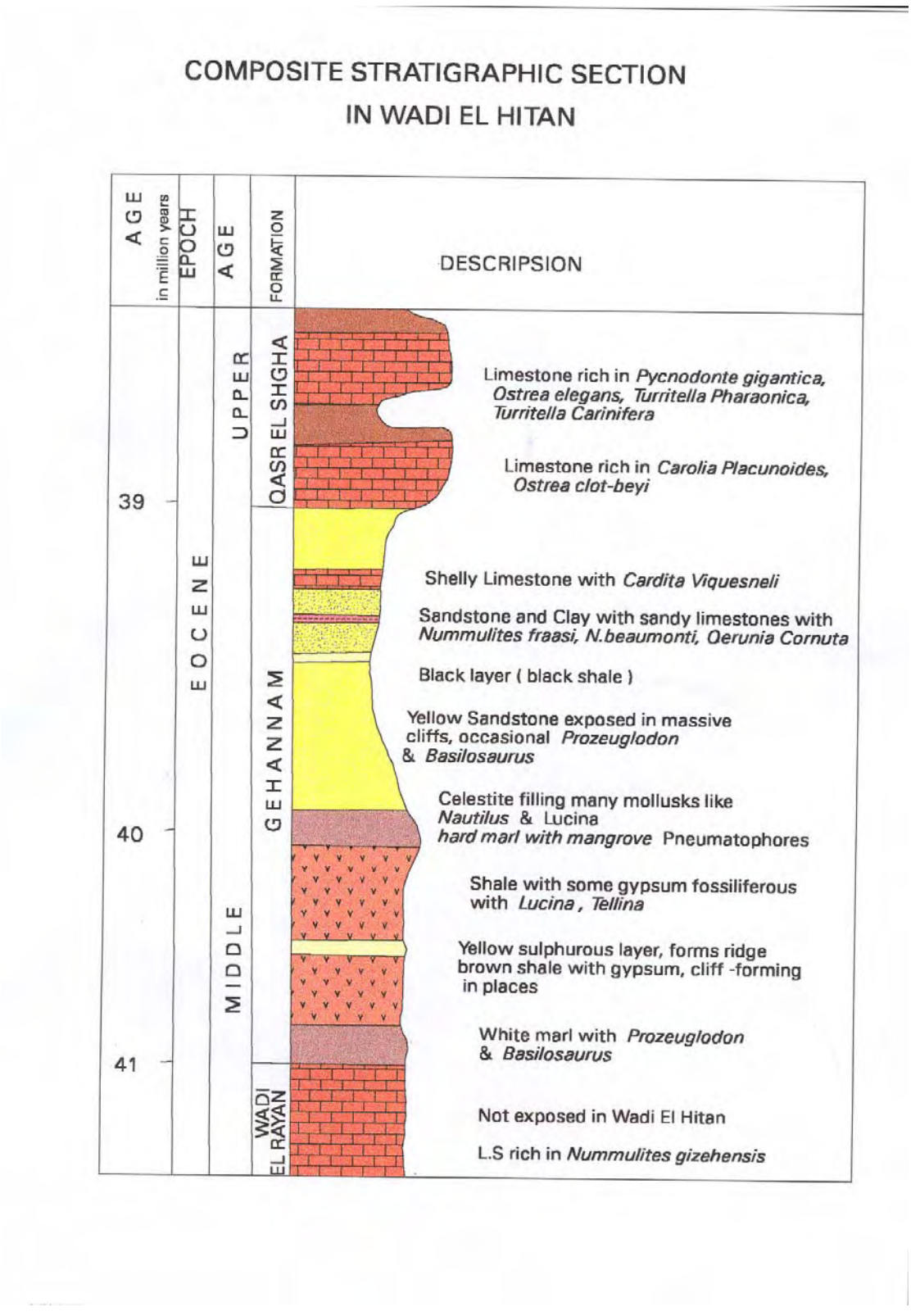


Fig.10 – Composite stratigraphic section in Wadi Al-Hitan (courtesy Prof. M. Abed and Prof. F. El-Bedewy).

Fig. 11 – General view of Whale Valley area.

Fig. 12 – WRPA Fossil Area, called Wadi Al-Battikh (= Water Melon Wadi).

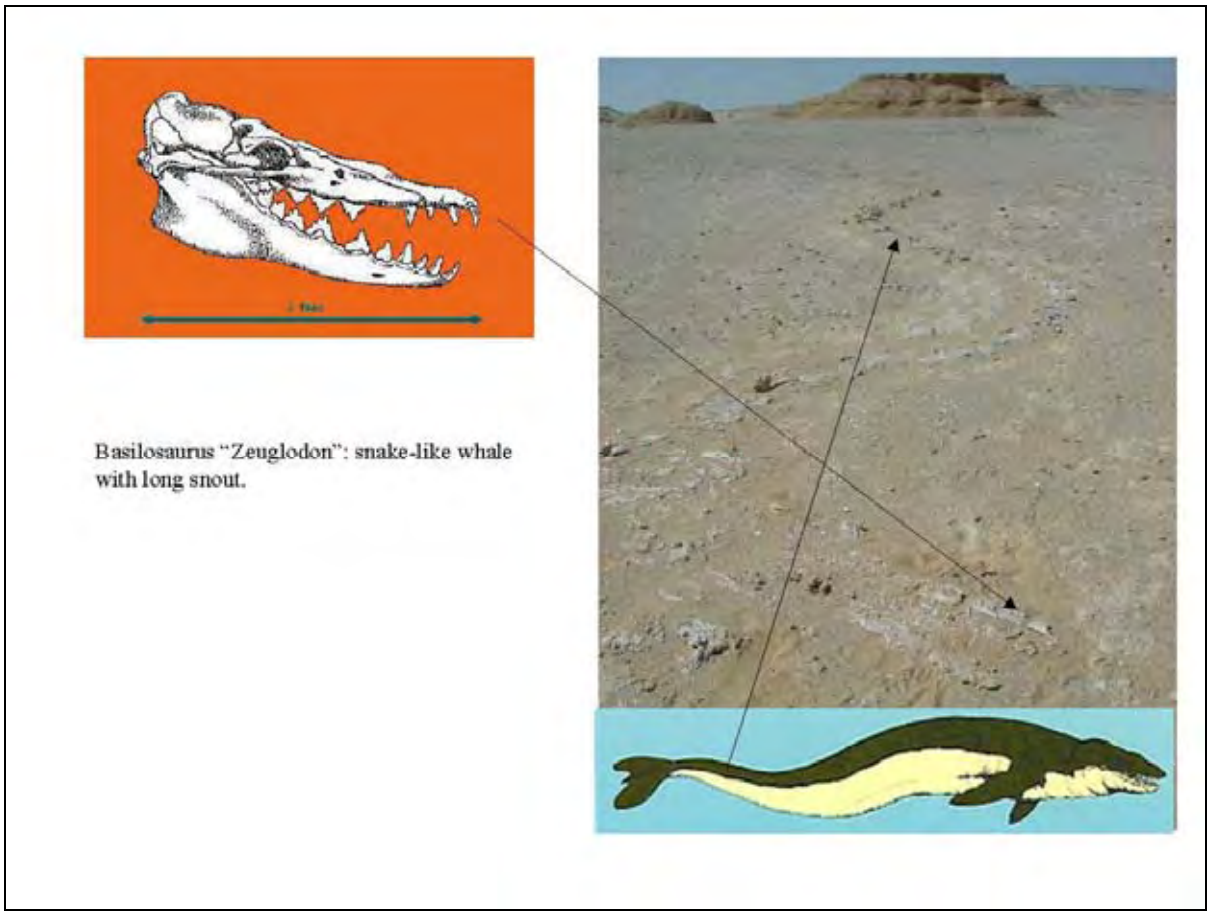


Fig. 13 - A complete whale skeleton (courtesy of Dr. A. El Barkooky). The reconstructed whale diagram is somewhat inaccurate, as the *Basilosaurus* whales were much more serpentine in shape. Note the curved spine typical of most skeletons. This is caused by muscle contraction after death that distorts the spine. The lower left hand figure shows how the whale may have looked like (after Dolson *et al*. 2002).

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Fig. 14 – A fossil whale skeleton. Note the curved position at death.

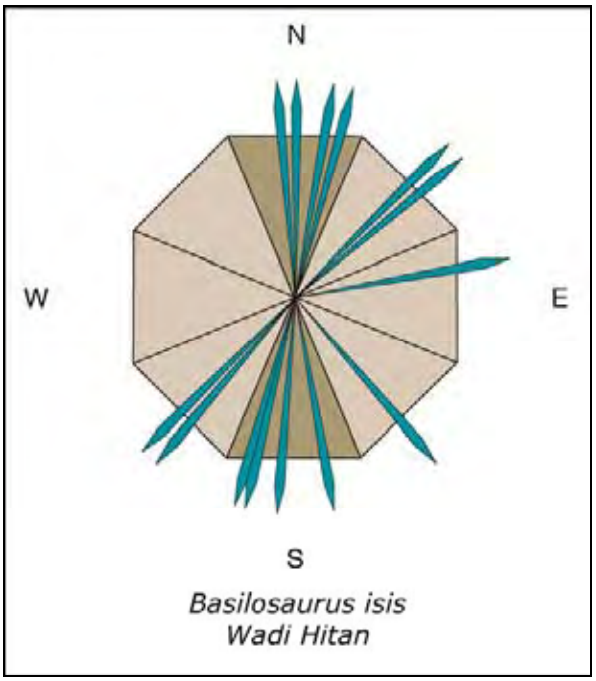


Fig. 15 - Rose diagram showing orientations of 14 *Basilosaurus isis* skeletons in Wadi Hitan. Tails are at the origin, and heads point away from the origin. Bearing of head relative to the trailing skeleton was recorded in the field, to the nearest five degrees, using a brunton compass. Eight of the 14 specimens are oriented pointing north (N) or south (S), which is unlikely to happen by chance alone, and those pointing north and south occur with equal frequency (after Dolson *et al*. 2002).

Fig. 16 - *Prozeuglodon* skull (now called *Dorudon*) at the Cairo Egyptian Geological Museum. Note large triangular teeth of an efficient predator (after Dolson *et al*. 2002).

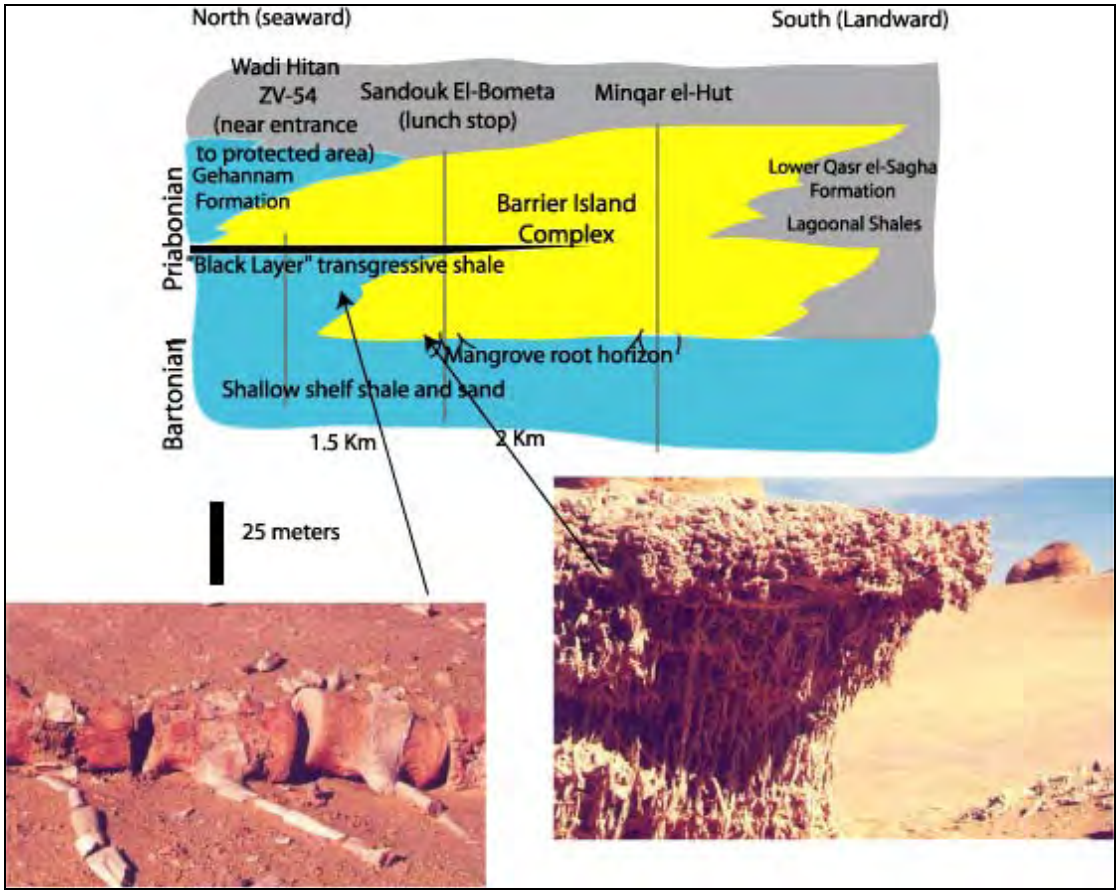


Fig. 17 – Top: summary stratigraphy of the fossil whale area (modified by Dolson *et al*. 2002, from Gingerich 1992). Fossil mangrove is clearly shown at the bottom right hand side. (The picture on the lower left hand side was for a moment's fantasy only.)

Fig. 18 – A block of fossil mangrove at Wadi Al-Hitan.

Fig. 19 -. Along the northeast edge of the mangrove horizon (Camp White Layer) is a heavily worm-bored fossil tree. The extensive worm borings would have occurred in shallow water within the Wadi Hitan estuary (after Dolson et al. 2002).

Fig. 20 – Skeleton of *Basilosaurus isis* from Wadi Al-Hitan. Note vestigial hind limb.

Fig. 21 – Marked trail for cars at entrance to the whale fossil area.

Fig. 22 – One of the fenced fossil whale skeleton at Wadi Al-Hitan, to prevent trampling over.

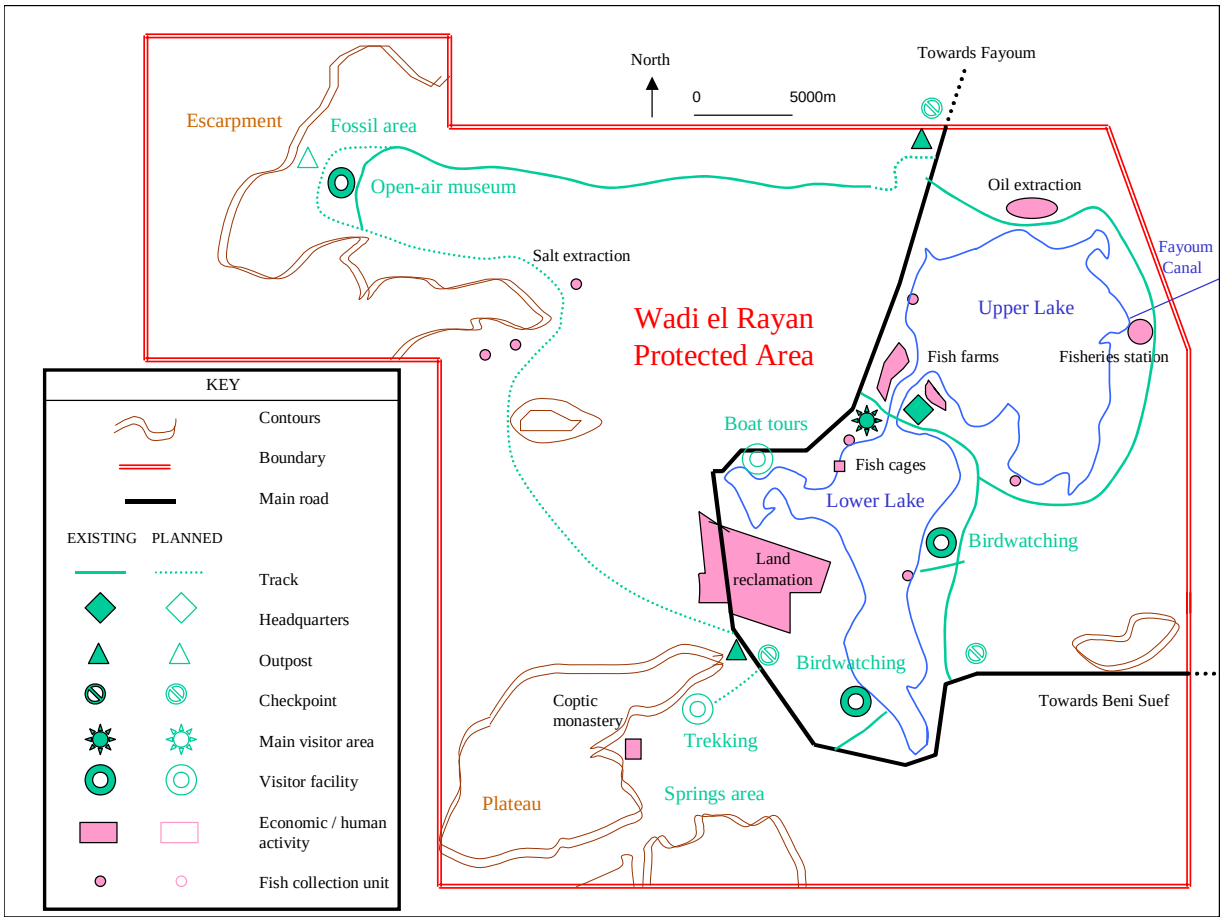


Fig. 23 - Schematic map of the Wadi Al-Rayan Protected Area – December 2001 (courtesy Dr. M. Marchetti)

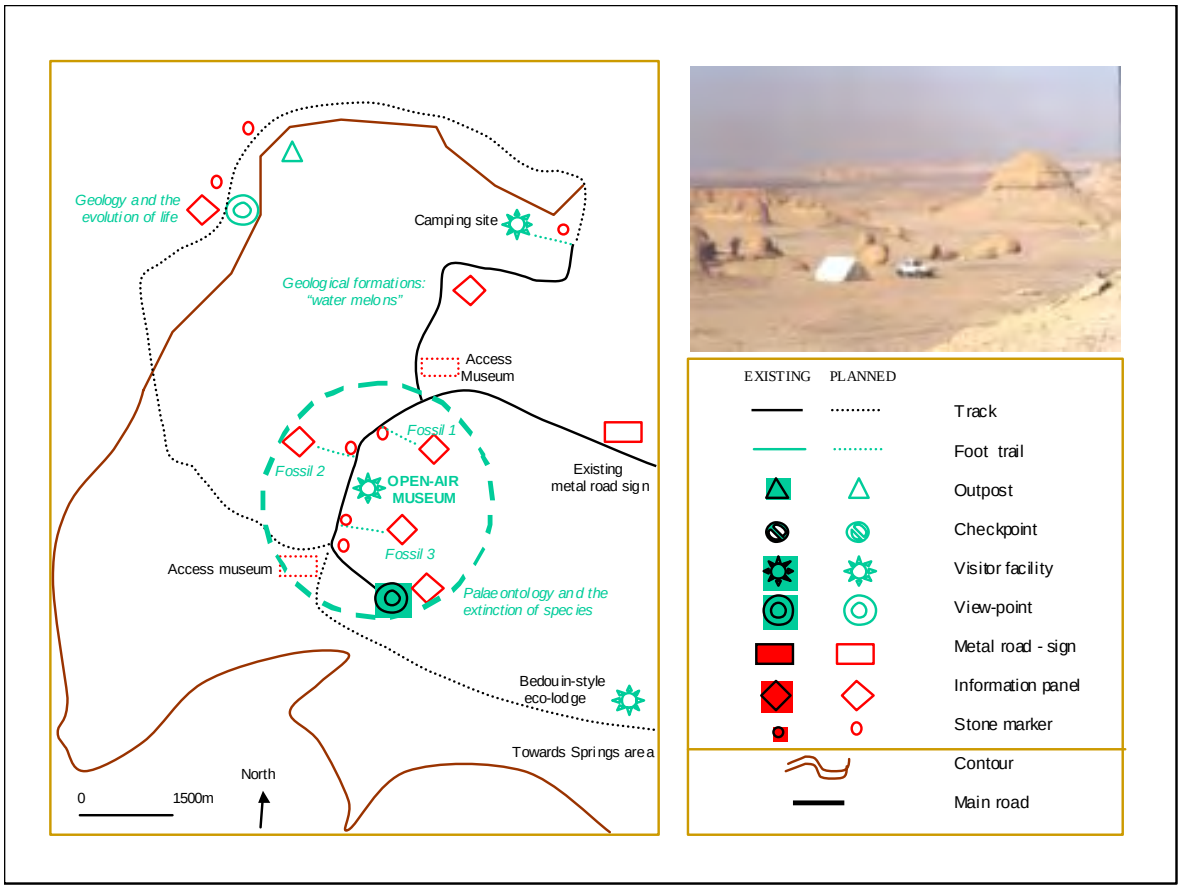


Fig. 24 - Schematic site plan for the Wadi Hitan area (courtesy Dr. M. Marchetti)

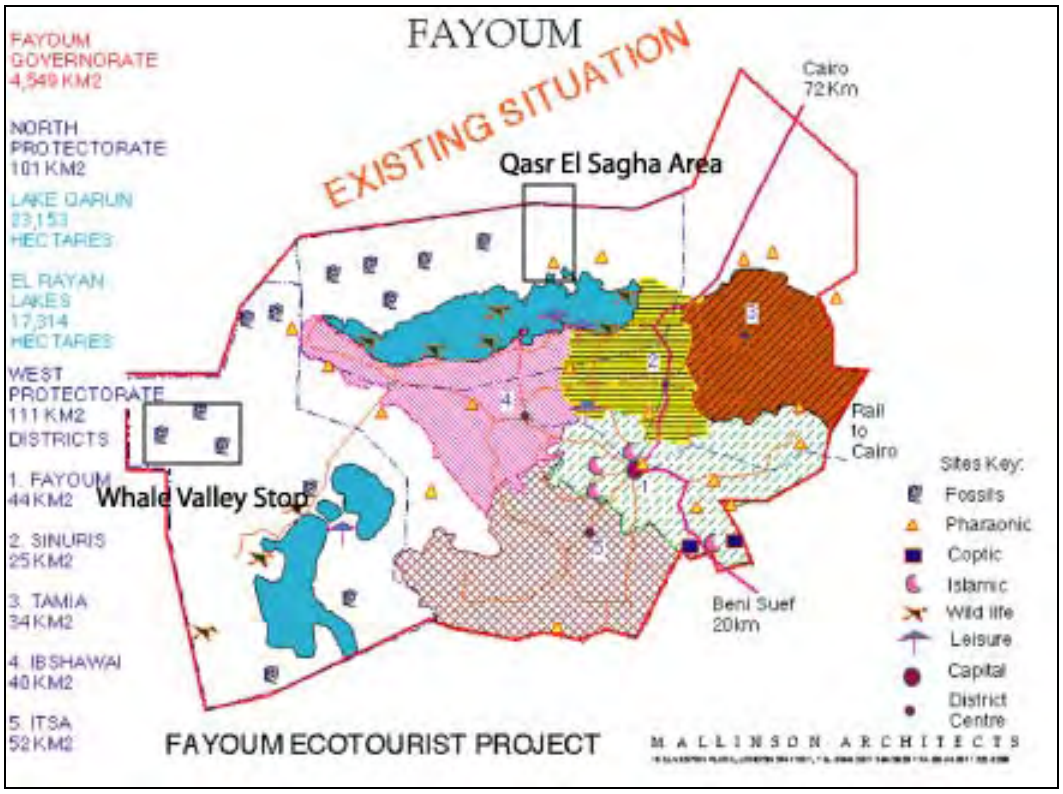


Fig. 25 - Current eco-tourism initiatives and major geological, cultural and archeological sites (courtesy Dr. M. Marchetti).

Fig. 26 – Visitor Center at WRPA, on the western shore of the Lake.

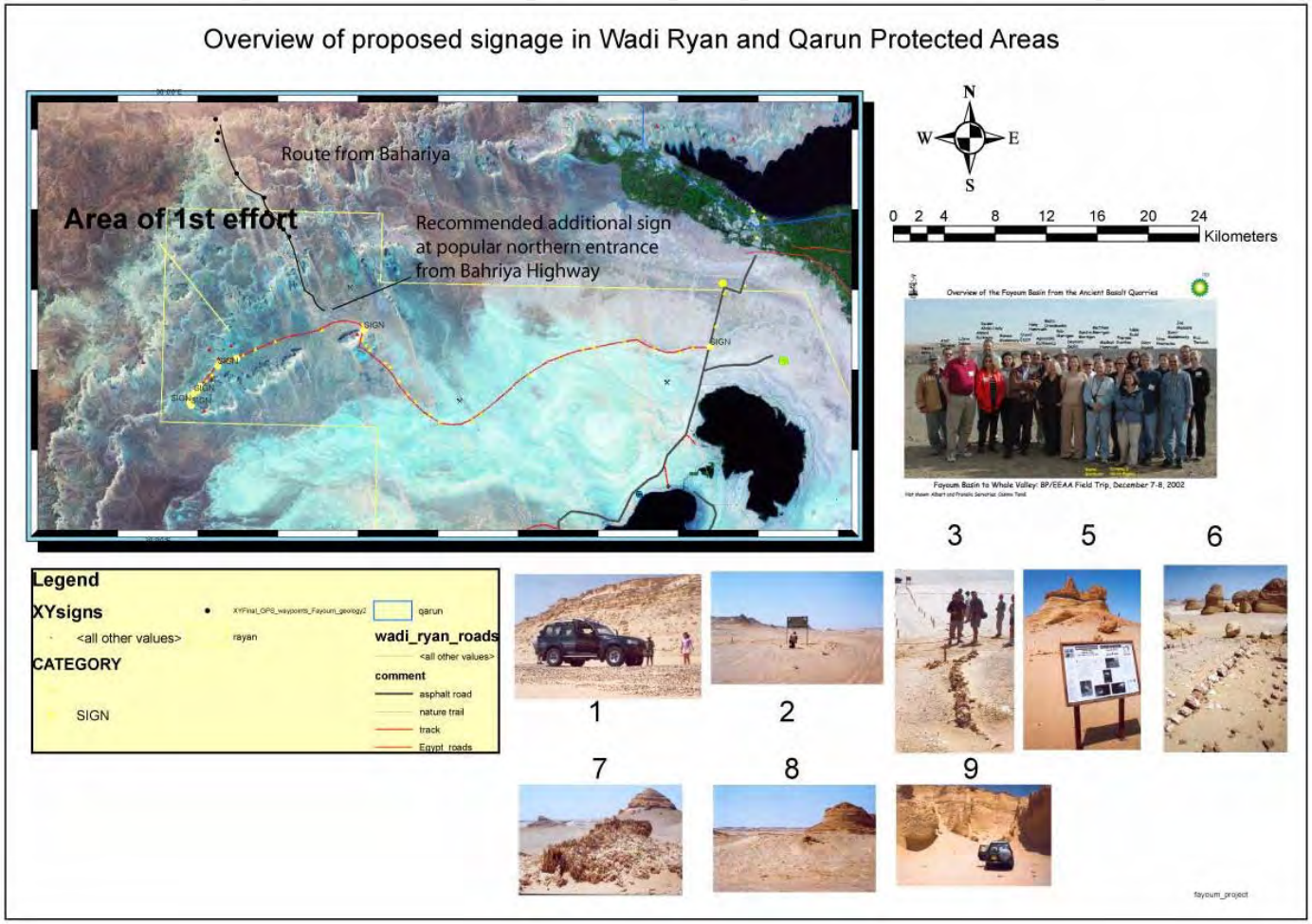


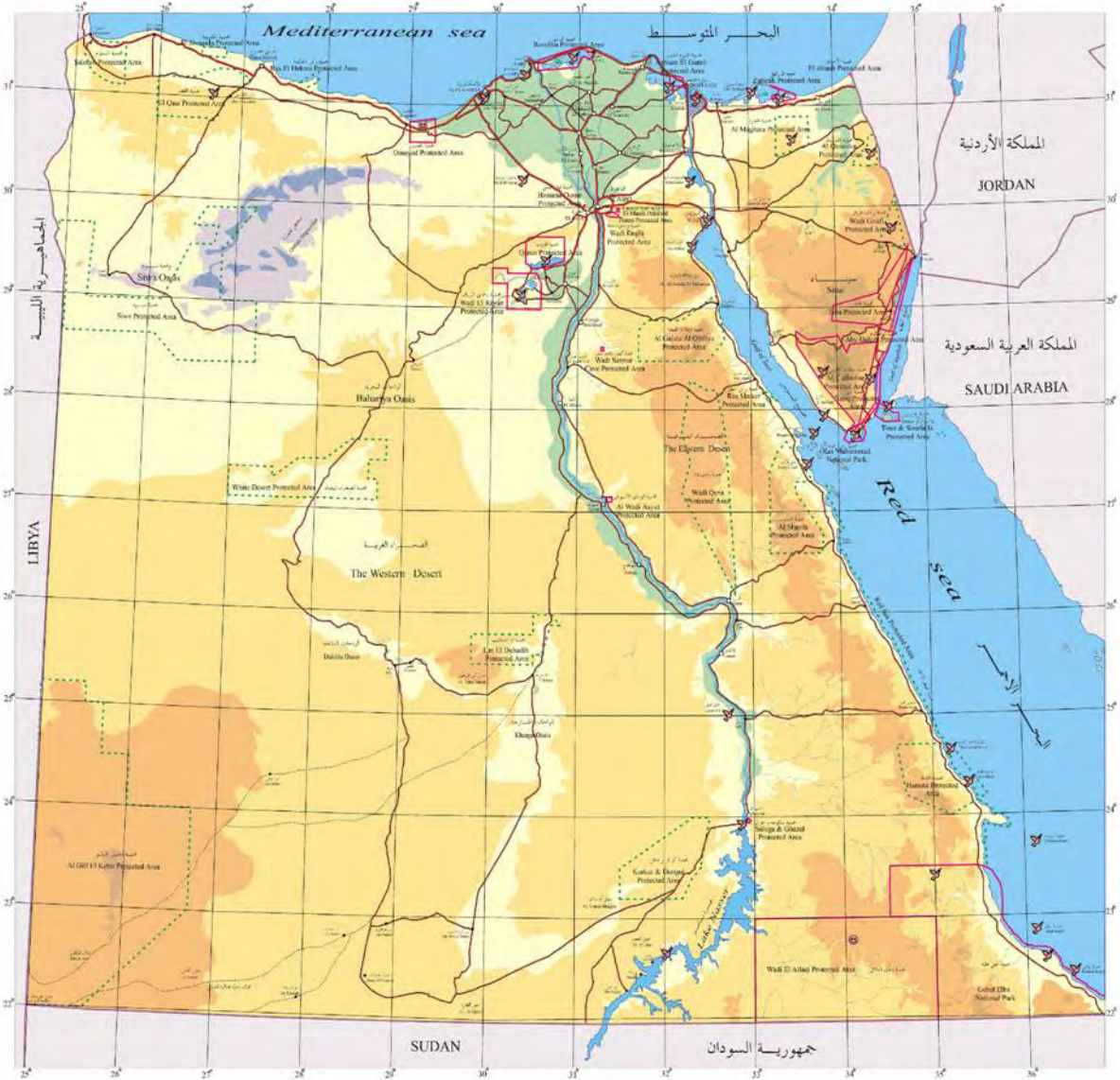
Fig. 27 – Signage operation at Wadi Al-Hitan (after Dolson *et al.* 2002).

Fig. 28 - HQ of Wadi El-Rayan Protected Area.

Fig. 29 - WRPA activities (monitoring).

Fig. 30 - WRPA activities (patrolling).

Plate I – Fossil invertebrates in Wadi Al-Hitan. The fossil in the middle bottom is number 12 while the two circular shapes on both sides are number 13 a and b.


Mediterranean sea
البحر المتوسط
المملكة الأردنية
JORDAN
المملكة العربية السعودية
SAUDI ARABIA
الجماهيرية الليبية
LIBYA
Siwa Oasis
Bahariya Oasis
The Western Desert
The Eleven Desert
Red sea
البحر الأحمر
Lake Nasser
SUDAN
جمهورية السودان

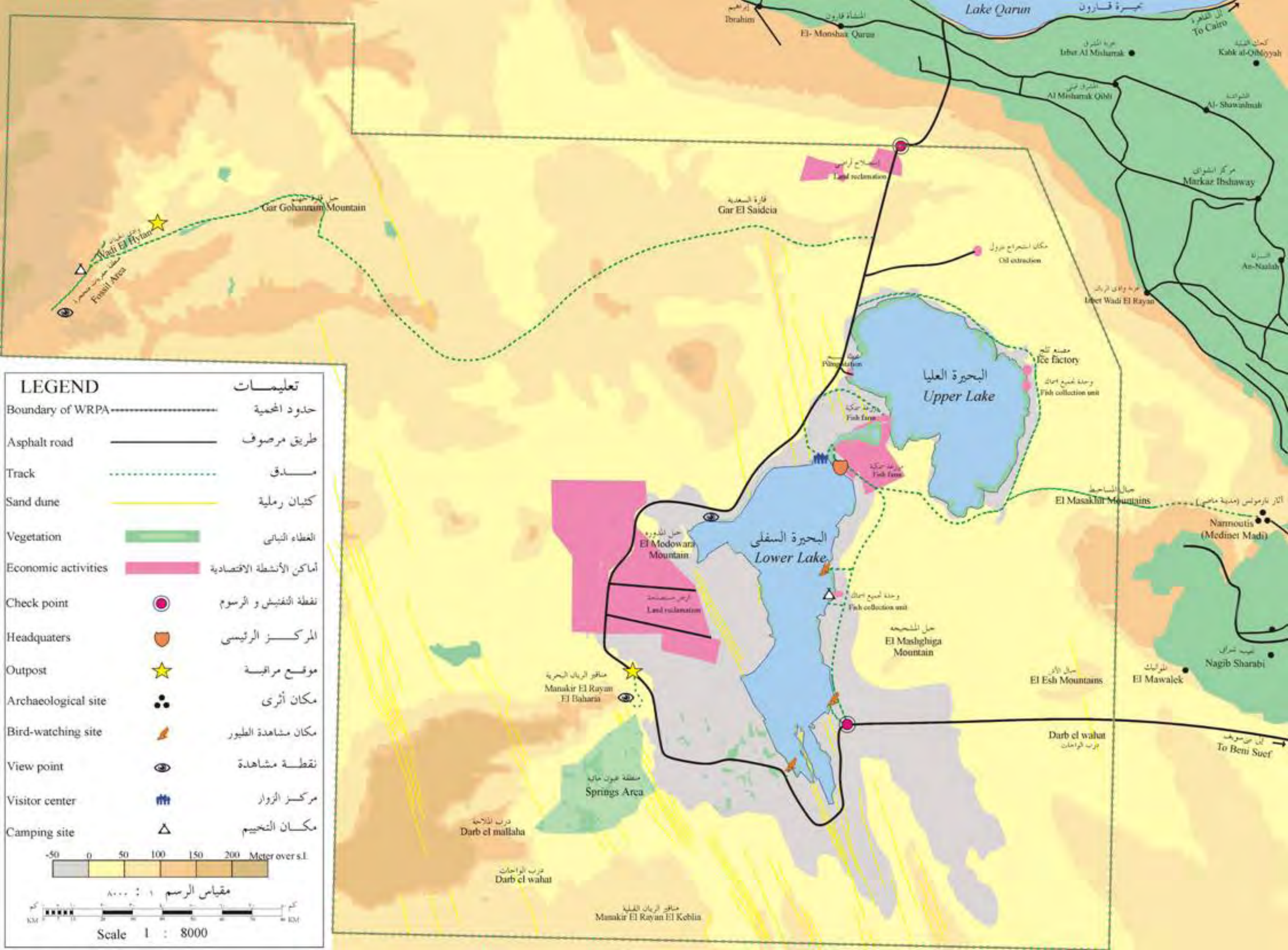

Lake Qarun
بحيرة قارون
To Cairo
Ibrahim
El- Monshaa Qarun
Izbet Al Mishurrak
Kahk al-Qibliyyah
Al Mishurrak Qibli
Al- Shawashnah
Markaz Ibshaway
An-Nazlah
Izbet Wadi El Rayan
Land reclamation
Gar El Saideia
Gar Gohannam Mountain
Wadi El Hytan
Fossil Area
Oil extraction
Ice factory
Fish collection unit
البحيرة العليا
Upper Lake
Fish farm
El Masakhit Mountains
Nanmoutis (Medinet Madi)
البحيرة السفلى
Lower Lake
El Modowara Mountain
Land reclamation
Fish collection unit
El Mashghiga Mountain
El Esh Mountains
El Mawalek
Nagib Sharabi
Manakir El Rayan El Baharia
Darb el wahat
To Beni Suef
Springs Area
Darb el mallaha
Darb el wahat
Manakir El Rayan El Keblia
LEGEND
تعليمات
Boundary of WRPA
حدود المحمية
Asphalt road
طريق مرصوف
Track
مدق
Sand dune
كثبان رملية
Vegetation
الغطاء النباتى
Economic activities
أماكن الأنشطة الاقتصادية
Check point
نقطة التفتيش و الرسوم
Headquaters
المركز الرئيسى
Outpost
موقع مراقبة
Archaeological site
مكان أثرى
Bird-watching site
مكان مشاهدة الطيور
View point
نقطة مشاهدة
Visitor center
مركز الزوار
Camping site
مكان التخييم
-50 0 50 100 150 200 Meter over s.l.
مقياس الرسم
Scale 1 : 8000

Figure 3. Map showing the 2-category system of WRPA

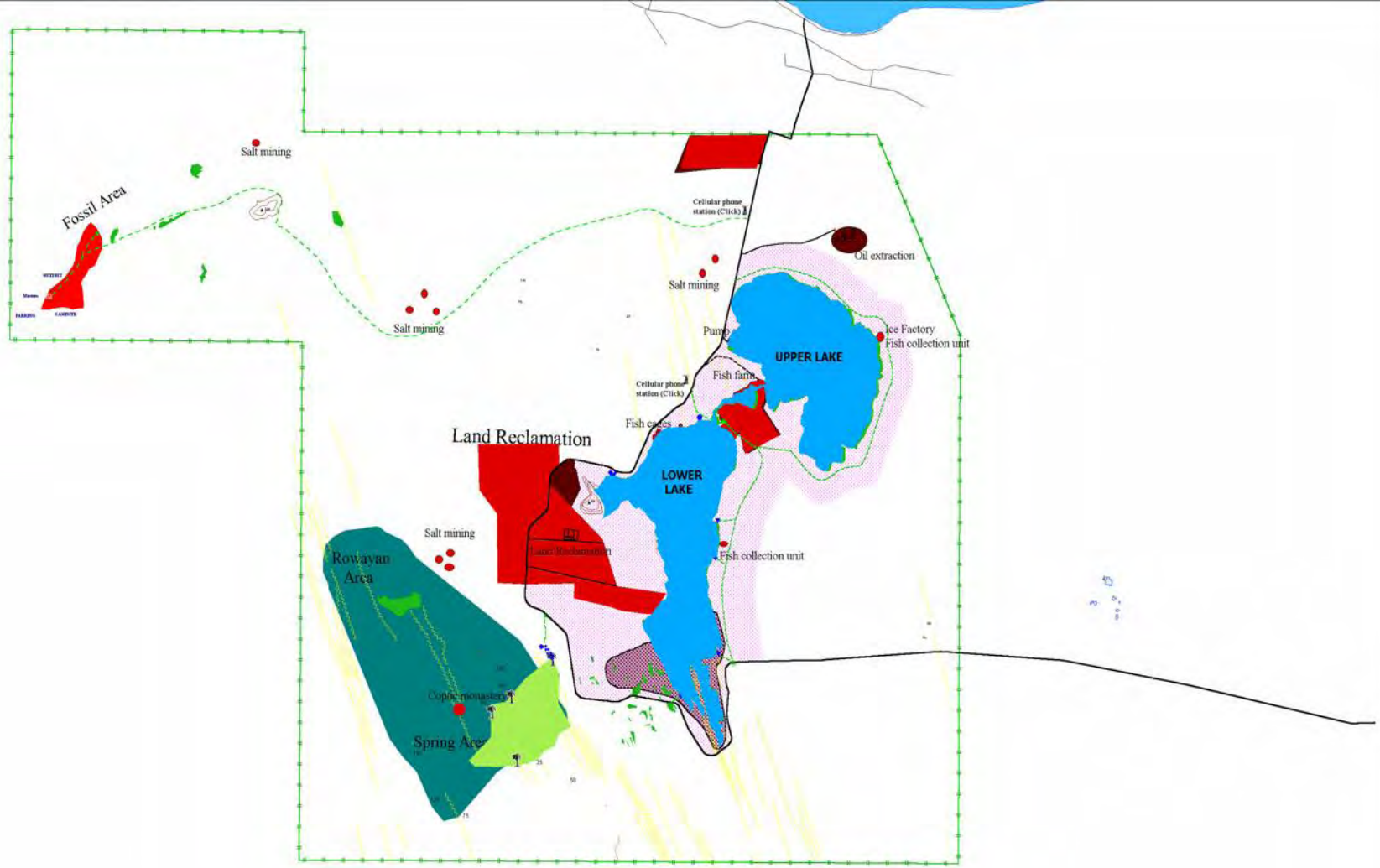


Figure 4. Map showing the Zonation of WRPA