Qatar Turtle Management Project

INCEPTION REPORT

Hawksbill turtle nest and track, Umm Tais, April 2013.
Photo: Aris Vidalis.

Damaged sign indicating conservation needs, Al Shamal southward coast, April 2013.
Photo: Aris Vidalis.

20-28 April 2013

TABLE OF CONTENTS

1. FIRST 'KICK-OFF' MISSION OF QTMP 3

2. THE FIRST MISSION IN APRIL 4

A. ORGANIZATION AND LOGISTICS 4

B. THE FIELD WORK 6

C. MANAGEMENT GUIDELINES (INITIAL UNSTRUCTURED SUGGESTIONS) 14

D. LITERATURE REVIEW 23

E. PREVIOUSLY UNDERTAKEN GENETIC ANALYSIS OF HAWKSBILL TURTLES NESTING IN QATAR 26

F. PREVIOUSLY UNDERTAKEN SATELLITE TELEMETRY 27

G. BIBLIOGRAPHY 28

H. APPENDIX 31

1. FIRST 'KICK-OFF' MISSION OF QTMP

20 April 2013: After conclusion of negotiations, the finalization of the scope of work and efforts regarding the organization of the field team for the Qatar Turtle Management Project in cooperation with the Ministry of Environment of Qatar, the first field mission of the project was initiated during for 20-28 April 2013.

The action plan of the 5 months of this project includes, according to the scope of work document, intense field work and research, in parallel with careful study of data and literature relevant to the subject of study: Sea turtle management in Qatar, and specifically at the Fuwairit coastal area.

In the 5 field missions planned, the first one reported in the present document, it was agreed that sea turtle presence in Fuwairit and adjacent water would be the main focus of field study, with a parallel study of the context in which Fuwairit hosts its turtles, namely the adjacent nesting beaches and islets, which, as a unified ecosystem, interact with Fuwairit.

It was agreed that two senior scientists from Biodiversity East Ltd, experts in turtle conservation and management, as well as two scientific assistants would be forming the team of each mission.

2. THE FIRST MISSION IN APRIL

A. ORGANIZATION AND LOGISTICS

Time frame: 20-28 April 2013.

(A) The team members were the following:

- ALan F. Rees, MSc, Marine scientist, marine turtle expert.
- Dr Stamatis Zogaris, MSc, PhD, Geographer-biologist, conservation scientist.
- Nancy Papathanasopoulou, MSc, environmental management expert - project coordinator.
- Aris Vidalis, Environmental interpretation expert
- Ali Alhafez - Environmentalist, field assistant/ field coordinator.

(B) Purpose of the visit:

- Initial observations of beach and marine biodiversity in the Fuwairit and adjacent turtle nesting areas with priority to sea turtle presence and activity – potential nesting, hatching, foraging and mating.
- Gathering of literature relevant to turtle/marine conservation in Qatar. Review of the literature.
- Surveying and evaluation of Fuwairit coast habitats (mangroves, marine area etc.) in order to observe relevance of turtle interactions with these bodies and the site conservation delineation.
- Assessing signage and field work needs in Fuwairit operated by existing scientific teams and rangers in order to assist with potential improvements and training.
- Proposing alternative/additional signage options

(C) Results in Logistics

Apart from the observations during the field work that shall be developed in the next two chapters, most goals have been attained with success promising a fruitful cooperation and good progress for the project.

- Logistics organized by the Ministry of Environment included initially a 4X4 Land Cruiser vehicle for the exploration of turtle nesting beaches by Biodiversity East.

The team explored the Coast from Al-Shamal to Fuwairit and Marrouna to Jassasiyah in this vehicle from 21-24 April.

- A fully-equipped portacabin, a second Land Cruiser and a caravan were introduced for the purposes of Biodiversity East research on 24 April and thus the terrestrial working unit was complete.
- Five mobile / data SIM cards were purchased by the Ministry of Environment for the team so communications were ensured.

(D) Seminar / Workshop with ME representatives

On 24 April a meeting was convened between Biodiversity East sea turtle scientist ALan Rees and field coordinator Ali Alhafez and five men from the Biodiversity Department of the Ministry of Environment who had be been identified as potential sea turtle monitoring observers for the 2013 season, to be trained by the Biodiversity East team during the next mission (May 2013), and was presided over by Ms Nayla Beyrouthi, Project Unit.

The two-hour session began with all five employees indicating that they had previously worked on the QU turtle project to varying degrees and therefore had experience of observing turtle nesting and tagging. Following this, a presentation entitled ‘Sea Turtles of Qatar’, covering the basic facts concerning sea turtle biology and conservation in Qatar was presented in English by Mr. Rees and in Arabic by Mr. Alhafez. The presentation was punctuated with further discussion based on the topics raised.

The five MoE candidates appeared most interested in research involving satellite tagging and genetic investigations and about these topics they seemed quite enthused. A second presentation on standard sea turtle monitoring techniques was then given. This presentation covered: track identification, use of hatcheries and nest relocation, best practice for nocturnal patrols, tagging and measuring turtles.

Subsequent to the meeting, during the field period worked by the BE team, none of the five candidates were deployed to Fuwairit for field training and assessment and this action was postponed to take place in May.

B. THE FIELD WORK

Fuwairit and the surrounding area

There is little doubt that the northeastern coastline of Qatar, between Ras Laffan and Umm Tais has a special interest for sea turtles and hosts important coastal habitats of wider nature conservation interest. The area inspected during the inception phase of the first mission includes the coastline from the tip of Umm Tais to the north to the Jassasiyah resort area (west of Ras Laffan) and covers a distance of 32 km. Figure 1 depicts the limits of the initial study area and the particular beach sites that are deemed of outstanding conservation interest (see Table 1).

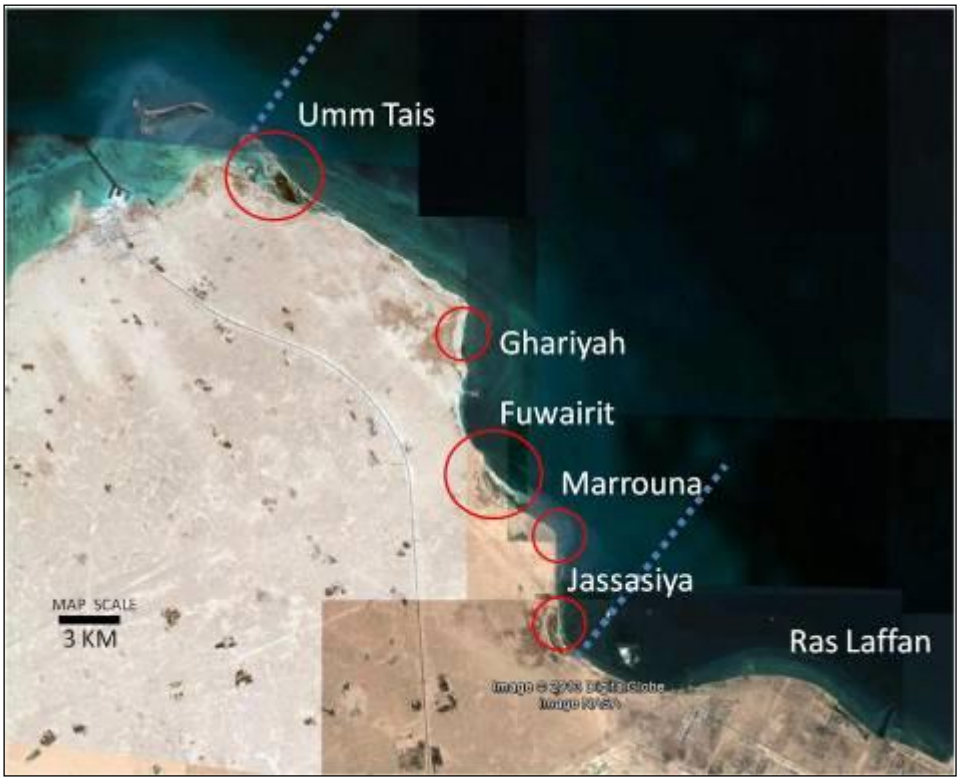

Figure 1. Main surveyed areas in the surrounding vicinity of Fuwairit. The coastline stretches 32 km between the two blue dotted lines and represents the surrounding study area of Fuwairit beach. Five areas of outstanding conservation interest are circled in red; of these, Fuwairit and Umm Tais hold the highest nature conservation potential (Map source: Google Earth).

Outstanding coastline sites - in brief:

Umm Tais

A narrow barrier island formed parallel to the main shoreline that extends for 5 km, approximately one km away from the shoreline. The barrier island protects a two-sided tidal inlet system, which hosts a great variety of interesting plant and animal communities and is responsible for generating a variety of sedimentation types (including the formation of an ebb tidal delta). The variety of habitats and the extent of some of the habitats here is impressive with no other area hosting such a juxtaposition of coastal formations (tidal bars, beaches, stromatolites, mangroves, coral platform margin). The area has the north coast's largest mangrove woodland. Wetland bird assemblages are of special interest; remarkable numbers of Socotra Cormorants are spotted offshore. Turtle nesting was confirmed in 2013 by the Biodiversity East team.

Gariyah

Typical sandy beaches of the north coast; turtle nesting was confirmed in 2013 the Biodiversity East team. Many villas and road access points exist; beach dunes are often leveled and degraded by SUV trampling.

Fuwairit

Hosts a combination of several important habitat features and an outstanding wildlife hotspot; especially due to the long turtle nesting beach and sandy spit, tidal lagoon, mangrove. A characteristic feature of this coastal area is the low rocky hill, Fuwairit Jebel, composed of a hilly stretch of hamada desert jutting above the coastline.

Marrounna

An extension of the Fuwairit coastline marked by extensive old rock-built Muskar fishtraps. Extensive dunes exist behind the beaches. Many villas and chalets have recently been built, fragmenting the shoreline. Most beaches have dunes behind them, many are in fair condition. Sea turtles are known to nest here, however no evidence was found during a rapid visit.

Jassasiya

A large inland wetland area with extensive mangroves, saltmarsh and tidal channels behind a sandy beach (the sandy beach in front of the mangrove was not inspected for sea turtle activity). Just north of here at a location often called "French Beach", a shell of a Hawksbill Turtle was found. The wetland area and extensive hummock dunes and surrounding *sabkha* is definitely of wider wildlife and ornithological interest.

FUWAIRIT: THE MAIN AREA OF STUDY

Initial Site description

Fuwairit is the most significant beach for nesting turtles outside Ras Laffan on Qatar's mainland and is therefore naturally a top-priority area for nature conservation along the coastal zone of Northern/North-Eastern Qatar. The area is of outstanding importance as a conservation site also because it has a variety of terrestrial, wetland and marine habitats within a rather small area. The ten generic landscape types that make up this site are the following:

A: Deeper waters (>4 m) offshore of the Arabian Gulf. An area of special interest for its benthic marine communities, sea mammals, birds and perhaps foraging or gathering site for marine reptiles also.

B: Shallow waters with coral rubble/gravels/sands and sea grass. Subtidal shallows typical of the coast along this part of Qatar. Sea grass beds are nursery grounds for many invertebrates and fishes.

C: Fuwairit Spit Beach. A beach of outstanding natural beauty, gently shelving towards the shallow bay and on a sandy spit behind a lagoon. Hosts one of mainland Qatar's largest known concentration nesting sea turtles (Hawksbills).

D: Fuwairit spit sandflats and lagoonal mudflats. Extensive intertidal flats extremely important for migrant waterbirds; including several regionally scarce species and seasonally large numbers of habitat-specialized species.

E: Fuwairit Lagoon Wetlands. A tidal lagoon very similar to a typical Khor but including a shallow embayment, a large open expanse of water near its outlet (thus termed "coastal lagoon" in several publications and reports). Extensive mangroves grow along the riparian area; other such extensive areas of mangrove are found only at Umm Tais and at Jassasiya.

F: Fuwairit spit dunes; Low hummock dunes (1.5 m). Partially degraded but holding a small population of sensitive coastal breeding birds.

G: Peripheral sabkha of Fuwairit lagoon; Sabkha area periodically tidally flooded. Fragmented and parts in-filled by construction work of the new settlement of Fuwairit.

H: Fuwairit Jebel; rock desert habitat. Much trampling by SUVs and ORVs. Interesting flora, potentially of interest for other wildlife (flora, insects, herps, mammals). Of high scenic value.

I: Old abandoned settlement (Archeological Site); Partially fenced.

J: New Settlement. A small settlement that is unfortunately expanding and is placed within the tidal lagoon riparian area.

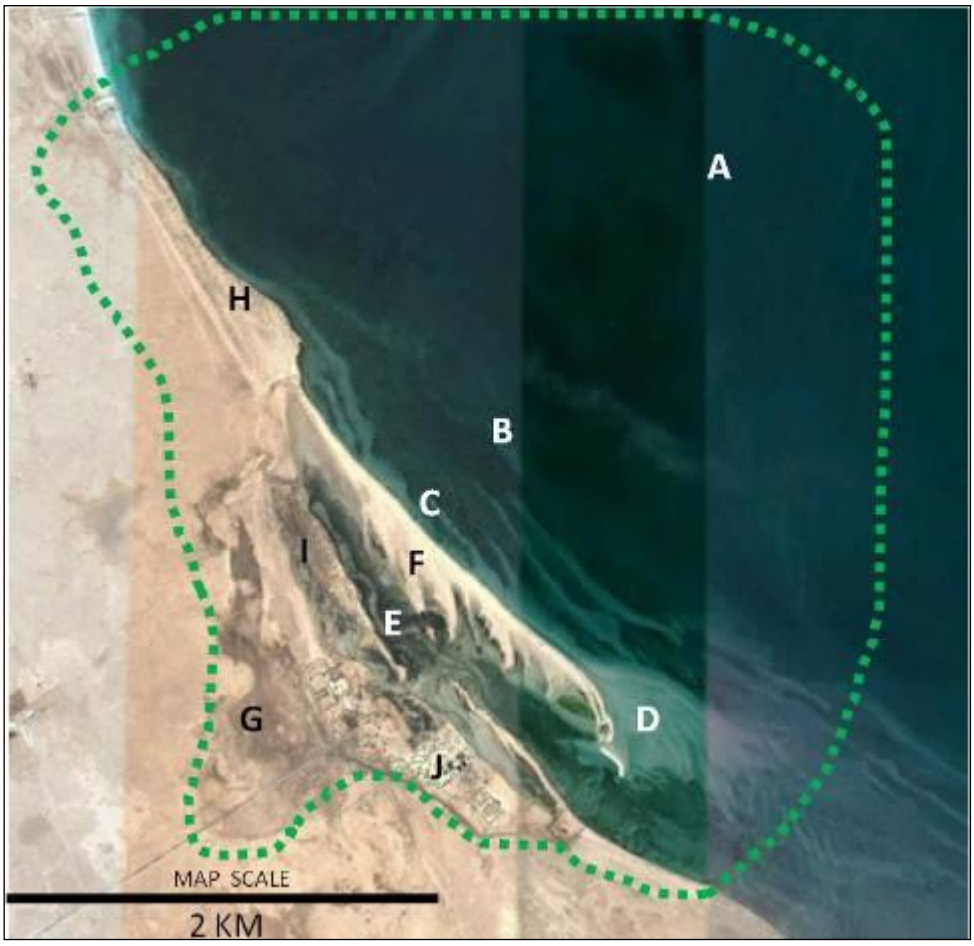

Figure 2. Initial Site Delineation of the Fuwairit Coastal Area (provisional) depicting generic landscape types: **A**: Deeper inshore marine waters (>4 m); **B**: Shallow inshore marine waters with coral rubble/gravels/sands and sea grass; **C**: Fuwairit Spit Beach; **D**: Fuwairit spit sandflats and lagoonal mudflats; **E**: Fuwairit Lagoon Wetlands; **F**: Fuwairit spit dunes; **G**; Peripheral sabkha of Fuwairit lagoon; **H**: Fuwairit Jebel; **I**: Old abandoned settlement (Archeological Site); **J**: New Settlement.

INITIAL OBSERVATIONS REGARDING SEA TURTLES

Fuwairit

- Fuwairit beach is apparently effectively fenced off during the sea turtle nesting season, preventing cars passing over incubating nests or disturbing nesting turtles. **This is an important and evidently successful conservation measure adopted by QU.**
- Fuwairit beach is patrolled during the night in a bubble-tyred beach buggy. This was observed to be sometimes driven at night with the headlights on and sometimes headlights off. QU fieldworker Mr. Shafeeq advised ALan Rees that he always drives with the lights off and it is the Ministry of Environment rangers that drive with the lights on.
- Fuwairit beach was not patrolled at regular hourly intervals through the night during the Biodiversity East (BE) field visit, which could lead to the potential for missing nesting turtles. However this may change based on tide conditions and time during the season, as nesting activity was low during the field visit.
- Fuwairit beach received one hawksbill nest during the time the BE team were in the field. Total nesting activity on the beach until 28th April was 3 nests and two non-nesting emergences (total 5 tracks). Mr. Shafeeq reported to the BE team the number of non-nesting emergences that had occurred prior to the arrival of the BE team.
- All three nests encountered on Fuwairit beach were transferred to a fenced off hatchery area on the beach, the reason given for relocating the nests was to protect them from high tides. The main hatchery structure was put in place on 24th April.

Umm-Tais

- One fresh hawksbill nest and three non-nesting emergences (total 4 tracks) were observed on 22 April by the BE team are the eastern-most part of Umm Tais. There was no evidence of any other beach monitoring activity taking place on the part of the Island covered.
- The easternmost part of the island was strewn with litter, ranging from plastic bottles to abandoned fridge-freezers, and in need of cleaning.
- Another, complete, survey of Umm Tais on 27 April revealed a further three hawksbill nests and 3 non-nesting emergences (total 6 tracks) and still no evidence of any other beach monitoring activity.

- On our 27th April survey we found a cleanup of the beach had started in the previous days. A part of the beach starting from the south-eastern end had been cleaned and garbage was collected in bags and piled ready for pickup. It should be noted that during spring and summer time beach clean ups should be avoided as they may seriously affect nesting mainly of birds and turtles.
- **Total of 10 tracks (4 nests and 6 non-nesting emergences**) recorded on Umm Tais during the BE field period. All tracks were left intact by the BE team.

Al-Marrouna

- Surveying this area on 25 April revealed the remains of a dead juvenile hawksbill on the beach. Cause of death could not be determined due to the incomplete and decomposed condition of the remains encountered. The shell fragments were collected.

Madinat Algharya (Ghariyah)

- One hawksbill nest was recorded during a survey of the area on 23 April (total 1 track).
- The nest had been dug out and eggs removed/destroyed, possibly by humans, as dog / fox prints were not evident around the nest area.
- After observing the nest the BE team, still at the site the BE team met two Ministry of Environment rangers in their vehicle who were patrolling the area and BE team advised them of the depredated nest.

Environmental Change at Fuwairit

Observation of environmental change involves documenting and interpreting changes in the natural features and elements of the landscape. Documentation of past conditions (even two or three decades ago) has not been published. This was researched through remote sensing and local observation of plant communities, geomorphological conditions and coastal processes along the Fuwairit coastal area. Figure 3 shows the best available satellite images that were utilized to explore issues of environmental change during a recent time-frame at Fuwairit.

Figure 3. Environmental change as perceive through best available Google Earth images from autumn 2006 and 2010 (see text below).

Certain perceptible changes at the landscape scale at the Fuwairit coast during a recent four-year period (see Figure 3) include the following:

- Sabkha with low halophilous vegetation seems to have expanded or become more robust in structure; this is evident from the “texture” of the vegetation in the more recent satellite images. Vegetation density and height are perceived as being more robust and denser on the 2010 Google Earth image. (This could be in relation to the increased quality of precipitation or other weather conditions or may be an indicator of vegetation regeneration. A regeneration may have occurred in response to less grazing pressure; this investigation needs more research for verification and interpretation).

- Mangrove vegetation has expanded in density and marginally in areal extent also. This cannot be a result of weather or other recent climatic conditions during recent years and may be a vegetation regeneration trend perhaps in response to less grazing pressure (this remains unconfirmed and existing survey work has not researched this issue).

- Buildings within the new settlement have expanded. Several new buildings have been developed in the “new settlement” area and along the beach towards Marrouna.

- Outside the “new settlement” area the number of buildings; major tarmac roads or other constructions are restricted.

- Coastal processes have not radically altered the lagoonal and spit formation during a four year period; this shows that there is a rather high degree of stability in the local coastal processes. No artificial structures have penetrated into the coastal fringe marine environment or the wetland area during the last four years.

Natural environment observations (on-site)

Mangroves

Potential indicators of vegetational regeneration of the mangroves is also evident from on-site observations and this may be due to a lack of livestock grazing (or other former pressures) that may have suppressed the plant community in the past. Research into this will be investigated since it is sometimes said that these and other mangroves away from Al Thakira and Al Khor have been recently planted or re-planted (this statement needs research and verification). Whatever the case, there are many mangrove trees that are higher than 4 m but most are still in shrub form and seem to be growing fast. Grazing of sheep and goats was observed only once and only close to Umm Tais. All

evidence point to a decline of grazing pressure at Fuwairit (no camel-sheep-donkey dung present; no extensive browsing or wood-cutting evidenced etc).

Sand dunes

Fuwairit's sand dunes are locally of high conservation interest however they have definitely been affected by off-road vehicle and SUV trampling in the recent past (and specifically during the winter seasons). These dues are not as degraded as others in the Ghariyah area or near the beaches of Dukhan, for example. At Fuwairit, two species of shrubby plants dominate in the dues and help the dunes hummocks stabilize and form tall hummocks. Initials observations show that the dunes of Fuwairit include hummocks that rise up to 1.5 m above the beach sandflat. Indicator species that utilize the dune and the dune fringe habitat for breeding include Saunder's Tern, Kentish Plover and Greater Hoopoe-Lark. It must be mentioned that during the last three years the erection of a fence keeps cars off Fuwairit spit from April to August each year; this is definitely an important development in the gradual implementation of conservation measures for the dunes; not only for the sea turtle nesting sites.

Tidal Lagoon

The tidal lagoon of Fuwairit is a remarkable feature that is now threatened by development (housing and roads) on the west riparian side (potentially expanding new settlement; etc). The old settlement, now a designated archeological site, has not been developed in any way and may help protect the inland fringe of the lagoon. Apart from the above threats the lagoon seems to be in very good condition. Fishing is a disturbance that may even affect turtles here. At the lagoon's outlet, fishermen frequently attempt to "close" the outlet mouth with a long gillnet. More research into the environmental condition of the lagoon and its associated wetland habitats in critical to the site's conservation management planning process.

C. MANAGEMENT GUIDELINES (INITIAL UNSTRUCTURED SUGGESTIONS)

Initial assessment and justification for promoting conservation measures

The coasts of Qatar have not been thoroughly assessed for their nature conservation values; international assessment procedures targeting biodiversity values such as Important Bird Areas plans (IBAs), or other criteria-based conservation evaluations are poorly developed (e.g. Evans 1994; General Secretariat for Development Planning 2009). In this section expert judgment and documentation from existing surveys are utilized (see Literature review and references). The area of NE Qatar is targeted. Adjacent and other coastal areas that were surveyed are used to initially assess and delineate the Fuwairit coastal area.

The conservation potential of the Fuwairit has been mentioned in at least one reference, a marine turtle nesting report in the recent past. Reference to the conservation evaluation of the site has been published in the past (Mehsin, 2008): “Indeed, this site should be considered by SCENR as a potential Nature Reserve given its importance to turtles, and the diverse flora and fauna the area encompasses”.

Criteria for delineating the proposed protected study area include the following:

- Ecosystemic integrity and ‘Naturalness’
- Rarity (species, assemblages, biocommunities, habitats, geological features, landscape)
- Wilderness quality
- Diversity / biodiversity
- Landscape-scale ecosystem connectivity

Initial Recommendations for protected-area status designation, delineation and management

There is absolutely no doubt the Fuwairit coastal area must be protected within a protected-area designation that should include among others, a marine, terrestrial and wetland area within a unified area. This area should have Natural Reserve status that includes controlled access, recreation and enjoyment by the public. We recommend this area should be classified under IUCN Category IV (known as habitat management and species management area). This protected area designation category focuses on specific areas of conservation in relation to an identifiable species or habitat that requires continuous protection rather than that of a wider natural feature such as a landscape monument or larger wilderness area or national park. IUCN Category IV protected areas will be sufficiently controlled to ensure the maintenance, conservation and restoration of particular species and habitats – possibly through traditional means – and public education of such areas is widely encouraged as part of the management objectives. Habitat or species management areas may exist as a fraction of a wider ecosystem or protected area and may require varying levels of active protection. Management measures may include (but are not limited to); the prevention of poaching, creation of artificial habitats (Lausche & Burhenne-Guilmin, 2011).

At the proposed “Fuwairit Coast Natural Reserve” specific targets features should be protected and managed.

- Ecosystemic integrity and ‘Naturalness’:

- Keeping the landscape area in a wider part to the beach in a natural state and ensuring the connectivity and natural ecosystem structure and function along the coastal area including the wider wetland area and alon the coast to the Fuwairit Jebel.
- Rarity
- Protecting and restoring the Sea Turtle nesting beach
- Wilderness quality
- Keeping some areas seasonally remote from human disturbance and alteration.
- Maintaining qualities of difficult access; managing visitor traffic.
- Diversity / biodiversity
- Protecting biodiversity especially sensitive plant and animal communities and visiting/staging and roosting assemblages of animal populations.
- Landscape-scale ecosystem connectivity
- Protecting a wider area beyond the turtle nesting beach; in this way conservation of ecosystem connectivity and various function are maintained.

Study Requirements

This report and the initial observations and suggestions are preliminary; specific studies need to be initiated to plan for an effective conservation area at Fuwairit. The following important studies are recommended.

- <u>Special Conservation Planning Study</u>

Fuwairit is not only an outstanding “turtle beach”; the area is of national conservation interest for a multitude of values. Most of these values pertain to the wider biodiversity at the landscape, habitat, populations and species scales. Other important values include its outstanding scenic, recreational and educational values. Conservation planning to promote a “park planning structure” within a natural reserve must be developed and justified within a scientific study. This must include zonation, management and enforcement issues etc.

- <u>Visitor Management / Ecotourism and Awareness Study</u>

This popular beach area is definitely threatened by being overwhelmed by visitors. It is certain that the number of visitors will continue to rise as has been the reported trend during the last five years. The beach is considered one of the most scenic areas in Qatar as expressed in the internet and various guidebooks. This rising threat of large numbers of visitors must be managed to accommodate both the recreational and

education opportunities offered by the site and the conservation of its biodiversity and natural heritage values.

Conservation management of the sea turtles

Several specific points concerning the management of sea turtles at Fuwairit need to be elaborated:

- Speed boats and Jet skis must be controlled during nesting and hatching seasons. Speed cannot exceed 6kn/h and distance from the coast (high tide line) should restricted to at least several hundred metres (depending on depth as well, element which has not been studied yet), in order to ensure safety for people and turtles.
- Annual monitoring of sea turtles is required and must continue in a standardized way. Monitoring should not disturb any part of the breeding cycle in any way.
- Educational experience through turtle watching at night must be strictly regulated. If it is controlled effectively it could become an important promotional and educational opportunity for both Qataris and visitors. The proposed Visitor Management / Ecotourism and Awareness Study must find solutions and organize this sensitive aspect of the areas natural values.

Habitat Conservation Priorities

Other issues:

Obviously these initial suggestions are not exhaustive; they are placed here to begin discussion on the important unmet need to develop planning and a specific initiative for protected area development at Fuwairit.
Other issues that are extremely important in protected area development at Fuwairit include:

- Beach clean-up projects should be completed by early March[1] and should start no earlier than September 1st (after the end of the Turtle hatching period).
- Provision for awareness and environmental interpretation. A building on the shore next to Jebel Fuwairit seems to be an excellent location for building an interpretation facility (i.e. Environmental Information Center or visitors center). Since fortunately few buildings or holiday homes or villas exist in the vicinity any

[1] The date of ending clean-up in late March is also promoted by Al Ansi (2008).

new structures should be clustered and focused on specific “honey-pot” areas (i.e. where visitors concentrate).

- Signage issues are being investigated in the short term in the present study; future information signs must be elaborated as well.

Other sites explored during the initial investigation

There is evidence, through some QU yearly reports that a state-wide sea turtle nesting beach survey was organized in 2005, but in order to establish clear trends and population assessment it is important that this exercise is repeated every few years.

West coast sites

Two beaches on the west coast, near Zekreet and Near Dukhan were walked. The Zekreet site is not suitable being a very large shallow area with extensive tidal flats. The Dukhan area is more interesting but disturbance by beach-goers, off-road vehicles has degraded the dunes and beaches. No evidence of turtles was found.

Figure 4. Sites explored for evidence of turtle nesting near Zekreet and Dukhan on 27 April 2013 (shown in yellow).

Ornithological Survey of Fuwairit's Coastal Habitats

Rationale

Birds are important for habitat conservation evaluation and are widely used to document various planning issues in proposed conservation areas (Zogaris 1999); however they are very poorly researched in Qater. In this case, a rapid assessment of the bird species richness and populations per habitat along the Fuwairit coastal area was executed in order to help asses constituent habitat conservation values. Statistical analysis of results will be completed in the forthcoming weeks; a short summary is presented here.

Method

A short-term survey was developed and executed; it obviously represents a rapid assessment only within a short window in time within the spring migration period. One experience ornithologist using binoculars (Zeiss 10x40 B) employed a modified transect method as described in Bibby et al. (1992). The survey technique adopted follows a transect along a 3.7 km route that was walked slowly with frequent stops on five separate days (always during flooded tide conditions). The survey start-point was the base camp at the north end of the beach and the route always begun from the mangrove side of the spit and folded-back along the beach. The spit conveniently provides an opportunity to effectively survey six generic habitat types effectively. Figure 5 shows the route (in blue) and the six generic habitats that were surveyed.

Figure 5. The transect route for the ornithological survey taken by one observer during five trials along Fuwairit spit. Six generic habitat types were surveyed effectively and within representative areal coverage for each habitat. The 3.7 km transect was walked slowly with frequent stops and took approximated 2.5 hrs to 3 hours.

Results of the Survey

A total of 53 species of birds were recorded on the Fuwairit Coast; and this represents the first list of birds for Fuwairit as documented by a professional ornithologist (many of the birds were also photographed to provide further documentation). This is a rather high number however it likely represents only a fraction of the bird species assemblage that migrate through the area; the species richness of the birds is rather high but typical of a broad front migration pattern dominated by migrant passerines and shorebirds. Most species concentrated on the mangrove and mudflat habitats (of the six generic habitats surveyed). Numbers of land birds were rather low but the species richness within the mangroves was very high (warblers, shrikes, and several widespread passerines). Numbers of seabirds and shorebirds were rather high (especially concentrating on the beach's spit cap and sandflats – a roosting site for flocks of Lesser-crested Terns and gulls). The intertidal mudflats of the lagoon are an important shorebird foraging area. Numbers of breeding birds were low as expected. The dunes and spit area are important for three sensitive breeding species Saunder's Tern, Kentish Plover and Greater Hoopoe-Lark. The survey results express the outstanding conservation value of the intertidal wetland of the lagoon and its mangroves. The

unique geomorphology of the beach's spit also attracts large numbers of shorebirds and seabirds. The survey technique employed was effective in giving initial impressions of relative habitat-use and specific species-habitat requirements. We recommend this survey technique be repeated to build a seasonal knowledge of bird conservation needs for Fuwairit in the future.

Miscellaneous Information from field natural history observations

Mammals

- Indian-pacific humpbacked dolphins *Sousa chinensis* (=*S. plumbea*) (6 individuals) were spotted and photographed about 2 km out at sea from Fuwairit Beach on 26 April 2013.
- The number of mammal tracks and spoor seen on the Fuwairit Dunes was limited and included primarily rodents. Domestic dog tracks were seen but no fox tracks were identified (fox are assumed to be important predators of sea turtle hatchlings).

Reptiles

Very few terrestrial reptiles were spotted behind the beaches. At Umm Tais a species of *Acanthodactylus* lizard was captured and photographed; Tracks of spiny-tailed lizard were also spotted on the Umm Tais dunes. It may be hypothesized that the lack or scarcity of lizards such as *Acanthodactylus* or others at Fuwairit or many other beach dunes may be due to severe trampling by SUVs. The presence of lizards on Umm Tais is another example of the many elements of natural integrity that the habitats show due to high degree of naturalness (not so prevalent on the mainland beaches).

Birds

59 species of birds were observed in Qatar during the initial research. The number is typical of the late spring migration period. However, with the exception of quantitative surveys at Fuwairit the documentation of birds utilized only incidental encounters and does not represent an wider ornithological investigation.

It should be said that during the duration of the mission no shots were noticed and no evidence of un-regulated shooting of migrant birds was witnessed in Qatar (this is in marked contrast to the situation in the northern Gulf, e.g. in Kuwait).

The following notable sightings were made and confirmed by an experienced team member with professional ornithological training:

- 1200 Socotra Cormorants moving 1.5 km offshore along Umm Tais (27 April 2013).
- Isolated or small groups of Socotra Cormorants were observed at Marrouna, Jassasiya, Gariyah, Umm Tais, and Dukhan.
- 380 Lesser-crested Terns roosting at Fuwairit Spit (27 April 2013).
- 300+ shorebirds (plovers, sandpipers, etc) at Fuwairit Spit.
- Osprey (singles) were spotted at Dukhan and Umm Tais.

Fish and Marine Invertebrates

- 7 species were observed within the tidal inlet of Fuwairit Lagoon. As the tide flows into the mudflat and mangrove fish spread throughout. The toothcarp *Aphanius dispar* is one of the first species to progress since it inhabits “refuge ponds” in the mangrove where it survives the tide-out period. Grey-mullets, breams, a *Mojarra* species and a needlefish species were observed. A characteristic fish here is the Target Fish (*Terapon jerbua*) and it was seen to infiltrate deep into the mangrove with the grey-mullet and toothcarp.
- Decapods abound in the tidal lagoon (swimming crabs *Portunes* sp. are common; Sand Bubbler Crabs abundant).
- At low tide very few fish species were observed in the shallows and seagrass beds immediately in front of the turtle nesting beach of Fuwairit (i.e. in the shallow <1 m depth). Five species were observed in 30 minutes of snorkeling here.
- One cuttlefish was observed; the beach is littered with “cuttlefish-bone” so they are presumably very common here.

Flora & Vegetation

- Mangrove vegetation was documented at Jassasiha, Fuwairit and Umm Tais. One mangrove tree *Avicenna* sp*.* was in full flower at Umm Tais and attracted scores of small insects and insectivorous passerines.
- The parasitic “broomrape” *Cistanche* sp. was flowering on Umm Tais (dozens seen).
- The variety of dune plant communities (with grasses, sedges, shrublets etc) behind the beaches was impressive. In most cases trampling by ORVs (=Off Road Vehicles) had destroyed natural structure. Best-preserved and most diverse beach dunes were seen at Umm Tais.

D. LITERATURE REVIEW

Literature relevant to Conservation in Qatar

A wider literature review on nature conservation reports and published materials has begun during the initiation stage of the project and will continue throughout the course of this project. The major targets of this literature review is to assess the specific interest and commitment in developing legislation for the identification, delineation, planning, and management of protected areas, species and ecosystems along Qatar's coast and in its marine environment. The recognition of the local context with respect to potential for conservation management is important providing an assessment and furthering specific management proposals.

Other than work concerning Sea Turtles (discussed below), other literature on protected species and/or protected areas in Qatar is very poorly developed and poorly disseminated in both the scientific and popularized literature. This has been repeatedly stated in several previous reports; even at the highest planning level (e.g. General Secretariat for Development Planning 2009). However, it is evident that the state of Qatar has been placing increasing emphasis on environmental conservation and protection but development in such important issues as protected-area planning, species management plans have progressed very slowly.

While there has been a steady evolution in the institutions handling environmental management in Qatar, limited institutional and human resource capacity, as well as gaps in related data and research, have constrained effectiveness. This is evident by the rather poor development of local literature on protected areas. Policy and regulatory controls have by and large not kept pace with the nation's rapid development. Few if any of the protected areas have management plans and very few related documents are available or have been disseminated.

Identified reports etc. containing data on sea turtles in Qatar

Entries in bold in the following list are published accounts potentially available to the public. Numbers in brackets indicate the data years presented in the document.

- **[01-02] Tayab MR, Quiton P. 2003. Marine Turtle Conservation Initiatives at Ras Laffan Industrial City, Qatar (Arabian Gulf). Marine Turtle Newsletter 99: 14-15.**
- [01-02] Tayab MR, Quiton P. Date Unspecified. Marine Turtle Conservation Initiatives at Ras Laffan Industrial City, Qatar (Arabian Gulf). Unpublished Report. 7pp.
- [02-03] ANON. Date Unspecified. Nesting and Conservation of Marine Turtles along the Coastal Areas of Ras Laffan Industrial City (Status Report- 2003). Unpublished Report. Ras Laffan Industrial City. 7pp.
- **[02-03] Al-Ansi MA, Al-Khayat JA. 2008. Marine Turtles in the State of Qatar. National Council for Culture and Heritage. 158pp.**
- [01-04] ANON. Date Unspecified. RLC Marine Turtles Conservation Program Status Report 2005. Unpublished Report. Ras Laffan Industrial City. 3pp.
- [05] IEMC Ltd, Pilcher N. Date Unspecified. Status of sea turtles in Qatar. Unpublished Final Report. 81pp.
- [05] ANON (Pilcher N?). Date Unspecified. Status of sea turtles in Qatar. Unpublished Report. 120pp.
- [06] Pilcher NJ. 2006. Provision consulting services for research monitoring and protection of sea turtles on north beach areas of Ras Laffan – 2006. Unpublished Final Report. 28pp.
- [07] ESC/QP. 2008. Development and Implementation of Conservation and Monitoring Project for Marine Turtles in RLC and in the State of Qatar. Unpublished Final Report. 78pp.
- [09] ESC/QP. 2009. Development and Implementation of Conservation and Monitoring Project for Marine Turtles in RLC and in the State of Qatar. Unpublished Final Report. 74pp.
- [10] ESC/QP. 2011. Development and Implementation of Conservation and Monitoring Project for Marine Turtles in RLC and in the State of Qatar. Unpublished Final Report. 81pp.
- [11] ESC/QP. 2012. Development and Implementation of Conservation and Monitoring Project for Marine Turtles in RLC and in the State of Qatar. Unpublished DRAFT Report. 88pp.

Observations on previous reported nest counts

- No data were retrieved for 2008 and 2012, with indications that no research was undertaken in 2008.
- It is not clear from the reports whether the reported ‘number of nests’ are strictly true in that they represent the number of clutches deposited by turtles at the different nesting areas and not the number of turtle tracks observed at each area. The total number of tracks (which would be greater than the total number of nests) has not been consistently reported since before 2009.
- Timing and frequency of surveys, on which nest counts are based are not presented in the reports, neither is any extrapolation method used for areas with infrequent surveying. The methods section of the ESC/QP reports (2008, 2009, 2011, 2012) reports are overly brief and hence uninformative.
- Some discrepancy in the magnitude of nesting activity is revealed upon reading documents from different years. This may be due to re-analysis of previous data but is not explained in the reports. The main discrepancy arising is between data reported by Al-Ansi & Al-Khayat (2008) and those in the ESC/QP reports (2008, 2009, 2011, 2012).

E. PREVIOUSLY UNDERTAKEN GENETIC ANALYSIS OF HAWKSBILL TURTLES NESTING IN QATAR

It is unclear whether further genetic analysis will be undertaken on existing tissue samples obtained by Qatar University during the current contracted fieldwork. Based on the methods and results presented in the yearly reports we believe that the most relevant and useful analysis of the tissue samples has not been undertaken and therefore the results are currently of limited use.

The genetic research, (subcontracted to Advanced Biotechnology Centre, Dubai, UAE) by QU has been to 'bar code' (COI) the individuals and not obtain the mtDNA haplotypes which are universally used and would aid in better analysis of population diversity and interconnectedness within Qatar, the region and globally. The reports provide simplistic observations that the analyzed samples indicate all the turtles were hawksbills which could and should be more simply and cheaply determined from observations of morphological characteristics of the animals from which the samples were taken.

Examples of more effective genetic analyses for hawksbills, in the Caribbean, are presented by Bass (1999) and Blumenthal et al. (2009). Within the Arabian Gulf hawksbills nesting in Iran have been processed using the preferred primers for mtDNA haplotyping (Tabib et al. 2011) but again the analysis does not present the standard haplotypes that can be globally compared and limits the publication from regional comparisons.

It seems there is a need for coordination or international collaboration on this topic in the Gulf to maximize the suitability of results from tissue sampling and genetic investigations for regional and global analyses.

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Tabib M, Zolgharnein H, Mohammadi M, Salari-Aliabadi MA, A. Qasemi, Roshani S, Rajabi-Maham H, Frootan F (2011) mtDNA variation of the critically endangered hawksbill turtle (*Eretmochelys imbricata*) nesting on Iranian islands of the Persian Gulf. Genetics Molec Res 10:1499-1503

F. PREVIOUSLY UNDERTAKEN SATELLITE TELEMETRY

Yearly reports show that QU have deployed 6 satellite transmitters (tags) in 2009, 5 in 2010 and 5 in 2011. No reports were found with information from 2012. These reports present simplistic overviews of the initial movements of each year's tagged turtles. Other basic data that may be obtained from tracking turtles, e.g. clutch frequencies (number of nests made by a turtle in a season) and internesting habitat use are not presented and to our knowledge have not been published or disseminated in any way.

To maximize the value of the data gained from these tags they need to be analyzed together by a person experienced in GIS and remote sensing techniques, to determine national-level insights into hawksbill turtles' behaviour and also preferably shared within the framework of the international hawksbill tracking project (coordinated by EWS/WWF in the UAE), in order to obtain a more regional understanding of the turtles' biology and ecology.

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H. APPENDIX

1) Fuwairit beach

Biodiversity East / Aris Vidalis

Biodiversity East / Aris Vidalis

Biodiversity East / Aris Vidalis

Biodiversity East / Aris Vidalis

2) Fuwairit Mangroves

3) Fuwairit signage and QU station

Biodiversity East / Aris Vidalis

Biodiversity East / Aris Vidalis

4) Rangers patrolling on Fuwairit beach with lights on (21 April 2013)

5) Friday – Saturday (26 - 27 April 2013)

6) Powerful floodlights pointed to the sea and camp fires (25 & 26/4/2013)

Floodlights on the house at the end of the beach were on the 23/4/2013.

8) 4x4 vehicle in the Jebel Fuwairit area at night

9) Sunday morning (before cleanup)

10) Sunday cleanup crew

11) Power boats and jetskis very close to the beach - almost constant presence

Biodiversity East / Ans Vidal

12) Kitesurfing

13) Beach activities, which can create further obstacles for turtles attempting to nest

14) Beach south of Gariya

15) Different beaches north of Gariya – full of car tracks

16) Recently destroyed nest north of Gariya (26.105N, 51.353E, 23 April 2013)

17) Umm Tais: car tracks even here

18) Umm Tais: recent nest (spotted on 21 April 2013)

19) Umm Tais: springtime beach clean-up (between 22 and 27 April 2013)

20) Protected area signage (between Shammal and Umm Tais)

21) Fishermen's interviews at Shammal port (21 April 2013)

22) Gargour at Shammal port