

# Birds of Wadi Sayq, Dhofar, Oman: British Exploring Society expeditions January–March 2012 and 2013

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The first thorough biological assessment of the Dhofar region was conducted in 1977/1978 by the Oman Flora & Fauna Survey and published as a special report in *Journal of Oman Studies* (Shaw Reade *et al* 1980). Since then the wildlife of Oman has become comparatively well known, with the bird fauna particularly well recorded and reported (Eriksen & Victor 2013). In contrast Wadi Sayq, in southernmost Dhofar close to the Yemen border, has received comparatively little scientific attention. Shaw Reade *et al* (1980) reported a number of new bird species records for Arabia in this area although the survey was limited to just three days. Since then, Wadi Sayq had not been assessed by a dedicated expedition. The British Exploring Society ([www.britishexploring.org](http://www.britishexploring.org)) led two expeditions, 2012 and 2013, to the area (Borrell & Ball 2012, Ball *et al* 2013), undertaking detailed surveys of a number of taxonomic groups including insects (Ball 2014), amphibians, reptiles, mammals and birds. Wadi Sayq is considered one of the greenest valleys in the Dhofar mountains and is comparatively less affected by human disturbance due to remoteness and inaccessibility than adjacent areas (Annette Patzelt & Hadi Hikmani pers comm February 2012).

Wadi Sayq is unusual in that it runs west–east, before finally turning south to meet the sea (Figure 1). From June–September this area is strongly influenced by the summer monsoon (Khareef), during which low cloud and mist form against the south-facing



**Figure 1.** Wadi Sayq and surrounding area, with survey locations from 2012 and 2013 identified. Inset map shows location of Wadi Sayq in the far south of Dhofar, Sultanate of Oman.

mountain slopes, depositing moisture and providing an interesting spatio-temporal combination of habitats within its catchment area. On each side the wadi rises steeply, to the south reaching c400 m asl and to the north almost 1000 m asl. Woody vegetation predominates on these slopes and gullies, consisting largely of *Acacia* and *Boswellia* species. Grasses and scrub cover the flatter environments of the valley shoulders and the gravel plains of the estuary are dominated by reeds, grasses and stands of *Phoenix dactylifera* palms. For a full description of wadi vegetation in southern Dhofar see Mosti *et al* (2012). A small number of permanent and temporary water sources, natural and man-made, occur in the wadi. Evidence of overgrazing from cattle and camels can be identified throughout much of the area. High levels of biodiversity across many different taxonomic groups were recorded by the expeditions, including the presence of the critically endangered Arabian Leopard *Panthera pardus nimr* and regionally endangered Arabian subspecies of Striped Hyena *Hyaena hyaena sultana* and Grey Wolf *Canis lupus arabs*. Here we report the abundance and diversity of bird species recorded in Wadi Sayq and assess the potential for conservation management of the area.

## METHODS

The expedition undertook fieldwork in Wadi Sayq (16° 43' N, 53° 20' E) during the dry winter months of January–March for a period of 30 days in 2012 and 29 days in 2013. Team members, equipment and supplies sufficient for the duration of the expedition were transported in by small fishing boats from the nearby village of Rakhyut, and landed on the beach at the mouth of Wadi Sayq, known locally as Khor Kharfot. Base camp was situated here on the flat gravel plain. The approximate survey area encompassed much of the Wadi Sayq catchment area (Figure 2), although this was constrained by the challenging terrain and difficulty in accessing many of the steeper tributaries. However every effort was made to adequately survey locations along the length of the wadi, to gain even coverage and an accurate representation of the habitats and species present. The distribution of survey points for both years in Wadi Sayq is shown in Figure 1.

Stationary point count survey methods were employed for several reasons. Firstly, the dense vegetation and rocky terrain meant moving through the wadi system was very difficult. Secondly, birds were often focused around specific features like water bodies or fruiting trees, and thus a prolonged survey time at these sites was favourable. Additionally, wildlife can take some time to re-emerge after being disturbed in the dense vegetation on the wadi sides and so a stationary survey method was most appropriate to record these individuals. Surveys were conducted by between three and nine observers of varying experience and proficiency from both the UK and Oman. However, all surveys were led by one of the authors of this study. The survey locations were marked by GPS and survey start and finish time recorded. The majority of surveys were one hour in length. Numbers of birds were recorded, with care taken to minimise repeat counts of the same individual(s) during the same survey. Care was also taken to accurately identify species. We ensured that birds were positively identified by at least two observers. Where this was not possible and we were unable to take a diagnostic photograph the observation was noted as unconfirmed. In addition to the formal surveys, incidental observations were also recorded. The same criteria for positively identifying species were used throughout. It should be noted that for some species, the same individual(s) may have been recorded in separate surveys, zones, or indeed in both years. Basemap imagery for the region was obtained and map generation conducted in ArcGIS Desktop v10.1 (Environmental Systems Research Institute ESRI, World Imagery basemap and the GIS User Community).

Table 1. Species recorded in Wadi Sayq over the course of both expeditions, 2012 and 2013. Arid upper reaches (AUR), Grassland plateaus (GP), Monsoon woodland (MW), Freshwater pools (FP), Estuarine pools (EP), Freshwater marsh (FM), Saline lagoons (SL), Beach (B). VU vulnerable, NT Near Threatened (IUCN status). Species richness is defined as the number of species observed. The percentage of the total is given in brackets. <sup>1</sup>Unconfirmed observations, <sup>2</sup>Incidental observation.

Species	Zone									Total
	AUR	GP	MW	WB	FP	EP	FM	SL	B	
Arabian Partridge <i>Alectoris melanocephala</i>	2	6	12	15						35
Northern Pintail <i>Anas acuta</i>							6			6
Eurasian Teal <i>Anas crecca</i>							1			1
Tufted Duck <i>Aythya fuligula</i>						3				3
Greater Flamingo <i>Phoenicopterus roseus</i>							12	11		23
Little Bittern <i>Ixobrychus minutus</i>					1					1
Black-crowned Night Heron <i>Nycticorax nycticorax</i>						1				1
Western Cattle Egret <i>Bubulcus ibis</i> <sup>2</sup>							1			1
Grey Heron <i>Ardea cinerea</i>					1	5	16	9	1	32
Purple Heron <i>Ardea purpurea</i>							2			2
Great Egret <i>Ardea alba</i>							3	4		7
Intermediate Egret <i>Egretta intermedia</i> <sup>2</sup>							1			1
Little Egret <i>Egretta garzetta</i>							11	2	1	14
Western Reef Heron <i>Egretta gularis</i>						1	2	8	9	20
Brown Booby <i>Sula leucogaster</i> <sup>2</sup>									1	1
Great Cormorant <i>Phalacrocorax carbo</i>							1	5	3	9
Western Osprey <i>Pandion haliaetus</i>							2	1	4	7
Short-toed Snake Eagle <i>Circaetus gallicus</i>		1	4	3	2	2			2	14
Greater Spotted Eagle <i>Clanga clanga</i> VU		1	2	2	5		1	2		13
Booted Eagle <i>Aquila pennata</i>				3	1		1			5
Steppe Eagle <i>Aquila nipalensis</i>							2		1	3
Eastern Imperial Eagle <i>Aquila heliaca</i> VU	1	5	5	7	2	2			1	23
Verreaux's Eagle <i>Aquila verreauxii</i>		9	3	35	2		4		1	54
Bonelli's Eagle <i>Aquila fasciata</i>		1	7	3		4	1			16
Eurasian Sparrowhawk <i>Accipiter nisus</i>		2					1			3
Hen Harrier <i>Circus cyaneus</i>				1			1			2
Pallid Harrier <i>Circus macrourus</i> NT				1						1
Black Kite <i>Milvus migrans</i>				3						3
Long-legged Buzzard <i>Buteo rufinus</i>		2		7		2		1		12
Steppe buzzard <i>Buteo buteo vulpinus</i>				2	2					4
Common Kestrel <i>Falco tinnunculus</i>		18	6	21	3	4	7			59

Species	Zone										Total
	AUR	GP	MW	WB	FP	EP	FM	SL	B		
Peregrine Falcon <i>Falco peregrinus</i> <sup>2</sup>									1	1	
White-breasted Waterhen <i>Amaurornis phoenicurus</i>						5				5	
Baillon's Crake <i>Porzana pusilla</i> <sup>2</sup>							1			1	
Common Moorhen <i>Gallinula chloropus</i>					2	7	4	6		19	
Kentish Plover <i>Charadrius alexandrinus</i>								14	15	29	
Common Snipe <i>Gallinago gallinago</i> <sup>1</sup>						1				1	
Common Greenshank <i>Tringa nebularia</i>							3	7	9	19	
Wood Sandpiper <i>Tringa glareola</i> <sup>2</sup>								1		1	
Common Sandpiper <i>Actitis hypoleucos</i>						4	11	18	9	42	
Sanderling <i>Calidris alba</i> <sup>1</sup>									5	5	
Little Stint <i>Calidris minuta</i>									5	5	
Pallas's Gull <i>Ichthyaetus ichthyaetus</i>						1				1	
Sooty Gull <i>Ichthyaetus hemprichii</i>							5		1	6	
Common Gull <i>Larus canus</i> <sup>1</sup>									1	1	
Heuglin's Gull <i>Larus heuglini</i>									8	8	
Lesser Crested Tern <i>Thalasseus bengalensis</i>							8			8	
Sandwich Tern <i>Thalasseus sandvicensis</i>								1		1	
Common Tern <i>Sterna hirundo</i> <sup>1</sup>									60	60	
Whiskered Tern <i>Chlidonias hybrida</i> <sup>1</sup>									2	2	
White-winged Tern <i>Chlidonias leucopterus</i>							24	3	9	36	
Rock Dove <i>Columba livia</i>		96	47	107	707	150	374	47	1	1529	
European Turtle Dove <i>Streptopelia turtur</i>				2						2	
Eurasian Collared Dove <i>Streptopelia decaocto</i> <sup>1</sup>			1							1	
Laughing Dove <i>Spilopelia senegalensis</i>		13	16	453	2	45	23			552	
Bruce's Green Pigeon <i>Treron waalia</i>			1	16	38	6				61	
Arabian Spotted Eagle-Owl <i>Bubo africanus milesi</i> <sup>2</sup>			1							1	
Common Kingfisher <i>Alcedo atthis</i>							5	1		6	
Green Bee-eater <i>Merops orientalis</i>				2						2	
Eurasian Hoopoe <i>Upupa epops</i>				2		1				3	
Black-crowned Tchagra <i>Tchagra senegala</i>		1	1	7						9	
Isabelline Shrike <i>Lanius isabellinus</i>		1				2	2	2		7	
Southern Grey Shrike <i>Lanius meridionalis aucheri</i> <sup>1</sup>				3						3	
African Paradise Flycatcher <i>Tersiphone viridis</i>	1	6	10	57	23	8	7			112	

Species	Zone									Total
	AUR	GP	MW	WB	FP	EP	FM	SL	B	
Brown-necked Raven <i>Corvus ruficollis</i>			5	8		5				18
Fan-tailed Raven <i>Corvus rhipidurus</i>	8	120	171	285	19	30	32	16	38	719
Singing Bush Lark <i>Mirafra cantillans</i>		2								2
Black-crowned Sparrow-Lark <i>Eremopterix nigriceps</i>							1			1
White-spectacled Bulbul <i>Pycnonotus xanthopygos</i>	8	40	77	415	221	121	36	4	2	924
Barn Swallow <i>Hirundo rustica</i>							7			7
Pale Crag Martin <i>Ptyonoprogne obsoleta</i>	10	51	68	187	17	53	21	9		416
Streaked Scrub Warbler <i>Scotocerca (inquieta) inquieta</i>		2								2
Unidentified Warbler <i>Sylviidae</i> sp					7	31	6			44
Willow Warbler <i>Phylloscopus trochilus</i>				2						2
Common Chiffchaff <i>Phylloscopus collybita</i>		7		3						10
Great Reed Warbler <i>Acrocephalus arundinaceus</i>					1	3				4
Clamorous Reed Warbler <i>Acrocephalus stentoreus</i> <sup>1</sup>						1				1
Graceful Prinia <i>Prinia gracilis</i>				1	1	2	3			7
Arabian Warbler <i>Sylvia leucomelaena</i>		1	1	2		1				5
Abyssinian White-eye <i>Zosterops abyssinicus</i>		24	22	202	19	42	3			312
Tristram's Starling <i>Onychognathus tristramii</i>	40	108	230	478	40	38	6	3		943
Rufous-tailed Scrub Robin <i>Cercotrichas galactotes</i>			1			1				2
Bluethroat <i>Luscinia svecica</i>				2		5	3			10
Semicollared Flycatcher <i>Ficedula semitorquata</i> NT					2					2
Blue Rock Thrush <i>Monticola solitarius</i>				1					1	2
Desert Wheatear <i>Oenanthe deserti</i>				1			4	1	2	8
Blackstart <i>Oenanthe melanura</i>	2	12	5	38	1	29	6			93
Arabian Wheatear <i>Oenanthe lugentoides</i>				3						3
Palestine Sunbird <i>Cinnyris osea</i>	1	6	27	114	4	17	2			171
Shining Sunbird <i>Cinnyris habessinicus</i>	1	9	19	132	6	13	1			181
Rüppell's Weaver <i>Ploceus galbula</i>				2		62	28			92
African Silverbill <i>Eudice cantans</i>				34		15				49
Western Yellow Wagtail <i>Motacilla flava</i>		3		1	4	5		13		26
Citrine Wagtail <i>Motacilla citreola</i>				1			19	5		25
Grey Wagtail <i>Motacilla cinerea</i>				1			4			5
White Wagtail <i>Motacilla alba</i>				2				3	8	13
Tawny Pipit <i>Anthus campestris</i>				1		6				7

Species	Zone									Total
	AUR	GP	MW	WB	FP	EP	FM	SL	B	
Long-billed Pipit <i>Anthus similis</i>								1		1
Tree Pipit <i>Anthus trivialis</i>						1				1
Arabian Golden-winged Grosbeak <i>Rhynchostruthus perivali</i> NT		4		2	4	13	2			25
Striolated Bunting <i>Emberiza striolata</i>		9	1	204	52	79	9			354
Cinnamon-breasted Bunting <i>Emberiza tahapisi</i>		49	17	286	89	77	24			542
Number of individuals recorded	74	609	760	3160	1278	904	760	198	201	7944
Species Richness (%)	10 (9.8)	30 (29.4)	27 (26.5)	49 (48.0)	30 (29.4)	44 (43.1)	52 (51.0)	28 (27.5)	28 (27.5)	102 (100)



**Figure 2.** Map of Wadi Sayq distinguishing different habitat zones and their distribution across the wadi landscape. Arid upper reaches (AUR), Grassland plateaus (GP), Monsoon woodland (MW), Freshwater pools (FP), Estuarine pools (EP), Freshwater marsh (FM), Saline lagoons (SL), Beach (B).

## RESULTS AND DISCUSSION

In total, 94 species were recorded within Wadi Sayq (Table 1), of these, seven resulted from incidental observations. A further eight may be considered unconfirmed as we were unable to obtain a diagnostic photograph, bringing the overall total to 102 species. Point surveys were conducted at 105 locations over two years (33 locations in 2012, 72 locations in 2013). Total survey time was 152 hours. Based on our exploration of Wadi Sayq and for the purposes of later discussion the survey area was divided into nine habitat zones. These



**Plate 1.** Arid upper reaches (AUR) looking north showing part of the road that crosses the upper reaches of Wadi Sayq. © James Borrell



**Plate 2.** Grassland plateaus (GP) to the south of Wadi Sayq. © Lawrence Ball



**Plate 3.** Monsoon woodland (MW) covering steep slopes in a central portion of Wadi Sayq. © Lawrence Ball



**Plate 4.** Wadi bottom and forest edge (WB) habitat in Wadi Sayq, consisting of large rocks and boulders with vegetation encroaching in places. © James Borrell

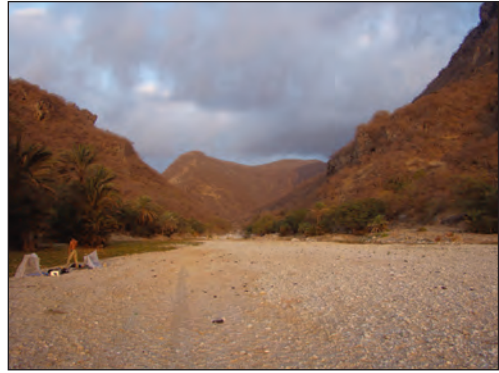
zones differed in habitat type, elevation and distance from the wadi mouth and their location is shown in Figure 2. Plates 1–9 illustrate these zones. Descriptions of the wadi habitats are given below with some notes on species of interest.

*Arid upper reaches* (AUR). The uppermost region of the wadi was surveyed at an elevation of *c*400 m asl. It is characterised by the meeting of the main wadi bed with part of a newly constructed road network (Plate 1). Although mostly arid, this area does contain a localised freshwater source creating a series of pools for *c*100 m with accompanying vegetation. The levels in these pools fluctuated every few days and occasionally dried up completely. The extent of this water source thus appears to be erratic, but nevertheless is of importance. The wadi bed is comparatively wide and the gradient of surrounding slopes is shallow in this area.

*Grassland plateaus* (GP). At higher elevations above the steep wadi sides the slope becomes much shallower and the vegetation structure more open (Plate 2). This habitat occupies the higher ground between the tributary valleys entering the main wadi from the north. Notable in this zone was the observation of a pair of Streaked Scrub Warblers *Scotocerca inquieta*, and a pair of Singing Bush Larks *Mirafra cantillans*. These species were not observed elsewhere in the wadi.



**Plate 5.** Freshwater pools (FP), Wadi Sayq, this photograph shows the largest of these. © James Borrell



**Plate 6.** Estuarine plain (EP), Wadi Sayq, looking north. © Lawrence Ball

*Monsoon woodland* (MW). Occupying steep and largely inaccessible limestone cliffs and valley sides, dense seasonal cloud forest is extensive throughout the lower parts of Wadi Sayq (Plate 3). Considering the scarcity of this habitat type in Dhofar and the Middle East as a whole, the extent in Wadi Sayq should be considered important. A notable observation was an Arabian Spotted Eagle-Owl *Bubo africanus milesi*. The difficulty in surveying this dense habitat means that many smaller species are likely underrepresented in our observations.

*Wadi bottom and forest edge* (WB). The Khareef results in large volumes of water passing through Wadi Sayq. As such there is very little vegetation in the valley bottom, and a reasonably well defined forest edge at the high water mark forming a boundary with zone MW (Plate 4). The wadi bed consists of boulders of all sizes, undercut caves and overhangs, gravel troughs and in some places small sand banks. Midway along the wadi is a semi-permanent artificial water source (80 m asl), consisting of a concrete trough supplied by a pipe from a village on the southern side of the wadi. This water source attracted many birds. In addition there is one further temporary pool which appears to persist for several months into the dry season on account of it being relatively deep and shaded. It also attracted a considerable abundance of wildlife. The highest bird abundance and high species richness were observed in this zone. We describe the last kilometre of the wadi bottom as it approaches the coast in greater detail in the zones below.

*Freshwater pools* (FP). Several large freshwater pools occur in the lower reaches of the wadi, c1 km from the coast (Plate 5). These likely emanate from an underground spring and represent the largest source of fresh water in the wadi. Reports from local people and our advance party in 2011 suggest they persist reliably year round although the water levels appear to fluctuate. Some relatively large trees were able to survive in this area including wild tamarind *Tamarindus indica* and fruiting fig *Ficus*. The firm ground makes this location highly suitable for cattle to drink, with the resident herd observed to visit this area regularly. Thus only very small stands of vegetation were able to persist in the deepest and most inaccessible areas. The latter areas were found to show relatively low species diversity but common species such as White-spectacled Bulbul *Pycnonotus xanthopygos*, Abyssinian White-eye *Zosterops abyssinicus* and Laughing Dove *Spilopelia senegalensis* were highly abundant, feeding on the fruiting fig trees. Raptors were seen to alight on the edge of the pools to drink or bathe (not observed at any of the other water sources in the wadi).





**Plate 7.** Freshwater marsh (FM) habitat, Wadi Sayq, showing prolific grazing by resident cattle. © Lawrence Ball



**Plate 8.** Saline lagoons (SL), Wadi Sayq, with *Phoenicopterus roseus* and some expedition members. © Lawrence Ball

*Estuarine plain* (EP). A large, mostly unvegetated gravel plain east of the freshwater pools; likely entirely submerged during the Khareef (Plate 6). Many of the species observed here would normally be associated with the marsh or lagoon habitat nearer the sea, however the ease of view and comparatively concealed marsh habitat, meant they were observed here. In patches of shrub habitat regular observations were made of Arabian Golden-winged Grosbeak *Rhynchostruthus percivali*, however no more than four individuals were ever observed on a single occasion. Rüppell's Weaver *Ploceus galbula* was also common here.

*Freshwater marsh* (FM). The freshwater marsh is fed by a perennial spring that originates from the eastern slope, and is smaller in extent than that of FP (Plate 7). This creates a very narrow channel of marshy habitat extending c120 m towards the coast where it meets the saline lagoons (SL) and the habitat type alters. Reeds persisted throughout the marsh, but most were extremely short due to grazing pressure; a high abundance of insect prey was also identified through the multidisciplinary surveys. Considering the small extent of this habitat, and the extensive grazing and trampling damage, it is surprising that more than half of the species observed in the wadi were recorded here. Notable species included Greater Flamingo *Phoenicopterus roseus*, Purple Heron *Ardea purpurea* and Baillon's Crake *Porzana pusilla*. A White-breasted Waterhen *Amaurornis phoenicurus* was observed, and was



**Plate 9.** Beach (B)—looking east across the mouth of Wadi Sayq. © James Borrell

thought to be nesting amongst reeds. Even towards the end of the second expedition, new species for this study continued to be recorded here.

*Saline lagoons (SL).* A pair of brackish lagoons occur behind the beach. These are shallow and regularly flooded during high tides, and also fed by fresh water from zone FM (Plate 8). *Typha* and *Phragmites* were present, but similarly short due to grazing pressure. Unsurprisingly, numerous coastal species were observed here. Single individuals of Wood Sandpiper *Tringa glareola* and Long-billed Pipit *Anthus similis* were also observed.

*Beach (B).* The final zone where the wadi mouth meets the coast is known locally as Khor Kharfot, and is characterised by a beach c1.5 km in length flanked by cliffs along the back and to either side (Plate 9). An osprey nesting site was found in this area, and several raptor species were believed to have nest sites in the inaccessible cliffs. Due to the difficulty in approaching many of the birds in this zone, it is likely that the species here were under surveyed.

A comparatively much higher level of diversity was observed at zones EP, FP, FM, SL and B than throughout the remainder of the wadi, 88 species compared to 56 species, respectively. This highlights the importance of the estuarine plain for diverse avifaunal communities during the dry winter months. Sixteen raptor species, three of which are listed in threatened categories by the IUCN, were recorded during this research, a substantial number in just a single wadi system. Its numerous tributaries, sheer cliffs, variety of habitats, vast size and low level of human disturbance enable these species to coexist either as breeding residents or overwintering individuals. Rock Hyrax *Procapra capensis* and Arabian Spiny Mouse *Acomys dimidiatus* constitute an abundant prey base (recorded through complementary surveys) as well as the numerous small passerine birds and partridge. Only 500 breeding pairs of the Arabian Golden-winged Grosbeak *Rhynchostruthus percivali* are expected to be present in Oman (BirdLife International 2012). It is an Arabian endemic listed as near threatened experiencing population declines due to degradation of woodland habitat and now only occurs in small scattered populations (Fry & Keith 2004). Its occurrence within Wadi Sayq is therefore noteworthy.

The data demonstrates that Wadi Sayq supports a rich diversity and abundance of avifauna, representing a considerable proportion of the species recorded from Oman (20%), although populations of many species appear to be small and localised. The data highlights the influence of water sources during the dry winter months, which appear to draw in large numbers of birds. It is also encouraging to note the secondary benefits afforded to wildlife by the artificial livestock water trough midway along the wadi bottom (WB). Here a large number of birds utilised this water source throughout the day with an average of 106 birds recorded per hour, peaking at dawn and dusk. Thus the presence of pastoralism results in both positive and negative impacts. Zones EP and FM are currently undergoing unsustainable degradation due to overgrazing from livestock, thus resulting in destruction of critically important habitats. We hypothesise that if livestock could be excluded from just the most sensitive habitats, then the positive effects on these sites would be seen within a year followed by increased avifaunal populations and richer communities. It should also be noted that a road development has been proposed along the coast, from Rakhyut to Dhalkut, across the wadi mouth at Khor Kharfot. This can be anticipated to result in significant disturbance, by increasing the accessibility to an area of high biological importance. This has rightly been opposed by the authorities, but may still pose a risk in the future. There are currently no conservation measures protecting Wadi Sayq, thus considering the value and importance of this site, we recommend that this be addressed as soon as possible.

## ACKNOWLEDGEMENTS

The authors wish to gratefully acknowledge the support of the British Exploring Society and the Office for Conservation of the Environment, Diwan of Royal Court, Oman in undertaking this study. Special thanks also go to the Anglo-Omani Society, Shell Development Oman LLC and the Sandy and Zorica Glen Charitable Settlement for their generous financial support. Furthermore, we thank Chris Sweetman for assistance in bird identification and Terry Fones, Soo Redshaw and Andrew Stokes-Rees for supporting field logistics. We thank all the members of the expeditions. 2012: Terry Fones (chief leader), Soo Redshaw (deputy chief leader), Tino Solomon (expedition doctor), Chris Sweetman (base camp manager), Callum Jones, Elliott Simpson, Emma Docherty, Faye Collis, George Hammerton, Giles Keun, James De Wolff, Kiran Govind, Leo Buscombe, Oliver Troen, Paul Lorimer, Stevan Ye. 2013: Soo Redshaw (chief leader), Ian Steptoe (deputy chief leader), Harriet Charles-Jones (expedition doctor), Ken Josey (adventure leader), Alasdair Robertson, Amy Bennett, Ashley Templeton, Ben Howlett, Ceres Barros, Constantin Kirwan-Taylor, Holly Winsler, Howard Hartley, James Garry, James Hampson, Matt Lain, Michael Munson, Natalie Gilders, Rachael Lawler, Richard Goodacre, Sean Ketteringham, Sophie Drew and Toby Skales.

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