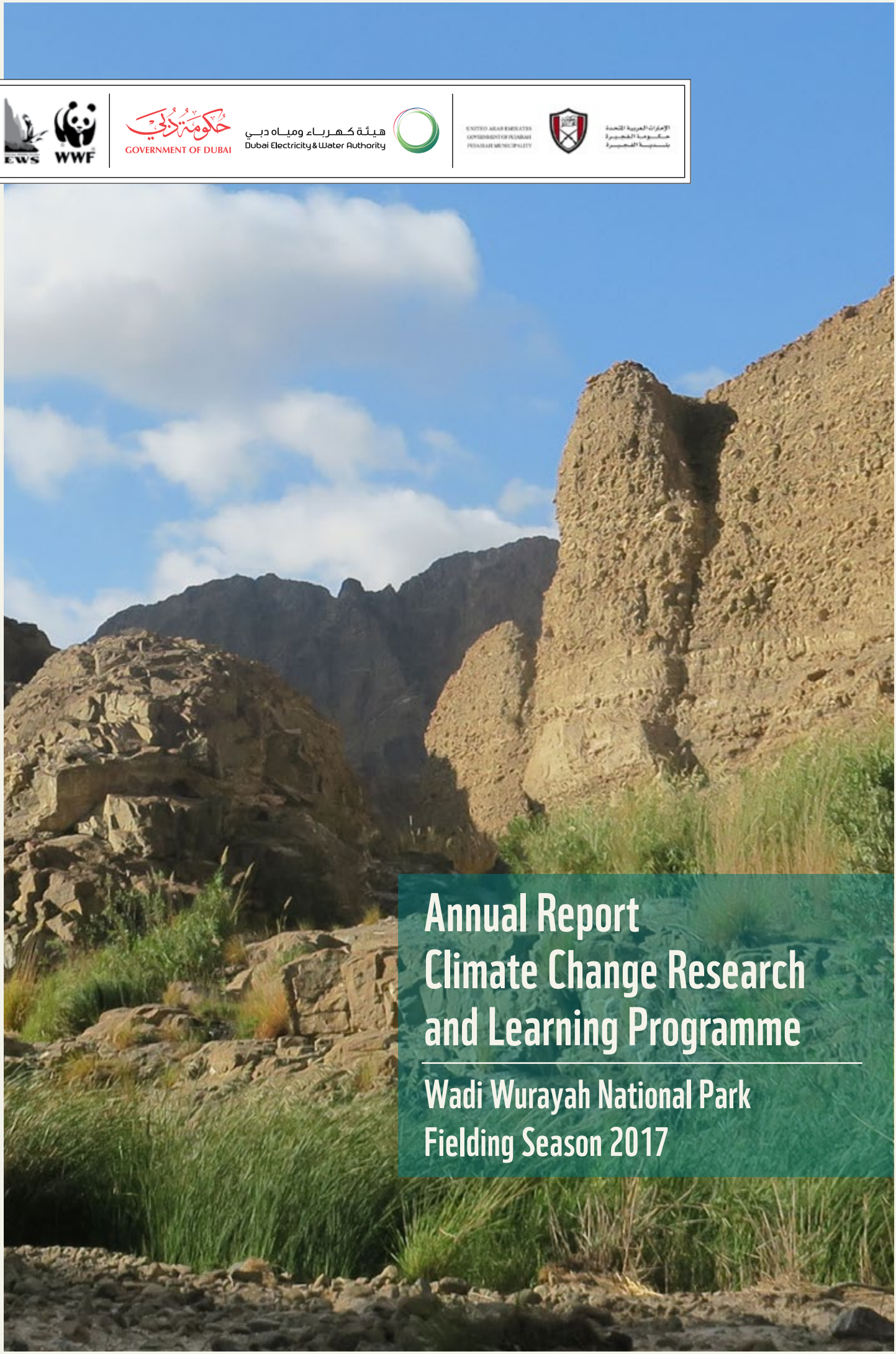

Annual Report
Climate Change Research and Learning Programme

Wadi Wurayah National Park
Fielding Season 2017

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PROJECT PARTNERS

Dubai Electricity and Water Authority (DEWA)

The Dubai Electricity and Water Authority (DEWA) was formed on 1 January, 1992 by a decree issued by His Highness Sheikh Maktoum bin Rashid Al Maktoum to take over and merge the Dubai Electric Company and the Dubai Water Department which had been operating independently for several years. Both these organizations were established in 1959 through the foresight and initiative of H. H. Sheikh Rashid bin Saeed Al Maktoum, the late Ruler of Dubai, as government supported bodies with the objective of availing an adequate and reliable supply of electricity and water to the people of Dubai. Today, DEWA is an inspiring success story known for its efficiency and reliability in every facet of its operations. Constant planning and forecasting to meet the growing demands of its customer has always been DEWA's well entrenched philosophy. Owing to this policy, the Authority has come a long way in serving customers, thereby making its own contribution to the economic growth of Dubai. DEWA employs a workforce of about 8,900 employees who constantly endeavour to see that both the quantity and quality of services provided are of the highest standards in consistency and reliability.

Fujairah Municipality

Fujairah Municipality is a strategic partner and driver of the Wadi Wurayah National Park development. Its mission is to provide advanced infrastructure, a sustainable environment, and excellence in services to the people of Fujairah.

Emirates Wildlife Society - World Wildlife Fund (EWS-WWF)

Emirates Wildlife Society-World Wildlife Fund (EWS-WWF) is a non-governmental UAE environmental organization established under the patronage of H. H. Sheikh Hamdan bin Zayed Al Nahyan, Ruler's Representative in the Western Region and chairman of Environmental Agency - Abu Dhabi (EAD). Since its establishment, EWS has been working in association with WWF, one of the largest and most respected independent global conservation organizations, to initiate and implement environmental conservation and education projects in the region. EWS-WWF has been active in the UAE since 2001, and its mission is to work with people and institutions within the UAE and the region to conserve biodiversity and tackle climate change through education, awareness, policy, and science-based conservation initiatives.

ANNUAL REPORT
CLIMATE CHANGE RESEARCH AND LEARNING PROGRAMME

Wadi Wurayah National Park
Fielding Season 2017

1. INTRODUCATION TO THE CLIMATE CHANGE RESEARCH AND LEARNING PROGRAMME (CCRLP)

This annual report summarizes the activities of the Climate Change Research and Learning Programme (CCRLP) from the period of January to December 2017 and gives an analysis of the data collected during this period. CCRLP is an ongoing water-focused programme that is being conducted over a four-year period.

CCRLP is the outcome of cooperation between Emirates Wildlife Society-World Wildlife Fund (EWS-WWF), Dubai Electricity and Water Authority (DEWA), and Fujairah Municipality. The programme addresses how changes in environmental conditions affect the species and habitats of delicate, interconnected freshwater ecosystems.

The aim of the programme is to equip individuals with a hands-on, deep understanding of the most pressing issues facing climate change, both regionally and internationally, through a series of lectures, discussion sessions, research activities, and field work under the supervision of environmental experts.

EWS-WWF has been working in partnership with Fujairah Municipality since 2006 towards the conservation of Wadi Wurayah National Park. The Water Research Centre at Wadi Wurayah National Park was established in 2013 to focus on the study of biodiversity and water conservation. The research participants contributed towards establishing a relevant and appropriate conservation strategy for all species existing in this fragile and unique landscape.

The programme enabled DEWA staff to spend five days in Wadi Wurayah where they conducted scientific research to understand the impact of climate change on biodiversity in the UAE. Participants not only learned about climate change, freshwater resources, and the flora and fauna of Wadi Wurayah National Park, but also conducted research and contributed significant data to be used in future conservation work for the wadi. Participants located 240 trees on Google Earth, measured and tagged 16 trees in the field, captured and tagged 19 dragonflies, performed 83 water-quality tests on 16 different water variables, and collected and measured 43 toads in the field. These significant efforts provided invaluable data that our scientists would not otherwise have had the capacity to collect, leading to the creation of a unique database of great scientific value.

2. GOALS AND OBJECTIVES OF THE PROGRAMME

Climate change profoundly reshapes the ecological balance of our environment and affects our daily lives. Through the Climate Change Research and Learning Programme (CCRLP) we aim to provide participants with baseline knowledge of what climate change is and the reasons why these changes to our climate need to be addressed to ensure our future livelihood. The programme offers an understanding of the unique challenges being faced in this region, along with a perspective on how climate change affects the lives and the interests of businesses. Through fieldwork, participants also connect to broader environmental issues that relate to climate change and its effect on fresh water ecosystems. This research is vital for the development of policies and regulations based on relevant scientific knowledge.

The programme's key objectives are as follows:

- Provide an understanding of climate change issues locally and globally.
- Motivate and enable participants to educate others around climate change issues and formulate possible solutions.
- Deliver important research data that contributes to ecosystem research inside Wadi Wurayah National Park.
- Inspire participants to become advocates for change.
- Increase scientific understanding of Wadi Wurayah National Park.
- Offer firsthand experience of field and scientific research.

3. LOCATION

3.1 WADI WURAYAH NATIONAL PARK, FUJAIRAH

Wadi Wurayah is located in the Al Hajar Mountains in the emirate of Fujairah, United Arab Emirates. It lies within a priority WWF Global 200 Ecoregion (Ecoregion 127, Arabian Highlands and Shrublands). This exceptional location — known for its rare and permanent flora, fauna, and freshwater resources — has been identified as a significant ecosystem for preservation. In 2006, Fujairah Municipality, the Government of Fujairah, and EWS-WWF joined forces to assess the biodiversity of the wadi and its merit for conservation. This important step was funded by HSBC Bank Middle East Ltd and was supported by other partners.

The fragile ecosystem was deemed extremely important for conservation. In March 2009, Wadi Wurayah was declared the UAE's first Mountain Protected Area by Decree No. 2, signed by H. H. Sheikh Hamad bin Mohammad Al Sharqi, Supreme Council member and ruler of Fujairah. This area covers 129 km² among the towns of Khor Fakkan, Dibba, and Masafi.

Wadi Wurayah is critical to environmental and cultural preservation. The area shelters a rich diversity of rare, endangered mountain and freshwater habitats, and species. It also provides opportunities to revive and support local livelihoods.

The geology of the area has allowed for a unique hydrogeological system where run-off water from the upper catchment emerges as springs at places where layers of impermeable and permeable rock meet. Nine different freshwater habitat types are found here, ranging from riffle to stream to waterfall. All are spring-fed throughout the wadi with alternating underground and surface water flows.

In 2010, Wadi Wurayah National Park officially joined the list of over 2,000 wetlands around the world that were declared as international importance by the Ramsar Secretariat. It is the second Ramsar site in the UAE (site number 1,932) after Ras al Khor Wildlife Sanctuary in Dubai.

There are 218 species of plant that grow in the area, including the country's unique orchid, *Epipactis veratrifolia*, as well as numerous other wetland species.

Nineteen species of mammal have been recorded, four of which are now locally extinct: the Arabian wolf (*Canis lupus arabis*), the mountain gazelle (*Gazella gazella cora*), the Arabian leopard (*Panthera pardus nimr*), and, most presumably, the Arabian tahr (*Arabitragus jayakari*).

Populations of Blanford's fox (*Vulpes cana*), Brandt's hedgehog (*Paraechinus hypomelas*), and Caracal (*Caracal caracal schmitzi*) are still thriving.

Recorded to date are 109 species of bird (of which 36 are resident species, 42 migrant, 23 wintering, and 3 vagrant).

The wadi hosts 17 reptile and amphibian species, of which five are endemic to the UAE and northern Omani mountains. The Garra fish (*Garra barreimiae*), considered endangered by the IUCN, is also found in the wadi.

The wadi hosts 215 invertebrate families. More than 85 of these are insect species are new to science and include four water-dependent mayflies (*Ephemeroptera*).

So far, 29 heritage sites have been recorded, including Bedu settlements, ancient Islamic graveyards, pre-Islamic tombs, and a petroglyph (rock carving) site. Social surveys of resident and non-resident local people show positive responses to the creation of this protected area.

In 2013, the Government of Fujairah gave EWS-WWF the mandate to establish the Wadi Wurayah National Park.

The park is currently closed to visitors to preserve its fragile natural ecosystems. However, it is home to the Water Research Centre and hosts various Research and Learning Programmes.

3.2. THE WATER RESEARCH CENTRE

The Water Research Centre (WRC) opened in 2013. Its objective is to provide a venue for training and research activities that advances awareness and scientific knowledge of freshwater resources in Wadi Wurayah National Park. It was launched under the partnership of EWS-WWF, HSBC Bank Middle East Ltd, Earthwatch, and Fujairah Municipality, and funded by HSBC Bank Middle East Ltd.

A village of portable cabins is located at the entrance of Wadi Wurayah National Park. It includes accommodation for staff and volunteers, a learning room, an outdoor classroom, an environmental lab, offices, and a common area that includes a dining room, a kitchen, and a mosque. An on-site majlis also offers participants a place to relax, share stories, play games, and discuss the day's events. The village enjoys unobstructed views of the mountains and is surrounded by a large, fenced expanse of land.

In their free time, participants explored the area and observed local species. Indigenous Sidr (*Ziziphus spina-christi*) and Samar (*Acacia tortilis*) trees provide shelter for many of the park's insects, reptiles, and amphibians, among other organisms.

As the first of its kind in the region, the WRC aspires to be the premier water research and learning centre in the Middle East. It hopes to inspire local and regional communities to preserve freshwater resources and ecosystems for current and future use, and to create awareness of climate change issues.


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4. PROGRAMME STRUCTURE

Each five-day programme is designed and led by EWS-WWF, and consists of both field research and in-class theoretical lectures.

4.1 LEARNING SESSIONS

Field research is supplemented by daily indoor-learning sessions to give participants a broad-based education on regional and global climate change issues, equip them with skills and knowledge to enable them to share their insights with colleagues, friends, and family.

These facilitated sessions are designed to support learning in the field. They are interactive, collaborative, and dialogue-based. In addition, they focus on the scientific basis of climate change, explore mitigation and adaption measures, as well as its impacts on different industries and ecosystems. Participants are encouraged to explore the business risks and opportunities presented by climate change specific to the Middle East.

By the end of the journey, the combination of theoretical learning and time in nature left DEWA participants with a personal purpose and a vision for changing habits and raising awareness.


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4.2. RESEARCH AND MONITORING PROGRAMME

Research at the Water Research Centre (WRC) is coordinated by EWS-WWF for the management of Wadi Wurayah National Park and contributes towards helping the park establish an effective conservation strategy.

The main objectives of scientific research conducted at the WRC are as follows:

- Population monitoring studies of key species: adequate knowledge about seasonal and annual variations in plant and animal populations required to assess and monitor population trends and implement appropriate management measures.
- Ecological studies: Little is known of the natural history of many of the species dependent on the streams and pools of the wadi. Basic information such as the breeding season, activity rhythms, habitat, and food preferences remain unknown. Life history parameters that include productivity and survival rates, along with ecological requirements such as optimal temperature tolerance, are valuable discoveries when attempting to model the effects of environmental changes on wildlife populations.
- Monitoring surface water parameters in relation to the abundance of water-dependent organisms: Most fauna in WWNP is dependent, to some extent, on the presence of surface water which is present throughout the year in a few places. However, the extent varies greatly year to year, depending on the amount of rainfall. Monitoring water quality parameters over several years helps us understand how changes in environmental conditions affect variations in wildlife populations.
- Identifying threats and taking action: WWNP has largely been preserved due to its remoteness. However, one road into the area previously provided visitor access to the main waterfall yet these visits resulted in graffiti, littering, pollutants, and degradation of vegetation. A broad range of other factors threaten the fauna and flora, including over-grazing, disease, exotic species, climate change, poaching, and the harvesting of vegetation. These threats are seen in similar ecosystems all around the Middle Eastern region and are of real relevance.

Assessing these threats and understanding how they impact the wadi's natural systems are the ultimate objectives of research conducted at the WRC.

The WRC invited researchers from around the world. DEWA volunteers assisted research scientists with field research aimed at further comprehending the anthropogenic effects on habitats. Moreover, this weekly gathering aimed to preserve and secure water pools and streams that are vital lifelines to an entire ecosystem.

All participants received training in the research tasks. This included indoor sessions prior to the fieldwork as well as first-hand experience in collecting data under the supervision of our scientists. Research assignments did vary from team to team, but included some, or all, of the following:

4.2.1. Water Quality Testing

MOST BIODIVERSITY, IF NOT ALL, DEPENDS ON THE AVAILABILITY AND THE QUALITY OF THE WATER AT WADI WURAYAH. ANY DISTURBANCES CAN HAVE EFFECTS ON THE HEALTH OF THE ECOSYSTEM OVERALL.

Monitoring water quality is a fundamental component to wetland management and ecosystem health. Fresh water sustains biodiversity because a wide range of ecosystem services is directly linked to it. At Wadi Wurayah National Park, most of the species, if not all, depend on the availability of this resource and any alteration to the water quality can have effects on the health of the ecosystem overall. For that reason, EWS-WWF has developed a monitoring programme that has been carrying out since 2013 to understand the variations of different freshwater parameters. By knowing the range of natural variations in these parameters, thresholds can be defined and consequently set alert levels on the ecosystem's health.

The purpose of the monitoring programme is to determine the physicochemical parameters of different waterbodies in Wadi Wurayah and to understand their natural spatiotemporal variations that will allow for the determining of threshold values and variations, and ultimately orientate management decisions.

DEWA volunteers measured water quality parameters in the field using handheld instruments and collected water samples to take to the laboratory for analysis. Freshwater tests included counts of total hardness, alkalinity, nitrogen cycle, phosphates, iron, chloride, bacteriological analysis (Coliforms and E.coli), BOD (biological oxygen demand), and zooplankton.


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4.2.2. Toad Population Studies

AMPHIBIANS PLAY NO SMALL ROLE IN ENHANCING OUR LIVES. THEY PROVIDE VITAL BIOMEDICINES, REPRESENT A LINK IN THE FOOD CHAIN, AND - THANKS TO THEIR THIN, POLLUTION-SENSITIVE SKIN - HELP US MEASURE THE ENVIRONMENT.

Wadi Wurayah is inhabited by the only two species of native amphibians in the UAE; the Arabian toad (*Sclerophrys arabica*) and the Dhofar toad (*Duttaphrynus dhufarensis*). Both species are listed as least concern by the International Union for Conservation of Nature. However, their ecological differences might expose their populations to varying environmental changes induced by global warming. Due to differences in their habitat use and breeding biology, the Arabian toad is much more frequently encountered in Wadi Wurayah than the Dhofar Toad. It is the focus of our research to understand the ecological characteristics of their populations.

Toad point counts have been regularly carried out for five years at nine locations throughout the wadi to monitor their population variations. In parallel, a capture-mark-recapture study is conducted to assess population size, and survival.

DEWA volunteers counted toads within a radius of 10 metres from the water. After capturing a toad, researchers measured the lengths of its rear legs and body, and weighed it. Toads bigger than 40 mm were tagged using PIT (Passive Integrated Transponder) tags, before being released. This research helps build morphometric data for future analysis and helps us further comprehend the ecology of the species. Monitoring toad populations can also act as indicators of water quality.

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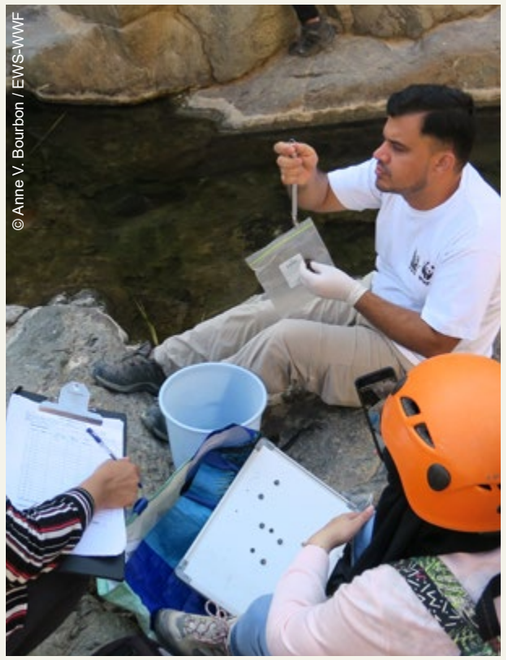
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4.2.3. Dragonflies and Damselflies Population Studies

ABOUT 70% OF THE ODONATA LIFESPAN OCCURS IN THE WATER. THIS MAKES THEM RELEVANT AS BIO-INDICATORS OF WATER QUALITY; A DRASTIC CHANGE IN THEIR HABITAT CAN JEOPARDIZE THEM AND MANY OTHER SPECIES THAT RELY ON THEM.

Dragonflies and damselflies are part of the Odonata order. These animals are often used as health indicators of freshwater ecosystems. Species diversity and abundance in odonate communities are generally considered a good gauge of water quality because odonates depend on water throughout their lifecycle (Corbet 2004). Each species has a different level of tolerance to environmental conditions, such as water temperature, dissolved oxygen, and pH.

Out of the 30 odonate species known in the UAE, 25 have been recorded in Wadi Wurayah; a positive indicator of health and water quality of the freshwater ecosystem. This played a key factor in Wadi Wurayah being granted the status of National Park and Protected Area and being declared a Ramsar site.

DEWA participants performed dragonfly and damselfly point counts in nine locations of the wadi. One of the most abundant dragonfly species in the wadi, *Trithemis arteriosa*, was selected to conduct a capture-recapture study to assess the species' survival and dispersal rates, life expectancy, and population abundance.

Dragonflies were captured with butterfly nets and pinned without harm to a magnetic board where numbers were written on their upper right wings. When tagged dragonflies were sighted, participants recorded the distance between tagging and re-sighting locations, as well as the number of days between the two events.

Participants also collected the cast-off outer skin of the dragonflies and damselflies to be identified at the lab then added to the collection.

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4.2.4. Bird Monitoring

Bird presence in Wadi Wurayah has been recorded for several years. However, there was need for a system that would allow population trends to be assessed over a long period of time. EWS-WWF initiated this in early 2017; the aim, to make it possible to assess variations in species diversity between the years from presence-absence data.

Distance sampling in different bird habitats provides an assessment of their population abundance and densities. Additional information documents species' habitat use, activity patterns, and behaviour in relation to their environmental conditions.

Participants performed point counts in eight locations that varied from wadis with water to plateaus. This quantified variations in the time-activity budget of the birds, depending on environmental conditions. In doing so, it was possible to make predictions on how climate change might affect bird populations in the long term.


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"TREES CAN BE USED AS A TOOL FOR CLIMATE CHANGE MITIGATION."

4.2.5. Tree Survey

Climate change is one of the most serious and complex environmental problems of the modern era, arising from increasing concentrations of atmospheric carbon dioxide (CO_2) and other greenhouse gases. Trees act as carbon storehouses and play an important role in influencing our climate. When trees are cleared, they release carbon and act as a source of carbon emissions. When they are restored they sequester carbon and become a sink of carbon. In this way, trees can be used to reduce climate change.

The main goals of this activity are to measure trees' relative abundance and density in the national park, understand the distribution of different species in relation to their habitat, initiate a monitoring programme of tree species growth and health, and calculate carbon stored by all the trees found in the national park.

DEWA volunteer research consisted of locating, geo-referencing, and counting all individual trees within pre-selected one square kilometre squares. This was done from satellite views using Google Earth in the lab. A random selection of trees from those easily accessible on ground were visited for direct observation and detailed description. Trees were identified at the species level and measured. Measurements included aspects such as DBH (diameter at breast-height), tree height, crown cover, and health status.


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BATS PLAY AN IMPORTANT ECOLOGICAL ROLE IN THE ENVIRONMENT AS INSECT POPULATION CONTROL AND SEED DISPERSERS.

4.2.6. Bat Survey

Bats are ecologically important in maintaining well-balanced ecosystems. They function as predators of insects and pollinators (as seed dispersers). Due to their position in the food chain and roles in the ecosystems, bats can be considered good bioindicators. As long-lived mammals with low-reproductive rates, any slight variations in their adult survival rates might quickly have negative consequences on their population trends. The potential effects of climate change on the bat population has so far been poorly investigated. As a small mammalian species with high energy requirements that must retain a certain body temperature, bats are expected to be highly sensitive to variations in temperature and humidity.

The study aims to characterize and quantify the relationships between the environmental conditions of temperature, humidity, moonlight, and bat activity. Volunteers were given bat detectors - special devices that allowed them to listen to bats' echolocation calls in real time and determine their call frequencies - counting and recording all auditory contacts with bats in a 30-minute period, shortly after sunset. The activity index calculated from these records were then correlated to environmental parameters.

4.2.7. Research Outcomes

The aim of the research and monitoring programme is to develop a relevant conservation strategy by studying the resilience of freshwater ecosystems to climate change and other major threats to the Hajar Mountains and the overall habitats in the Middle East.

The DEWA teams monitored water quality, weather parameters, and population trends in a selection of taxonomic groups. This scientific data is to be used for adaptive management of the national park to ensure conservation of freshwater habitats in the long term. This requires a thorough understanding of the different components of the freshwater ecosystems and their ecological functioning.

More specific outcomes include:

- Developing the baseline dataset on WWNP biodiversity.
- Continuing to assess wildlife population trends in relation to environmental conditions.
- Refining bio-indicators to optimize National Park adaptive management.
- Improving models that assess how vulnerable terrestrial habitats are to climate change and how scenarios change in the wildlife community.
- Producing peer-reviewed articles for publication as research progresses on biodiversity description, species ecology, population monitoring, and protected area management.

5. THE CCRLP FIELD SEASON: JANUARY - NOVEMBER 2017

5.1 OVERVIEW OF CCRLP

Four Dubai Electricity and Water Authority (DEWA) teams participated in the Climate Change Research and Learning Programme (CCRLP). Employees from different divisions, departments, and nationalities came together to learn about climate change challenges and how to tackle these issues as a team.

TEAM 1: 16-20 APRIL, 2017 – SEVEN PARTICIPANTS

1. Ahmed Ali Alblooshi
2. Marwan Juma Mohammed Bin Doei
3. Shaikh Khaled Majid Ali Al Nuaimi
4. Ahmed Abdullah Mohammad Hassan Al Harmoozi
5. Abdulrazzaq Abdulmajid Al Khaja
6. Mohammed Abdulla Saad Bakhit Alameri
7. Mohammed Abdulla

TEAM 2: 12-16 NOVEMBER, 2017 – SEVEN PARTICIPANTS

1. Aysha Mohammed Rashid Mohammad Al Remeithi
2. Hind Obaid Hassan Hantoush Al-Ali
3. Suhaila Saeed Ali Shaban Abdulla
4. Nada Mubarak Masood Abdulla
5. Ameera Ahmed Alhayyas Alblooshi
6. Haiyam Khalfan Al Hashemi
7. Amel Ahmed Malnak Omar Albloushi

TEAM 3: 19-23 NOVEMBER, 2017 – EIGHT PARTICIPANTS

1. Abdulla Saqer Obaid Sager Antar Alnuaimi
2. Mohammed Rashad Ismail Mansour
3. Nasser Ghuloom Abdullah Hussain
4. Owen Raymond Glynn
5. Abhaykumar Patil
6. Gauhar Ali Aslam
7. Majid Ali Hassan Alredhwan Alharthi
8. Ali Saeed Addullah Saeed Alhefaity

TEAM 4: 25-29 NOVEMBER, 2017 – SEVEN PARTICIPANTS

1. Jonalyn Villapando Go
2. Nour Ibrahim Saad
3. Maryam Habibollah Salmanpoor
4. Athbah Obaid Khalfan Mohammed Alroum Almuhairi
5. Ayesha Nasser Khalil Ibrahim Ali
6. Samira Qasim Zayid Almusalami
7. Marwa Ibrahim Mahmoud Albanna Al Raeesi

5.2 RESEARCH 'BIG PICTURE', 2013 TO 2017

Scientific research and monitoring programmes were initiated at Wadi Wurayah National Park in 2013. Most surveys are conducted within the ecotourism zone surrounding the waterfall. The main goal of this research and monitoring programme is to create a 'biodiversity and environmental parameters' database, document the health status of this special habitat, assist and orientate the management of the park, and give the general public a greater understanding of biodiversity and conservation of the wadi.

Research Achievements

579 dragonflies tagged and **125** recaptured.

540 Odonata point counts performed in the field and **26** species recorded.

376 zooplankton individuals were identified.

2022 toads counted and **366** tagged.

3942 water parameters collected in the field and **2255** tests performed in the laboratory.

3433 trees tagged on Google Earth and **84** trees measured and tagged in the field.

5.3 DEWA'S CONTRIBUTION TO THE 2017 MONITORING PROGRAMME

The DEWA teams spent a significant number of hours collecting data in all the research locations. Their remarkable effort provided invaluable material that our scientists would not have otherwise been able to collect. As a result, a unique database of great scientific value has been created. Below is a summary of the participants' contribution to the monitoring.

19 dragonflies tagged and **4** recaptured.

43 toads counted and **3** tagged.

20 Odonata point counts performed in the field and **18** species recorded.

83 water parameters collected in the field and **27** tests performed in the laboratory.

37 zooplankton individuals were identified.

Three more monitoring programmes have since been established in Wadi Wurayah where new, important information relevant to studying climate change in the UAE has been generated. The contribution by the participants for these surveys is illustrated below.

240 trees tagged on Google Earth and **16** trees measured and tagged in the field.

19 bat activity indices assessed in the field.

6 bird point counts performed and **12** birds species recorded.

5.4. PARTICIPANT PROFILES

100% PARTICIPANTS BELIEVED THAT THE PROGRAMME WAS SIGNIFICANTLY BENEFICIAL TO THEM PROFESSIONALLY.

26% PARTICIPANTS' KNOWLEDGE ON CLIMATE CHANGE IMPROVED AN AVERAGE OF 26% OVER THE DURATION OF THE PROGRAMME.

5.4.1. Programme Evaluation and Participant Feedback

At the end of each programme, DEWA participants were asked to submit an evaluation form to describe their level of satisfaction with the programme. This form asked various questions aimed at assessing the efficacy of the programme's design and delivery. EWS-WWF'S Research and Learning Programmes aim for continuous improvement to deliver a unique and memorable experience to its participants and this feedback assists in evaluating the programme's success in reaching its objectives.

Participants' knowledge on the subject of climate change was assessed through a 12 question quiz presented at the start of the first modules and then re-assessed through the same quiz presented at the end of the five-day programme. The answers to questions were only discussed at the end of the programme.

All four groups' knowledge improved from the initial assessment at the start of the programme to the last assessment completed on the last day (Figure 1). Groups on average improved their knowledge by 26%, a remarkable outcome since the programme's duration was only five days.

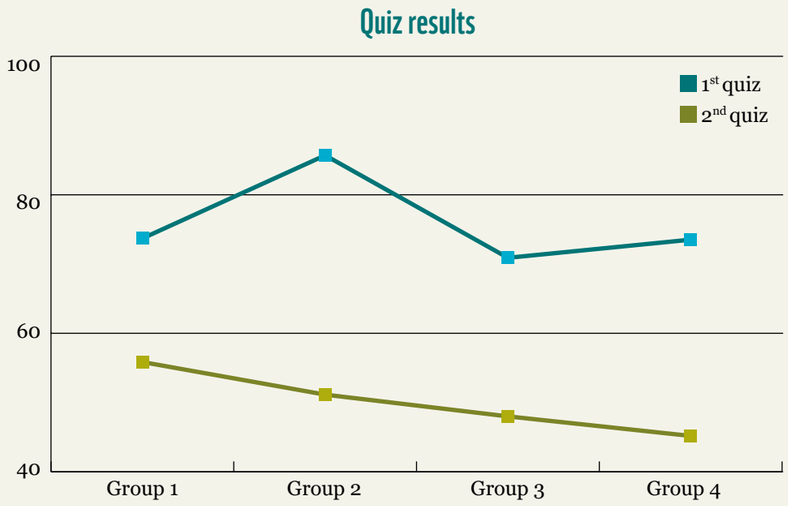

Figure 1. Average Climate Change Quiz Results

Upon completion of the CCRLP, all four teams' feedback was positive. Continual changes and improvements applied to the learning sessions and research activities through learnings obtained from WRLP and the CCRLP launch programme in April were well received. A hundred per cent of all participants believed that the programme was significantly beneficial to them professionally, and 100 per cent of participants also said they would highly recommend this programme to others.

Participants also felt that the programme had successfully increased their understanding of climate change issues globally and locally.

Moreover, participants found the programme to have been useful in increasing their understanding of the impacts to global and local biodiversity. Participants also significantly or very significantly agreed that the field sessions supported the information learned during the classroom sessions and felt that the programme deepened their connection with the natural environment.

From the total of 29 participants who completed the programme, the feedback received on different modules and learning sessions was highly positive. All modules and sessions were rated either a '4' or '5' on a scale from 1 to 5, with '1' being poor and '5' being excellent, as noted in Graph 2 below.

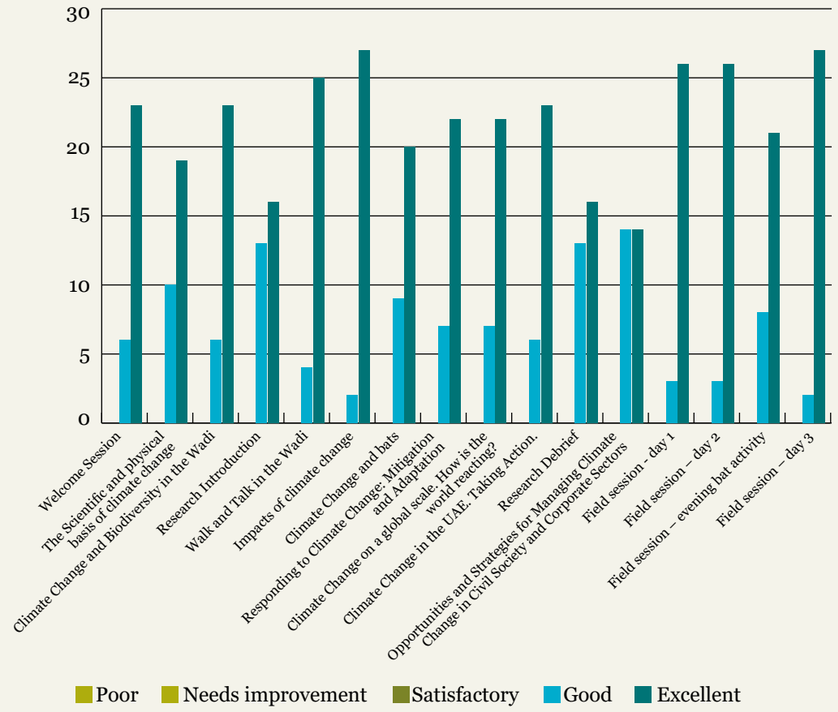

Figure 2. Levels of Participant Satisfaction with the Activities of the Programme.

5.4.2. Snapshots from the Feedback of the Survey

Team 1

Would you recommend this programme to your colleagues? Yes / No. Why?
"Yes, because one cannot know the importance of climate change just by reading about it in the news. In my opinion, they must experience it physically in order to become more self-aware and take it more seriously." **Abdulrazzaq Alkhaja**

Team 2

What was the most valuable piece of information you learned during the programme?
"We all should care about what is happening to our planet; it's for all of us. It's not just about our country but all of the world. We should drive this information to the people who are around us to increase their awareness. The UAE is taking a lot of action to reduce this problem." **DEWA employee**

Team 3

What was the most valuable piece of information you learned during the programme?
"It's time to act now, to save our future generations, wildlife and habitat."
Abhayhumar Patil

Team 4

Would you recommend this programme to your colleagues? Yes/ No. Why?
"Yes, because WWF conducts a highly informative format on how we can learn more with regards to the environment and how to help in a small way." **Jonalyn V. GO**

6. ACKNOWLEDGEMENTS

We largely owe the success of CCRLP to our generous sponsor, DEWA.

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EWS-WWF

Established in 2001 under the patronage of HH Sheikh Hamdan bin Zayed Al Nahyan, Ruler's Representative in the Western Region, EWS-WWF's mission is to conserve nature and reduce the most pressing threats to the environment by working with people and institutions in the UAE and the region to implement conservation solutions through science, research, policy, education, and awareness.

For more information about EWS-WWF, please visit **uae.panda.org**