
TECHNICAL NOTE

ENVIRONMENTAL ISSUES IN AREAS RETAKEN FROM ISIL MOSUL, IRAQ

RAPID SCOPING MISSION
JULY - AUGUST 2017



Table of Contents

Summary Highlights.....	2
1. Background.....	4
2. Assessment Planning.....	4
3. Reconnaissance Field Visits.....	5
3.1 Qayarrah Oil Field.....	6
3.2 Mishraq Sulphur Complex.....	10
3.3 Mosul City.....	11
4. Mosul Debris Management.....	15
5. Cessation of Environmental Governance and Education.....	19
6. Weaponization of water management infrastructure.....	21
Annex 1.....	24
Annex 2.....	25

Summary Highlights

General

- ❖ Iraq has experienced widespread destruction of civil and industrial infrastructure from systematic and extensive sabotage and looting by ISIL (so-called Islamic State in Iraq and the Levant, alias Daesh), as well as from airstrikes and military operations to recapture these areas.
- ❖ Destruction of major investments in new infrastructure made prior to the fall of northern and western Iraq to ISIL constitute a substantial economic and development setback.
- ❖ Meanwhile, there has been widespread looting - from oil resources to archaeological artefacts - by mafia-like organized crime during the period under ISIL control.
- ❖ It will take time to fully comprehend the level of environmental damage given the lack of institutional memory over what occurred during the three years of ISIL occupation. New contaminated sites are likely to be reported as inaccessible areas open up.

Mosul Debris

- ❖ The quantity of conflict debris in Mosul is estimated at **11 million tonnes**. Equivalent to three times the Great Pyramid of Giza or four times the Eiffel Tower.
- ❖ UN Environment is working with Mosul Municipality, UN-Habitat and technical partners to refine debris quantification estimates and develop **operational management scenarios** for recovering and recycling the enormous quantity of rubble.
- ❖ In collaboration with partners, UN Environment plans to organize a workshop with Mosul Municipality to help develop an **optimal debris management plan** in late 2017.

Contaminated Sites

- ❖ Burning for 9 months, the 18 oil wells set alight by ISIL in Qarrayah created such thick black smoke that locals refer to the darkened skies as the '**Daesh winter**'.
- ❖ **Al-Shuhadaa neighbourhood** was devastated by the blasting of an oil well lying in its midst. The interior of many homes is covered in toxic soot and residents complain that noxious fumes from the oil pools and smouldering fires have made the settlement uninhabitable.
- ❖ ISIL set alight a ~50,000 tonne stockpile of pure sulphur at the **Mishraq Complex**, creating a dense white cloud of toxic sulphur oxides that reached Baghdad and neighbouring countries.
- ❖ An approximately **two million tonne pile of sulphur waste** is at risk of future sabotage attempts or accidents in the inadequately guarded site.
- ❖ A wide range of sites from factories, workshops and warehouses to private homes and schools were converted by ISIL into **ammunition manufacturing plants** and are now littered with explosives and potentially toxic chemical products.
- ❖ There is a high risk of **toxic PCB contamination** from the extensive damage to Mosul's electricity network. At the main electricity station supplying western Mosul, heavy calibre rounds were deliberately fired by ISIL into a block of power transformers filling the basement of the building below with up to 3 metres of transformer oil.
- ❖ **Artisanal oil refining** on the outskirts of both eastern and western Mosul is another important legacy of the conflict. Makeshift refineries use rudimentary practices creating a localized but a potentially significant pollution footprint.
- ❖ Mosul airport, Ghizlani military camp and Western Mosul's central garages reportedly contain large amounts of **hazardous asbestos**.

- ❖ Adaya and Al-Jazira, are two high risk sites from Iraq's former **nuclear decommissioning programme** whose status remains unknown.

Cessation of Environmental Governance and Education

- ❖ **Niniveh Environment Directorate** was immediately disbanded by ISIL and its offices, laboratories and assets confiscated. Ordered not to return to work, its 140 staff were jobless for three years.
- ❖ Converted by ISIL into one of their command centres and suspected to have been used as an ammunition making workshop, the Environment Directorate's **offices were set on fire** by ISIL and are no longer useable.
- ❖ Mosul University's **College of Environmental Sciences and Technology was abolished** and its brand new building transformed into a command centre for ISIL leadership. The college was thoroughly ransacked and the building structurally sabotaged by ISIL prior to their eviction in January 2017.

Weaponization of water management infrastructure

- ❖ ISIL seized control of critical dams and barrages to exert **hydrologic hegemony** over downstream cities and rural areas by either cutting off water supplies or releasing a flood wave to drown government controlled areas. The 2014-2015 'drought' in central and southern Iraq was largely a result of ISIL blocking water flows.
- ❖ ISIL also used water facilities as a **battlefield weapon** to flood and impede government troop movements or to create defensive positions. A prime example was the flooding in 2014 of hundreds of square kilometres of agricultural land downstream of Fallujah which displaced thousands of people, reaching Abu Ghraib near Baghdad.
- ❖ Iraq's water battle was mainly played out on the **Euphrates River** where ISIL's command extended into Syria. At one point, ISIL controlled all of the water infrastructure along the Euphrates River from Tabaqa dam in Syria to Fallujah Barrage near Baghdad. Only Haditha, Iraq's second largest dam, remained under government control through airlift support.
- ❖ An initial assessment by the Ministry of Water Resources estimates direct damages to hydraulic infrastructure at **USD 600 million dollars**. Although water installations have now returned under government control they need urgent rehabilitation and maintenance.

1. Background

During his visit to Iraq in May 2017, Erik Solheim responded positively to the government's request for support in conducting an assessment of the environmental impacts in areas formerly occupied by ISIL (so-called Islamic State in Iraq and the Levant, alias Daesh). The Head of UN Environment witnessed first-hand the devastating environmental impacts affecting the inhabitants of Qayarra town, 60 kilometres south of Mosul, from oil wells deliberately set on fire. ISIL's scorched earth tactics provide a dramatic illustration of how pollution from conflicts and deliberate sabotage and looting of industrial facilities and civil infrastructure can affect people's health and livelihoods for decades, and impede reconstruction and peacebuilding efforts.

Two weeks after the Iraqi Government declared the liberation of Mosul on 9 July 2017, UN Environment deployed staff to Iraq to design and plan with the Environment Ministry an environmental assessment of the city and surrounding areas. Iraq's second or third largest city (estimates vary) with a pre-conflict population of around 1.4 million people, Mosul is today at the centre of one of the world's largest and most complex humanitarian operations with over one million displaced persons. An important commercial and industrial hub, Mosul is also where environmental impacts are considered to be of greatest concern given the high level of infrastructure destruction, the large number of hazardous sources, and the potential size of the exposed population.

UN Environment's reconnaissance assessment of the environmental impacts in areas retaken from ISIL is carried out in close coordination with and support from the UN System in Iraq. This work is also embedded within the UN Recovery and Resilience Programme for conflict affected areas currently being developed by the UN at the request of the Iraqi government, which will be presented in the upcoming Kuwait donor conference.

2. Assessment Planning

A technical meeting was held at the Environment Ministry in Baghdad on 27 July 2017 with experts from eight line ministries to identify the contaminated sites of most concern. With a dedicated Contaminated Site Assessment Department established following UN Environment's 'Hot Spots Assessment' project (2004-2007), the Environment Ministry has a young and professional team comprising 15 staff. Of the 60 polluted sites identified prior to the ISIL conflict, 40 have so far been assessed. Furthermore, the Environment Ministry's Central Environment Laboratory has an accumulated experience of over 30 years and is well equipped to conduct organic, inorganic, physical and bacteriological analysis. The laboratory, however, currently lacks international accreditation and does not participate in laboratory intercomparison programmes. Analysis of duplicate samples may therefore be required to ensure quality assurance of laboratory results.

At the abovementioned meeting, the government decided to set-up a joint task force comprising experts from the ministries of environment, oil, and industry and minerals, to lead the assessment of the priority contaminated sites from the ISIL conflict. UN Environment will provide technical guidance on contaminated site assessment and reporting. Fieldwork is planned to take place in October 2017.

3. Reconnaissance Field Visits

Scope and Purpose

UN Environment staff conducted fact-finding visits to obtain a general understanding of the nature and scale of the major environmental issues in areas retaken from ISIL. This included field visits to: i) the two priority oil and mining sites of Qayyarah and Mishraq torched by ISIL; and ii) the City of Mosul. Site visits were accompanied by staff from the Environment Ministry (Niniveh Environment Directorate) and oil and mining state companies.

Methodology

This rapid scoping assessment is primarily based on observational walkover surveys, and focus group discussions and interviews with government experts, academics and UN agencies. Identification of potentially contaminated sites was informed by the Mosul Environmental Hazards Assessment map prepared by the UN Environment/OCHA Joint Unit and UN-Habitat in May 2017, and consultations with the Niniveh Environment Directorate and line ministries in Baghdad. A total of 23 'grab samples' (soil, water) were collected to obtain an indicative measure of potential contamination. Samples will be analysed by Spiez and Bachema laboratories in Switzerland, and AI Control Laboratory (ASL) in the UK.

Map of sites visited during the UN Environment scoping mission



© NASA Earth Observatory

Preliminary debris quantification in Mosul city was derived from an initial damage assessment based on satellite imagery from 8 July, 2017, carried out by UN Environment in collaboration with UN-Habitat, Disaster Waste Recovery and Urban Resilience Platform.

Security and Operational Constraints

The high-risk security environment restricted both the locations visited and the length of time spent on-site. As a 'military controlled zone', travel to and within Mosul requires special permission and complex logistical arrangements including dedicated security escorts. The risk of explosive hazards, not only from unexploded ordnance and landmines, but also from improvised explosive devices and booby traps, is another important constraint. In certain areas, site visits were accompanied by experts from the UN Mine Action Service.

3.1 Qayarrah Oil Field



Large pools of crude oil pollute the landscape © UN Environment

- Qayarrah oil field is located around 60 kilometres south of the city of Mosul, and directly adjacent to Qayarrah town with an estimated population of approximately 23,000. Uncontrolled human settlements have encroached inside the oil field since 2006. The area fell to ISIL in June 2014.
- Operated by the government owned North Oil Company, Qayarrah oil field extends over an area of around 50 square kilometres. It contains 90 oil wells with an installed production capacity of approximately 30,000 barrels per day.
- An oil refinery is located on the south-eastern outskirts of the town, with an installed capacity of 34,000 barrels of heavy crude (asphalt), and 20,000 barrels of light crude per day.

- Eighteen of the 25 wells rigged with explosives and blown-up by ISIL in June 2016 caught fire, creating a vast black cloud stretching over tens of kilometres. So thick was the toxic black smoke that it obscured the sun. Locals refer to the darkened skies as the 'Daesh winter'.



Thick clouds of smoke blocked out the sun for months prompting locals to dub it the 'Daesh Winter' © Iraq Ministry of Oil

- The last oil well was put out 9 months later on 28 March 2017 (similar period to the Kuwait oil fires of 1991). An additional 16 wells were damaged but did not catch fire.
- Estimations of the total volume of oil loss is in the range of 1.4 to 2 million barrels according to government sources.
- The circumstances of controlling the fire were exceptional in that it took place on an active frontline. Underequipped and understaffed, the fire fighters worked under direct sniper and missile fire, and in a high risk zone not properly surveyed for landmines.

预览已结束，完整报告链接和二维码如下：

https://www.yunbaogao.cn/report/index/report?reportId=5_14636

