

OVERVIEW:

Trash detected: **4719 locations***

Vegetation detected: **3029 locations**

Algae detected: **180 locations**

Background

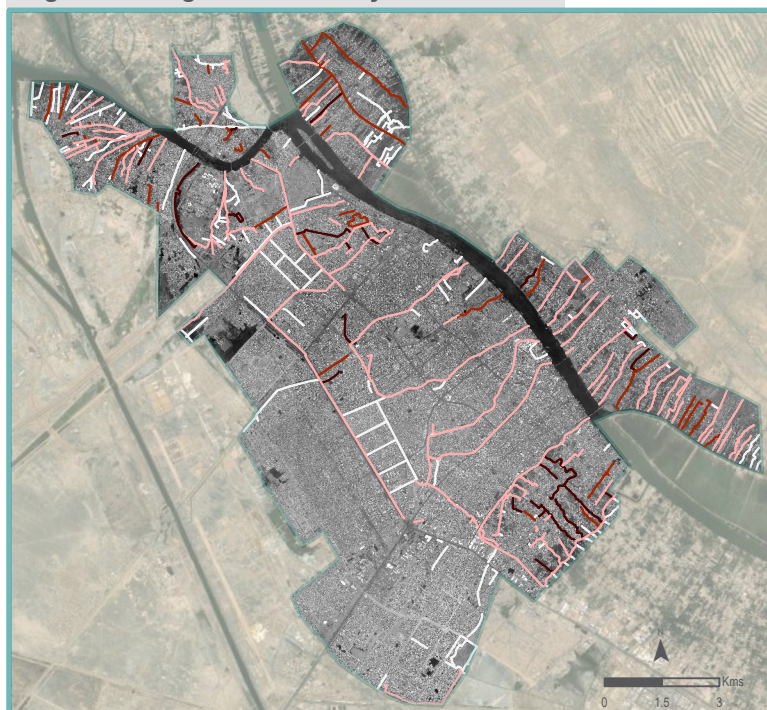
The city of Basrah is experiencing an environmental disaster in its waterways: the crisscrossed canals, which once provided an abundance of fresh water throughout the city, are now heavily polluted.¹ Located in the lower reaches of the Tigris-Euphrates basin and running right through the heart of the city, discharge from the Shatt-al-Arab River is reducing due to intensive upstream use.² As water levels drop, the concentration of pollutants increases, including household trash, sewage, industrial waste, pesticides, and encroaching seawater.³ By the time the river feeds into Basrah's waterways, it contains dangerous levels of bacteria, chemicals, toxic algae and salinity.^{1,4} And as the water levels drop, the turbidity caused by high concentrations of sediment can disable aging water treatment plants. The buildup of solid waste in Basrah endangers the health and wellbeing of the local population, which is largely reliant on the water to meet their needs, conditions that are likely to be further aggravated by expected population growth and climate change.⁵

REACH Iraq conducted a solid waste assessment in the main canals of Basrah as a first step to highlight the poor state of this vital infrastructure. The information surrounding trash in the main canals is minimal and more attention to this environmental disaster is needed. This assessment was based exclusively on satellite data and secondary data, without ground-truthing by REACH. Additional in-person research is necessary to have a better understanding of the dynamics of solid waste and other pollutants in Basrah's canals. This would give insight into issues such as: the health and economic implications of this contamination; whether these issues affect certain populations more than others; if the buildup exhibits any seasonality or other pattern; and, if there are already any successful local solutions to mitigating these problems.

Methodology

Solid waste, algae and vegetation within the main channels of Basrah city was visually detected and manually digitized by the United Nation's Operational Satellite Applications Programme (UNOSAT) using WorldView-3 images. Main trash types identified were: (I) floating trash - sparse trashes on the water, (II) trash islands - big areas with dense trash, (III) trash rope - trash in rope shape connected to at least one bank, (IV) dirty bank - trash on the banks near water, (V) trash under bridge - bridges/tunnels under which trash is likely to be stuck. Detection of algae and vegetation in the canals was accomplished using the infrared channel of WorldView-3. In a false-color composite, algae appear smooth and bright red, while vegetation has a brown-red color with a coarse texture. Densities of trash and algae/vegetation were calculated as follows: Vegetation and algae density = (# of Vegetation + algae points / channel length in km); Trash density = (# of trash points/ channel length in km). The canal layer was manually digitized by REACH based on WorldView-3 imagery.

Algae and Vegetation Density in the Canals



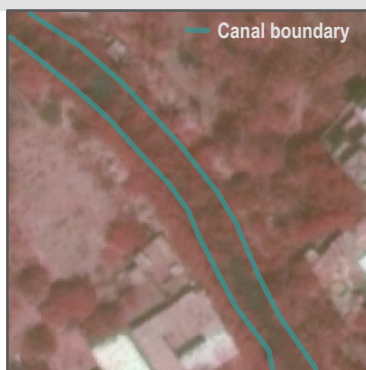
Area of interest

Vegetation and algae detected per km of channel
(# of Vegetation + algae points / channel length in km)

0 1-10 11-20 >20



Canal water covered with algae (bright red)



Vegetation inside the canal (red-brown)

Trash Density in the Canals



Area of interest

Trash detected per km of channel
(# of trash points/ channel length in km)

0 1-10 11-20 >20



A polluted canal in Basrah's old city⁶



Contaminated water and solid waste⁶

Satellite Imageries: WorldView-3-VNIR from 20/05/2020

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¹ Atti M. (2018). Once Iraq's Venice, Basra's waters have now turned deadly

² Moyel et al. (2015). Water quality assessment of the Shatt al-Arab River, Southern Iraq

³ Human Rights Watch (2019). Basra is Thirsty - Iraq's Failure to Manage the Water Crisis

⁴ Rahi et al. (2010). Changes in the salinity of the Euphrates River system in Iraq

⁵ World Population Review (2020). Basra Population 2020

⁶ Peyre-Costa T. (2020). 'We have no options': how water scarcity is changing south Iraq

* A location represents a specific point location in a channel where UNOSAT identified trash, algae, or vegetation. Channels can have multiple of those point locations.