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West Dana sub-district | Idleb

IDP Camps and Informal Sites Flood Susceptibility and Flood Hazard Assessment

February 2021

CONTENTS

CONTEXT

In northwest Syria, winter storms have the potential to generate devastating floods which have a disproportionate effect on internally displaced persons (IDPs) living in camps and informal sites.

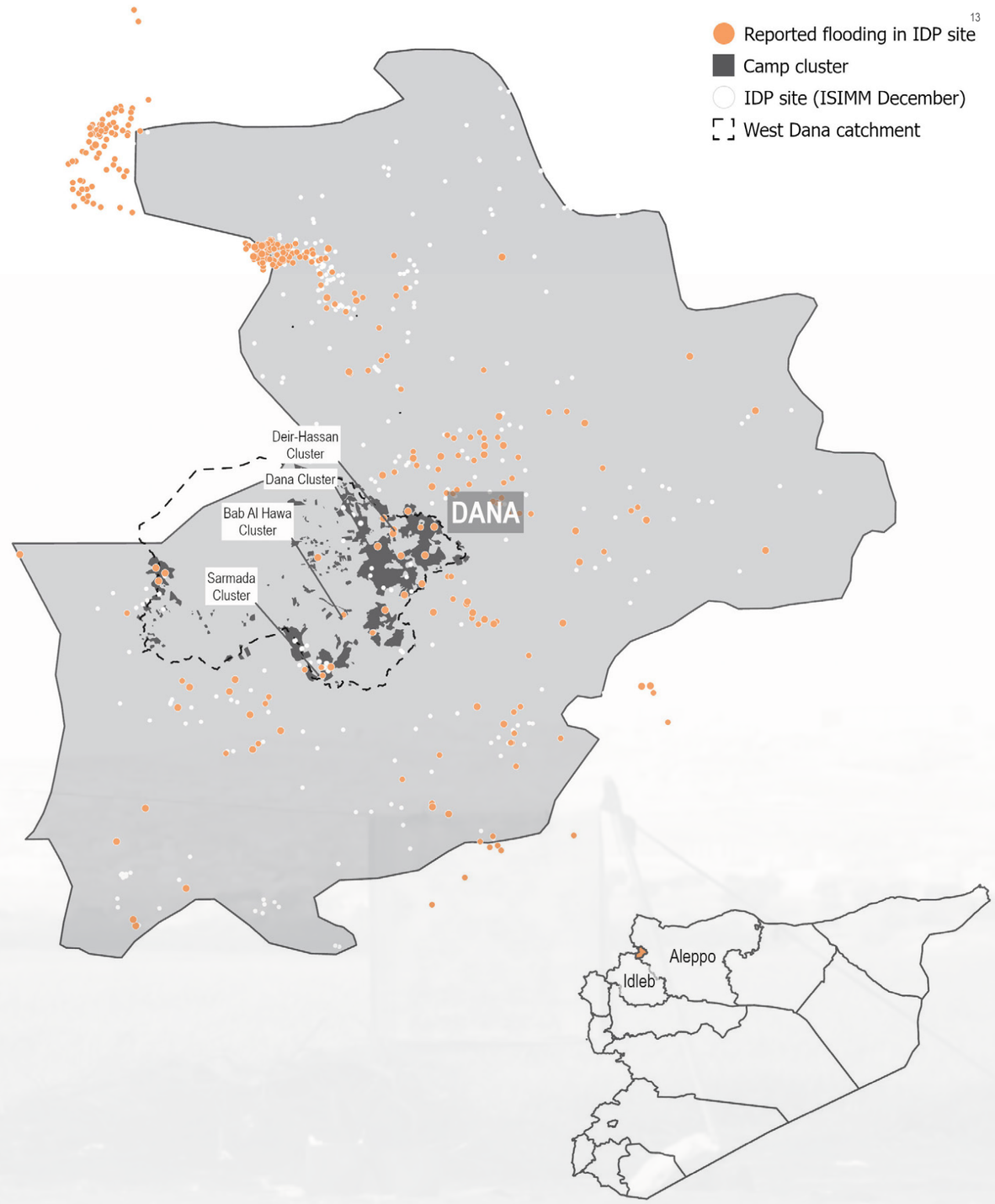
Recurrent heavy rain between 14 and 31 January 2021 generated widespread flooding throughout northwest Syria, affecting an estimated 122,953 IDPs[1] and resulting in the death of a child and injuries to three other individuals[2]. More than 300 camps and sites throughout the governorates of Idleb and Aleppo were impacted by the floods, 8,400 shelters were reportedly destroyed, while a further 13,800 shelters suffered some level of damage[3]. Thousands of households were forced to seek shelter in schools, mosques and open spaces where winter temperatures dipped below freezing levels[4].

Winter flooding within IDP camps and sites throughout Idleb and western Aleppo has been a recurrent problem for several years, the recent winter floods being the most recent example of this following many similar previous events in the past. In November 2016, camps in Dana sub-district were impacted by flooding which inundated tents and accessways, causing destruction of property and movement difficulties[5]. In December 2018 another severe storm resulted in widespread flooding throughout Idleb and Aleppo, damage to tents and property was reported in more than 60 camps[6]. Again, in March 2019 heavy rainfall caused severe flash flooding in the region, damaging road infrastructure and destroying food stocks[7]. In June, 2020 heavy rain in Ma'aret Tamsrin, south of Dana sub-district, caused severe flooding, resulting in the loss of three lives[8] and reportedly destroying hundreds of shelters and putting sanitation facilities out of service[9].

IDPs are among the population groups most vulnerable to the impacts of disasters associated with hazards for a number of reasons. The primary reasons are linked with the locations and living conditions of the sites where IDPs live. IDP sites and settlements are frequently located on land that has traditionally been considered uninhabitable due to environmental factors such as steep terrain, rocky or arid ground, or land that is known to be prone to seasonal flooding. The close proximity of IDP camps and informal sites to flood susceptible locations increases the exposure of IDPs to flood hazards. IDPs in camps and informal sites often live in densely populated environments, in shelters that are not designed to resist natural hazards, both of these factors exacerbate the risks natural hazards present for IDP populations[10]. In addition to the immediate hazard flash floods present to people and property, poor drainage and persistent standing water in and around shelters can lead to numerous health and sanitation problems in camps and informal sites extending the adverse effects of flooding beyond the event itself. Considering the current outbreak of COVID-19 and rising number of confirmed cases in northwest Syria[11], degraded sanitation conditions and overcrowding in camps and informal sites are of particular concern this winter.

Since the beginning of winter 2019, the number of IDPs living in Dana sub-district alone has increased by more than 35% from 617,000 IDPs in November 2019 to 845,000 in August 2020 following an escalation in conflict in early 2020[12]. Increased migration to areas with already large IDP populations is likely to result in IDPs living in increasingly dense living settings in locations considered less suitable for habitation and potentially more exposed to natural hazards like flooding.

This output presents the results of a flood hazard assessment undertaken by REACH with the aim of highlighting shelters located within IDP sites which may be most susceptible to flood hazards. The assessment focuses on the catchment of West Dana sub-district which includes Sarmada, Dana, Bab Al Hawa and Deir Hassan camp clusters which have reportedly experienced flooding on multiple occasions since 2016.



Sabreen Camp, Atmeh Cluster | January 2018

1 Tens of thousands of Syrians on the run due to floods | 25 Jan 2021
2 AL JAZEERA | Child dies as heavy rains | 19 Jan 2021
3 Tens of thousands in northwest Syria lose shelter after floods inundate camps|Jan 2021
4 CCCM bulletin | 20210201 Floods Updates - Monday 1 February 2021
5 Assistance Coordination Unit (ACU) | Winter Needs In Northern Syria | November 2016
6 REACH | North-west Syria:Inter-sector Rapid Needs Assessment - Flood Impact | January 2019
7 Northern Syria flooding | 20 Dec 2019
8 Daily Sabah | UN calls for safer living conditions after storms kill 3 children in Syria's tent camps | June 2020
9 United Nations Office for the Coordination of Humanitarian Affairs (OCHA) | Situation Report No. 16 | June 2020
10 United Nations High Commissioner for Refugees (UNHCR) | Displacement and Disaster Risk Reduction
11 Médecins Sans Frontières (MSF) | Ten-fold increase in COVID-19 cases adds new challenges in northwest Syria | September 2020
12 Humanitarian Needs Assessment Program (HNAP) | Mobility needs monitoring | November 2019 & August 2020
13 Flood affected sites data provided by CCCM cluster updated to february 2020

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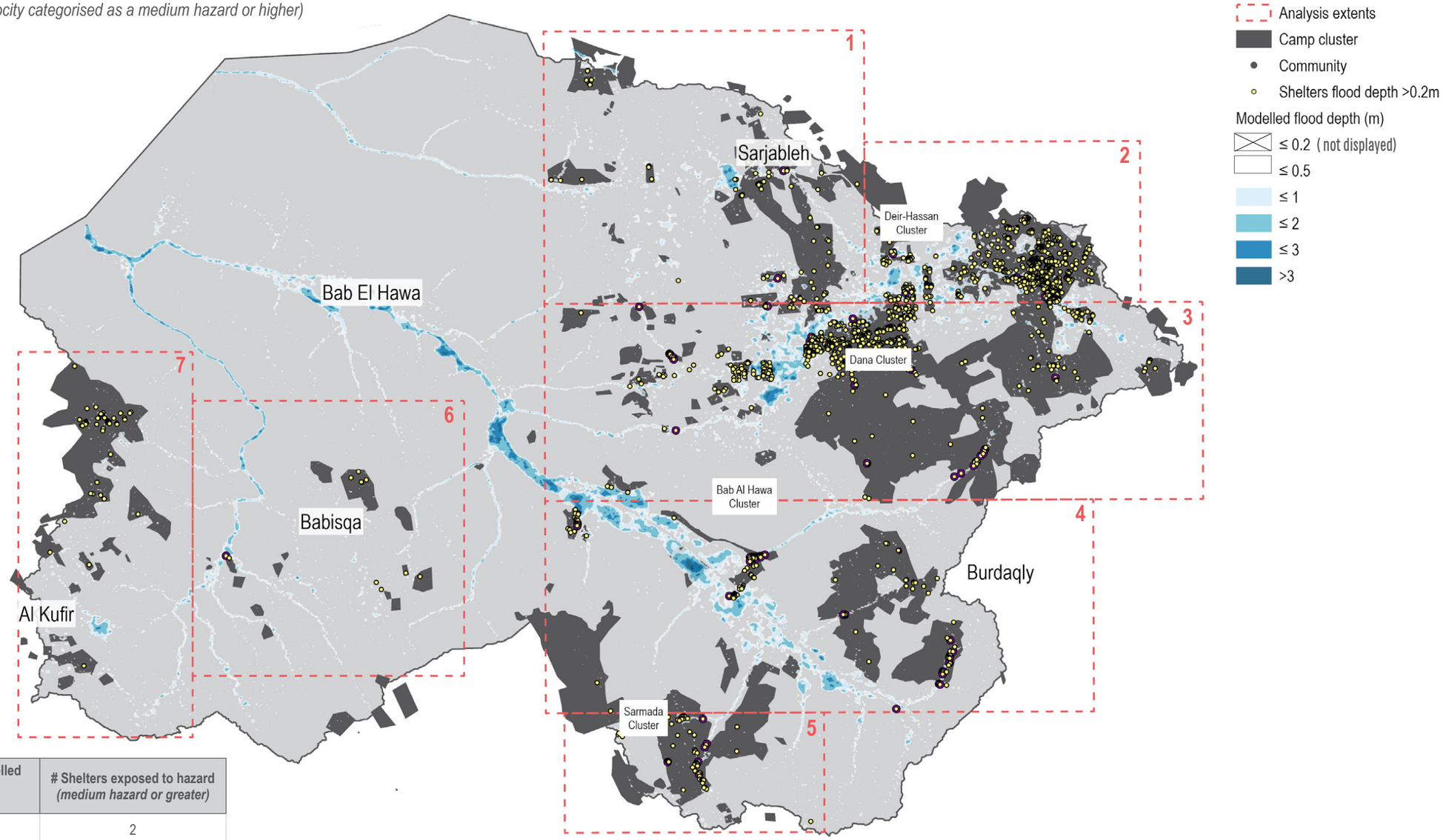
KEY FINDINGS

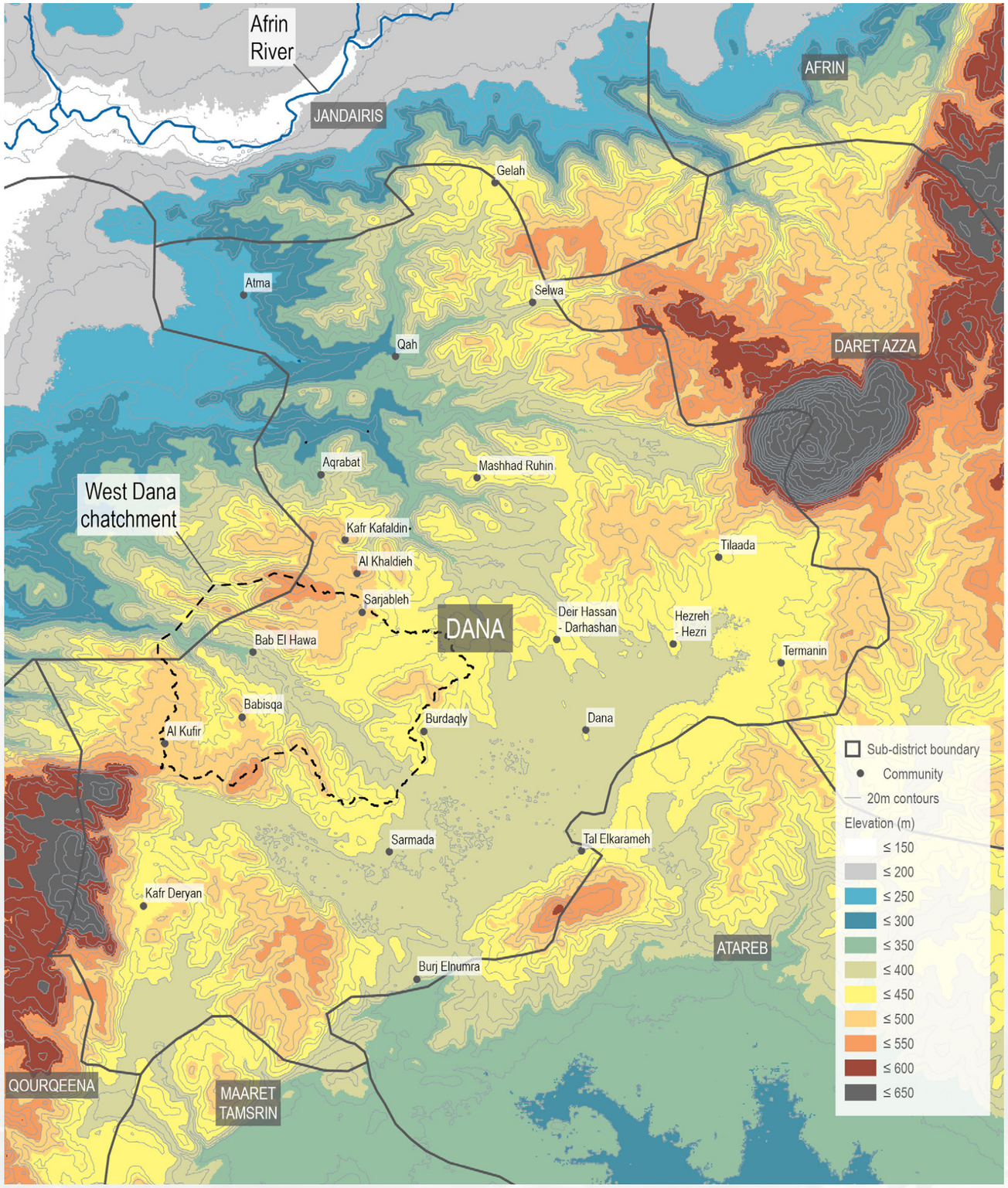
1,644 Estimated number of IDP shelters[14] exposed to flash flooding[15] with a modelled flood depth exceeding 200mm
(12-hour design storm of 96.4mm with a peak rainfall intensity of 143.5 mm/hr)

98 Estimated number of IDP shelters[14] exposed to a flood hazard[16]
(Modelled depth x velocity categorised as a medium hazard or higher)



Analysis Extent	Camp Cluster	# Shelters within modelled flood extents *(>200mm depth)*	# Shelters exposed to hazard *(medium hazard or greater)*
1	Sarjableh Community	71	2
2	Deir Hassan Cluster	655	30
3	Dana Cluster	684	23
4	Bab Al Hawa Cluster	114	36
5	Sarmada Cluster	61	6
6	Babsiqa Community	11	1
7	Al Kufir Community	48	0

14 REACH | Satellite detected shelters/structures 24 August 2020
15 Flash flooding is generated by heavy rainfall over a short period of time. Flash floods are characterised as having relatively high peak discharges and short response times between rainfall and the onset of flooding, usually within 12 hours | World Meteorological Organization - No.577
16 A flood hazard is a product of both flood depth and flood velocity. This output utilises a flood hazard classification based on simplified D*V severity grid symbolisation categories published by the US Federal Emergency Management Agency (FEMA) | Guidance for Flood Risk Analysis and Mapping

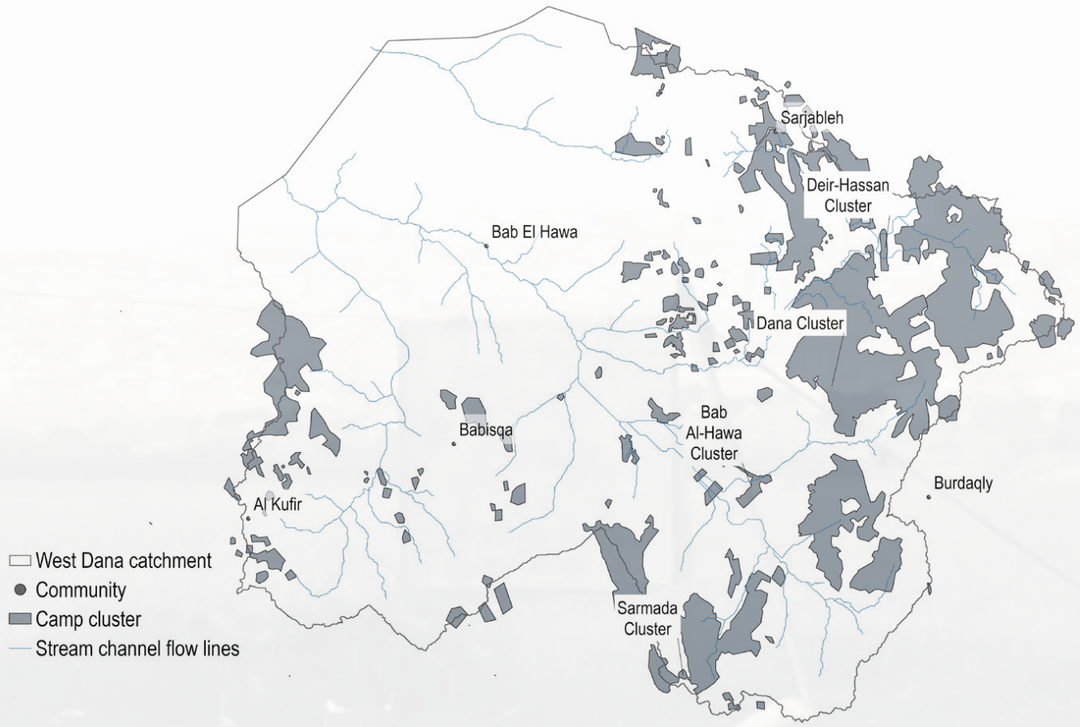


Catchment Characteristics

Dana sub-district is divided roughly in half along a central ridgeline which runs east to west via the communities of Tilaada, Deir Hassan and Sarjableh. The southern catchment comprised of the Dana and Atareb plains is relatively flat, in contrast the northern catchment is mountainous and steeply sloped.

The catchment of southern Dana can be further divided into three sub-catchments. The northern portion of this catchment extends from Tilaada in the northeast, passes through the Dana plains via the communities of Hezreh and Dana towards Sarmada, and finally exits to the Atareb plains via Burj Elnumra. The southern most portion of the catchment extends from Al Kufir and Kafr Deryan in the west and slopes down east towards Sarmada and the Dana plains, where it merges with the northern catchment and passes into the Atareb plains through Burj Elnumra. The third sub-catchment, and the area of interest for this assessment, is separated from the rest of the southern Dana catchment by a shallow saddle between Sarmada and Burdaqly communities. From this saddle point the catchment runs east to west via a central gully passing through the community of Bab El Hawa before exiting the catchment and continuing west into Turkey at an elevation approximately 300m above sea level. The catchment slopes up steeply either side of the central gully, reaching elevations approximately 550m above sea level.

The extent of the west Dana catchment was delineated from a 2.5m resolution Digital Terrain Model (DTM) utilising SAGA terrain analysis - hydrology and channel tools (fill sinks Wang & Liu; catchment area; channel network; watershed basins). The result of these processes is shown below.



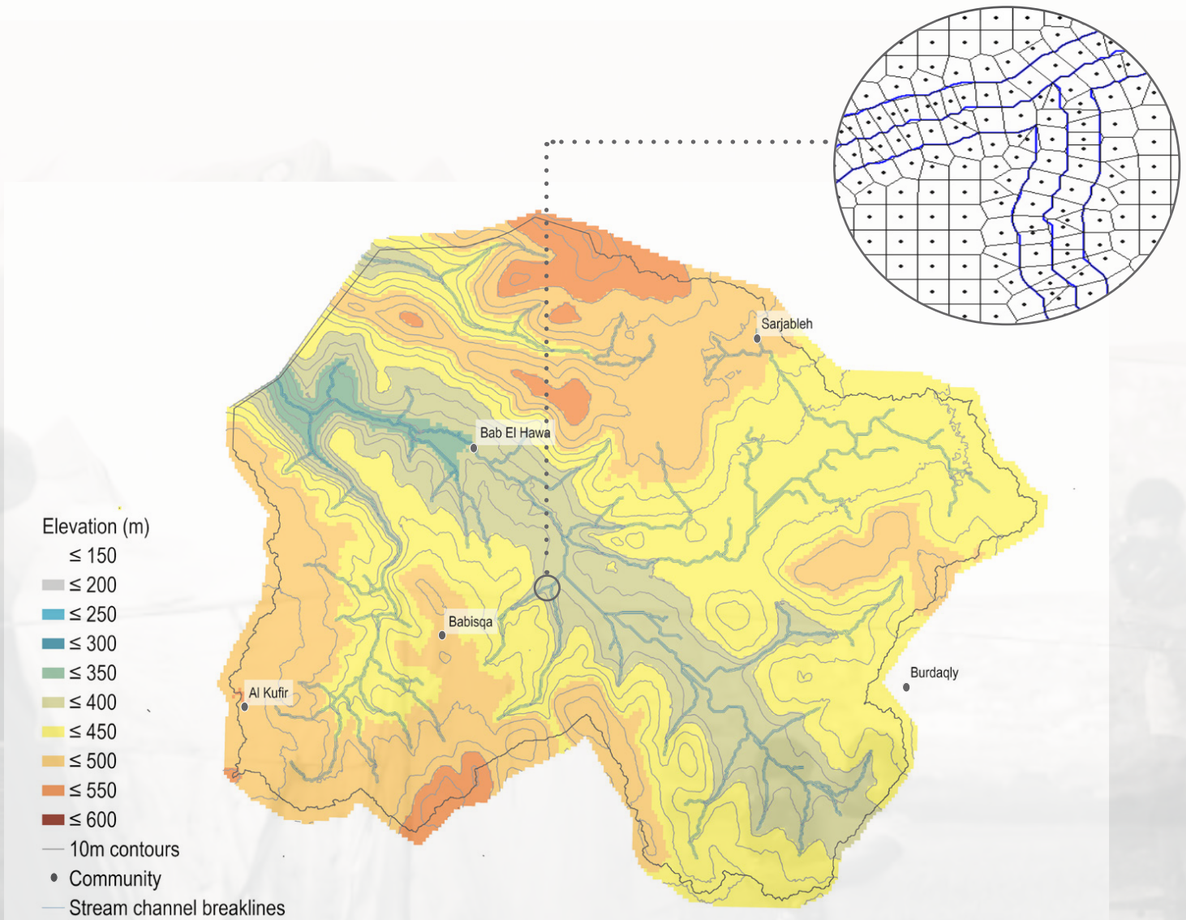
METHODOLOGY

Rapid Flood Hazard Assessment

A direct precipitation two-dimensional (2D) hydraulic model was built using HEC-RAS in order to provide insights on flash flooding in western Dana catchment during heavy rainfall events. This method of 2D flood modelling is often referred to as a Rapid Flood Hazard Assessment (RFHA). A RFHA can provide a high-level understanding of flood hazards on a catchment wide scale and helps to identify flood susceptible areas. The following section outlines the methodology utilised to obtain the flood extents and flood depth x velocity results presented in this output.

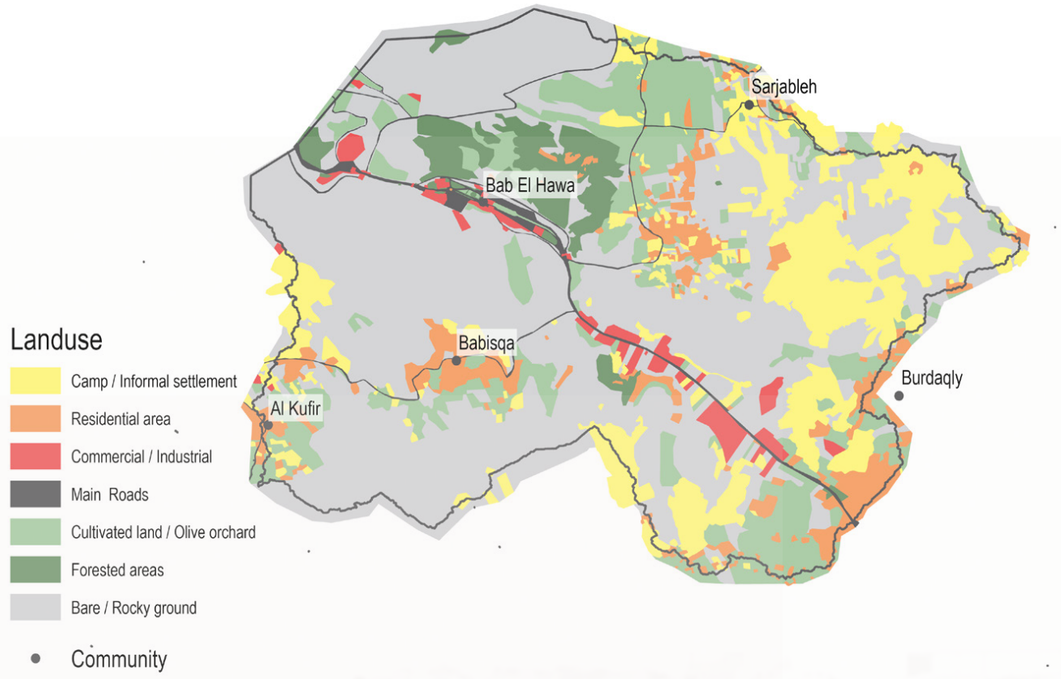
Model Inputs - Terrain/2D flow area

The terrain utilised for the HEC-RAS analysis is a 2.5m resolution DTM built utilising satellite imagery acquired by the Advanced Land Observing Satellite of the Japan Aerospace Exploration Agency (JAXA). The raw surface model has been processed to remove anomalies and adjusted to account for the presence of trees and structures[17]. The 2D flow area extents were defined in the HEC-RAS model environment and model computation points were generated at 10m intervals. Additional computation points were added along stream centrelines and along the stream banks of lower reaches to improve the resolution of the 2D flow area in these locations by enforcing breaklines. The 2D flow area contains a total of 276,384 cells and computation points.



Model Inputs - Landuse and roughness parameters

The west Dana catchment was delineated into 7 different landuse categories using satellite imagery as shown in the figure below. Each category was assigned a roughness coefficient (Manning's n) which was subsequently utilised as an input parameter for the HEC-RAS model.



The Manning's n values assigned to the different landuses are provided in the table below:[18]

Landuse Category	Manning's n value
Commercial / Industrial area	0.1
Informal settlement / IDP site	0.1
Residential area/ Community	0.1
Forested areas	0.07
Cultivated land / Olive orchard	0.05
Bare / Rocky ground	0.04
Roads	0.02

17 For more information on the digital terrain model utilised for the model build refer to AW3D product details | https://www.aw3d.jp/en/products/standard/
18 Manning's n values were based on reference tables for Manning's n values for Channels, Closed Conduits Flowing Partially Full, and Corrugated Metail Pipes (Chow, 1959) | http://www.fsl.orst.edu/geowater/FX3/help/8_Hydraulic_Reference/Mannings_n_Tables.htm

METHODOLOGY

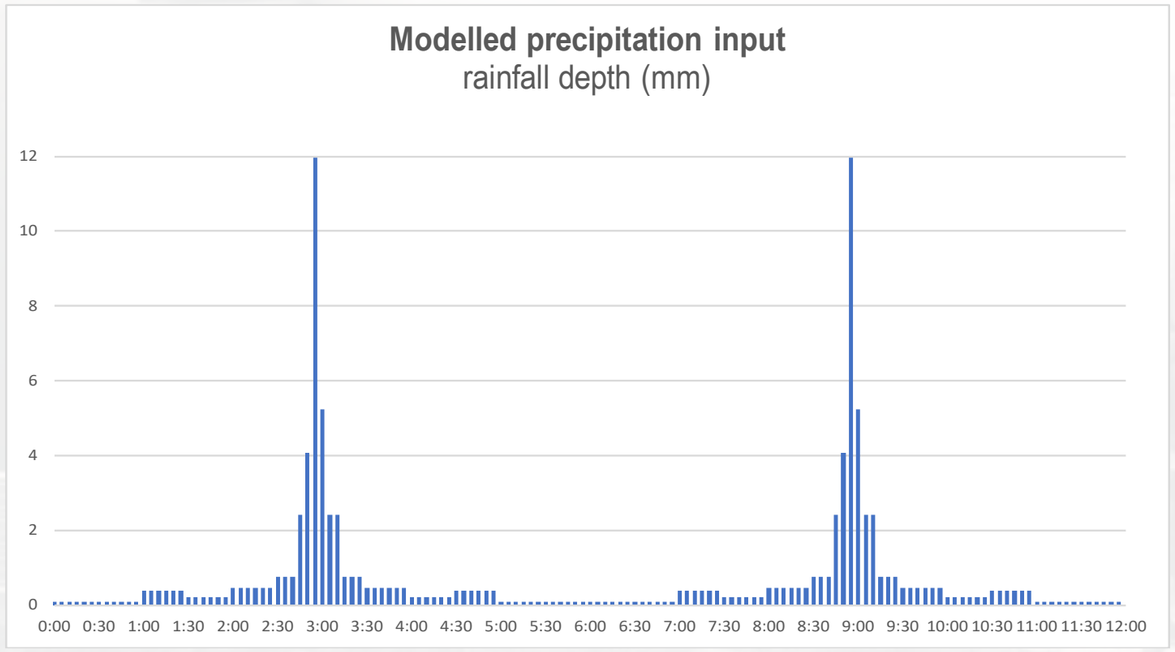
Boundary Conditions

A review of available regional precipitation data, rainfall gauge data and remote sensing datasets was undertaken in order to define appropriate rainfall inputs for the hydraulic model. In the absence of rainfall gauge data or associated statistical analysis of rainfall within northwest Syria, the precipitation data utilised as an input in the model was drawn from an intensity duration frequency (IDF) analysis undertaken for the city of Gaziantep[19] located in Turkey, approximately 100 km northeast of northern Dana (the closest area with available data). The precipitation input utilised in the model was derived from IDF curves using the alternating block method. Nine storms with a 25-year return period ranging in duration from 5 minutes to 6 hours were combined to synthesize the rainfall hyetograph shown below. The peak rainfall intensity is 143.5 mm/hr and the total storm depth is 48.2 mm.

As a second source of rainfall estimates, NASA's Global Precipitation Measurement (GPM) dataset was reviewed using Google Earth Engine in order to compare the synthesized design storm, with estimates of extreme rainfall inside Syria. Rainfall depths were extracted from the GPM dataset for dates of reported flooding in northwest Syria. Several large storm events in northwest Syria were identified including one rainfall event on 27 December 2018 centred just south of the study area in Atareb with an accumulated rainfall depth over 6 hours of 49mm, comparable to the accumulated total depth of the design storm.

Preliminary model runs highlighted a large volume of storage in the uppermost north-eastern section of the catchment. A single 6 hour 25 year recurrence interval storm event did not contribute enough accumulated rainfall to exceed the storage capacity of the upper catchment and generate runoff. Consequently, peak flows downstream were dampened. In an effort to model a "worst case scenario" event, the modelled precipitation inputs were modified to simulate the impact of a high intensity storm arriving after considerable accumulated rainfall had saturated the upper catchment limiting the volume of active storage capacity remaining at the time of the storm's peak. This was achieved by running two 6 hour, 25 year recurrence interval storms back to back. The total accumulated depth of the two storms is 96.4 mm.

A normal depth boundary was applied along the Northwestern edge of the 2D flow area west of Bab El hawa community.



Unsteady Flow Analysis Parameters

An unsteady flow analysis was run in HEC-RAS with a simulation time window of 16 hours. The additional 4 hours was added to the simulation at the end of the 12 hour precipitation input to ensure the receding limb of the runoff hydrograph was adequately captured despite the long lag time of the catchment. A computation timestep of 2 seconds was used for the simulation.

Hazard Classification

The severity of a flood hazard is a product of both the flood depth and flood velocity. Studies undertaken around the world aimed at classifying modelled depth x velocity results into flood severity categories have focused on identifying hazardous floodplain conditions for people attempting to wade through floodwater, vehicles moving through floodwater and buildings and structures located within the floodplain. The approach that has been adopted for this analysis is the simplified approach presented in the US Federal Emergency Management Agency guidance on Flood Depth and Analysis Grids[21]. The flood severity categories used to produce the hazard maps included in this output are provided below:

Flood severity category	Depth x Velocity Range (m^2/s)
Low	< 0.2
Medium	0.2 - 0.5
High	0.5 - 1.5
Very High	1.5 - 2.5
Extreme	> 2.5

Limitations

A RFHA is a simplified modelling approach which is suitable for obtaining a 'big picture' perspective of flooding over an assessed area, it is not intended to provide precise flood depths and extents. The results presented in this output should be considered as estimates, to be confirmed and validated with subsequent analysis at the individual site level.

The following should be considered when viewing the results presented in this output

- The HEC-RAS Hydraulic model is neither calibrated nor validated.
- Hydraulic structures such as bridges and culverts, piped drainage networks, irrigation canals and open channels have not been included in the hydraulic model.
- Obstructions to flow such as buildings, parked vehicles and vegetation are not included directly in the model. The effect of obstructions on the modelled flow regime are approximated by the selection of surface roughness parameters.
- Precipitation is applied directly onto the 2D flow area generating runoff which does not account for losses due to soil infiltration or evapotranspiration, the rainfall timeseries is applied to the 2D domain without any spatial variability.
- The modelled terrain relies on satellite detected data with a vertical accuracy of +/- 5-7m .

For questions or comments on the methodology please contact: mena.reach@impact-initiatives.org

19 Yuce, Mehmet & Deger, Ibrahim | Rainfall Intensity-Duration-Frequency Analysis for the City of Gaziantep | April 2019
20 By computing the change in elevation between to contour lines divided by ground distance (length between them)
21 FEMA | Guidance for Flood Risk Analysis and Mapping | February 2018

MODELLED FLOOD DEPTH RESULTS - CATCHMENT OVERVIEW

1,644

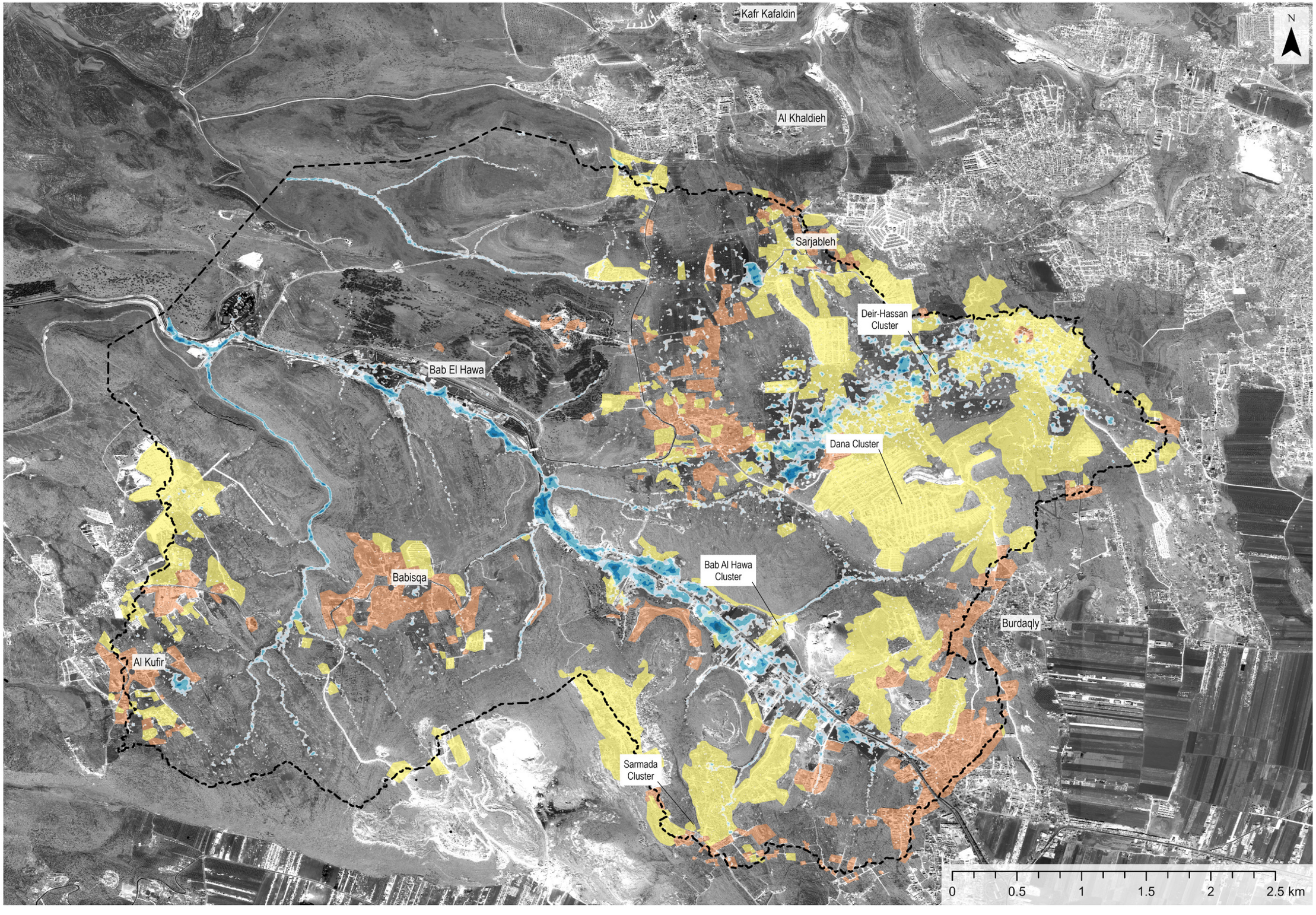
shelters were found to be located within the modelled flood extents (where flood depth exceeds 200mm).

Breakdown of shelters within modelled flood extents

0.2 - 0.5m	1,023
0.5 - 1.0m	488
1.0 - 3.0m	133
>3.0m	0

Populated areas
- IDP sites/settlements
- Community
- Community

Modelled flood depth (m)
- ≤ 0.2 (not displayed)
- ≤ 0.5
- ≤ 1
- ≤ 2
- ≤ 3
- > 3



Modelled flood extents calculated based on 25-year design storm derived from IDF curves for the city of Gaziantep, Turkey. Peak rainfall intensity is 143.5 mm/hr and the total storm depth is 96.4 mm over 12 hours.

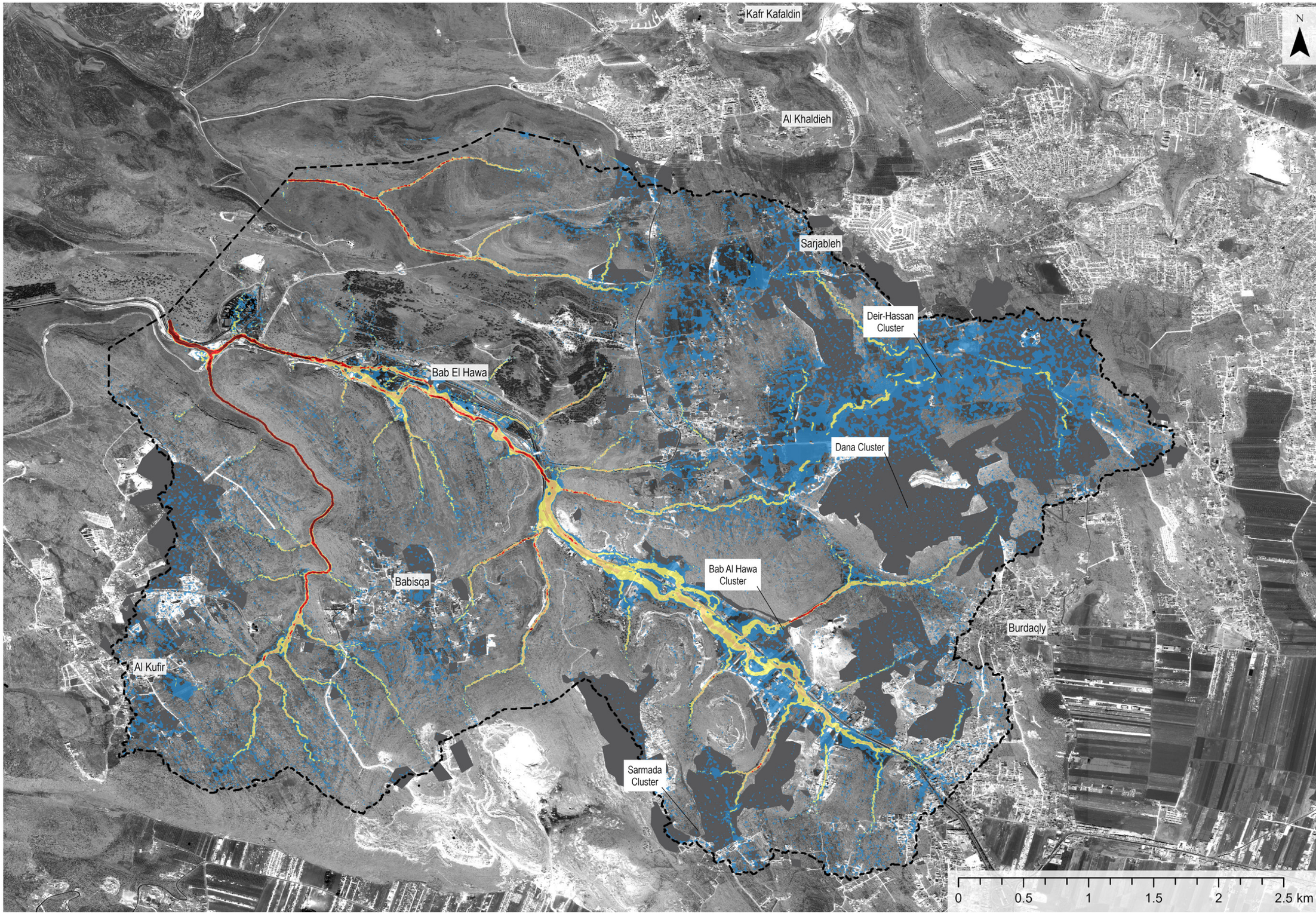
FLOOD HAZARD CLASSIFICATION - CATCHMENT OVERVIEW

98

shelters were found to be exposed to a flood hazard categorized as a medium severity or higher, based on modelled depth x velocity.

Breakdown of shelter exposure to flood hazards

Medium	83
High	15
Very High	0
Extreme	0



Camp cluster

Community

Flood hazard classification

- Low
- Medium
- High
- Very high
- Extreme

*Flood hazard classification based on simplified D*V severity grid symbolisation categories by FEMA : Guidance for Flood Risk Analysis and Mapping*

Satellite imagery:
WV01 from 26 February 2020
GE01 from 8 March 2020

Source: US Department of State, Humanitarian Information Unit, NextView license

MODELLED FLOOD DEPTH RESULTS - Sarjableh Community

71

shelters were found to be located within the modelled flood extents (where flood depth exceeds 200mm).

Breakdown of shelters within modelled flood extents

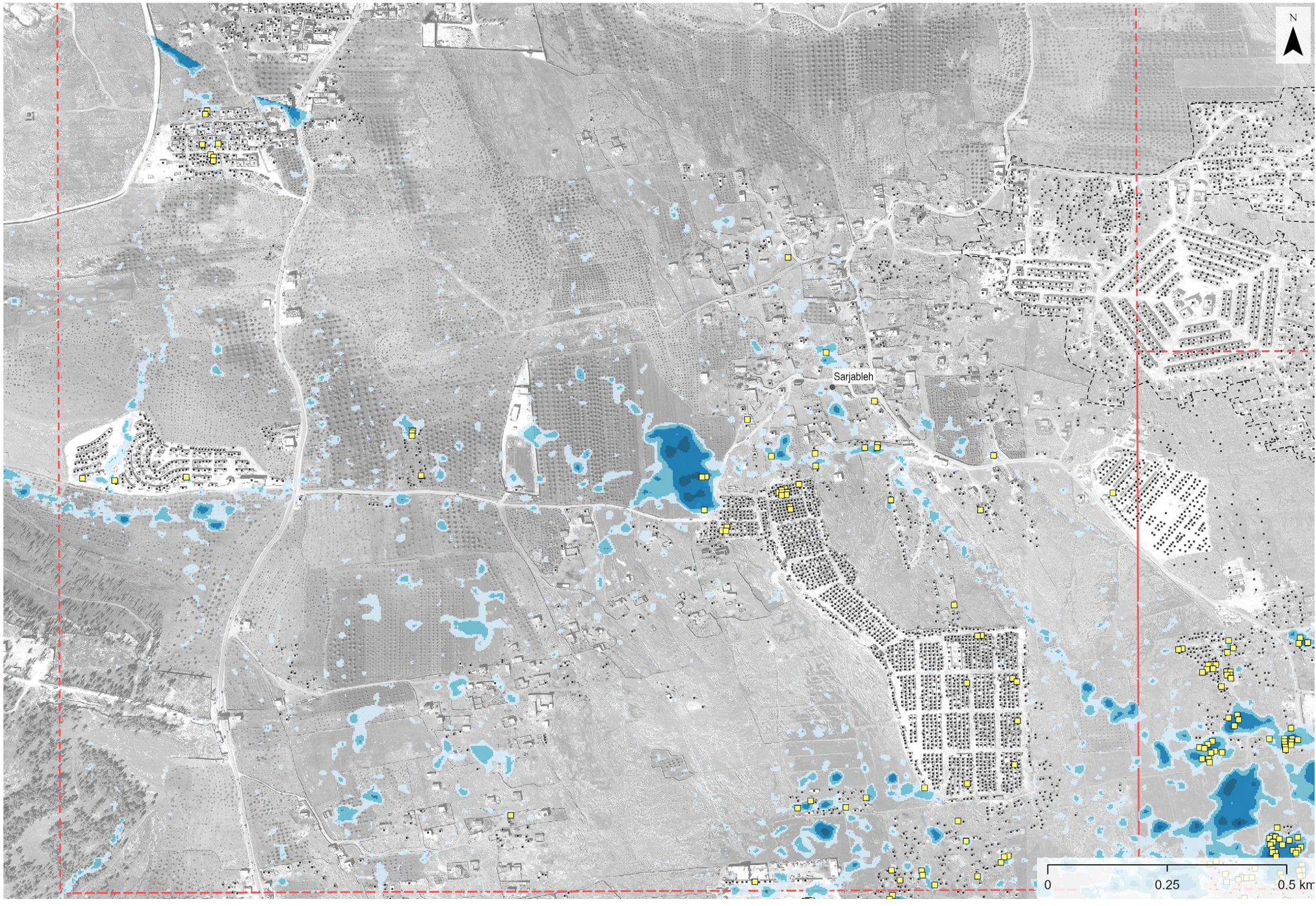
0.2 - 0.5m	61
0.5 - 1.0m	8
1.0 - 3.0m	2
>3.0m	0

- Shelters flood depth >0.2m
- Shelters (August 2020)
- Camp cluster
- Community

Modelled flood depth (m)

- ≤ 0.2 (not displayed)
- ≤ 0.5
- ≤ 1
- ≤ 2
- ≤ 3
- >3
- Analysis extent

Modelled flood extents calculated based on 25-year design storm derived from IDF curves for the city of Gaziantep, Turkey. Peak rainfall intensity is 143.5 mm/hr and the total two storms depth is 96.4 mm over 12 hours.



FLOOD HAZARD CLASSIFICATION - Sarjableh Community

2

shelters were found to be exposed to a flood hazard categorized as a medium severity or higher, based on modelled depth x velocity.

Breakdown of shelter exposure to flood hazards

Medium	2
High	0
Very High	0
Extreme	0

- Shelters exposed to flood hazard (medium hazard or greater)
- Shelters (August 2020)
- Camp cluster
- Community

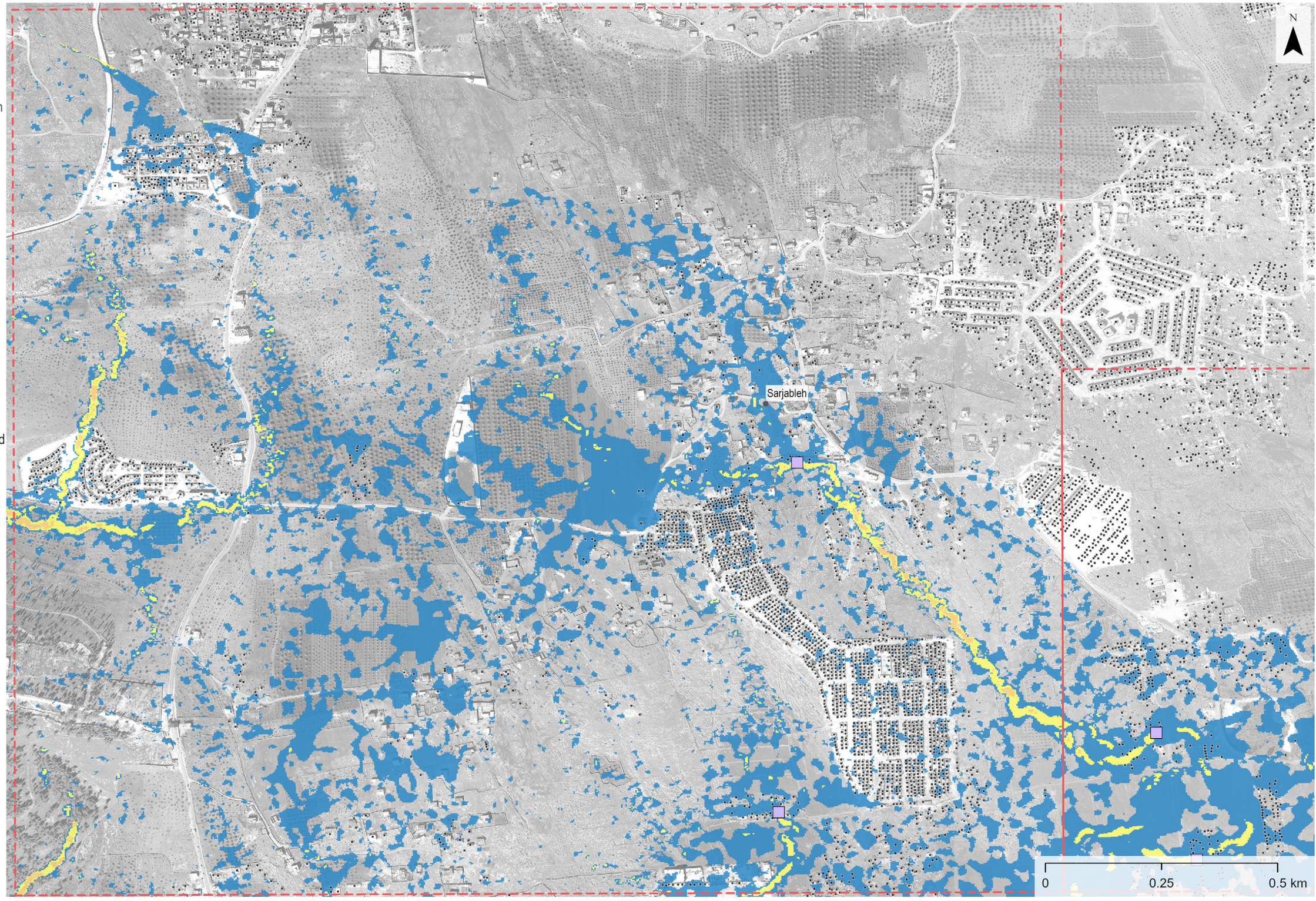
Flood hazard classification

- Low
- Medium
- High
- Very High
- Extreme
- Analysis extent

*Flood hazard classification based on simplified D*V severity grid symbolisation categories by FEMA : Guidance for Flood Risk Analysis and Mapping*

Satellite imagery:
WV01 from 26 February 2020
GE01 from 8 March 2020

Source: US Department of State, Humanitarian Information Unit, NextView license



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MODELLED FLOOD DEPTH RESULTS - Deir Hassan Cluster

655

shelters were found to be located within the modelled flood extents (where flood depth exceeds 200mm).

Breakdown of shelters within modelled flood extents

0.2 - 0.5m	380
0.5 - 1.0m	228
1.0 - 3.0m	47
>3.0m	0

- Shelters flood depth >0.2m
- Shelters (August 2020)
- Camp cluster
- Community

Modelled flood depth (m)

- ≤ 0.2 (not displayed)
- ≤ 0.5
- ≤ 1
- ≤ 2
- ≤ 3
- >3
- Analysis extent

Modelled flood extents calculated based on 25-year design storm derived from IDF curves for the city of Gaziantep, Turkey. Peak rainfall intensity is 143.5 mm/hr and the total two storms depth is 96.4 mm over 12 hours.

N

0 0.25 0.5 km

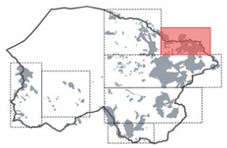
FLOOD HAZARD CLASSIFICATION - Deir Hassan Cluster

30

shelters were found to be exposed to a flood hazard categorized as a medium severity or higher, based on modelled depth x velocity.

Breakdown of shelter exposure to flood hazards

Medium	30
High	0
Very High	0
Extreme	0



Shelters exposed to flood hazard (medium hazard or greater)

Shelters (August 2020)

Camp cluster

Community

Flood hazard classification

Low

Medium

High

Very High

Extreme

Analysis extent

*Flood hazard classification based on simplified D*V severity grid symbolisation categories by FEMA : Guidance for Flood Risk Analysis and Mapping*

Satellite imagery:
WV01 from 26 February 2020
GE01 from 8 March 2020
Copyright: © 2020 DigitalGlobe
Source: US Department of State, Humanitarian Information Unit, NextView license

N

0 0.25 0.5 km

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MODELLED FLOOD DEPTH RESULTS - Dana Cluster

684

shelters were found to be located within the modelled flood extents (where flood depth exceeds 200mm).

Breakdown of shelters within modelled flood extents

0.2 - 0.5m	402
0.5 - 1.0m	206
1.0 - 3.0m	76
>3.0m	0

Shelters flood depth >0.2m
Shelters (August 2020)
Camp cluster
Community

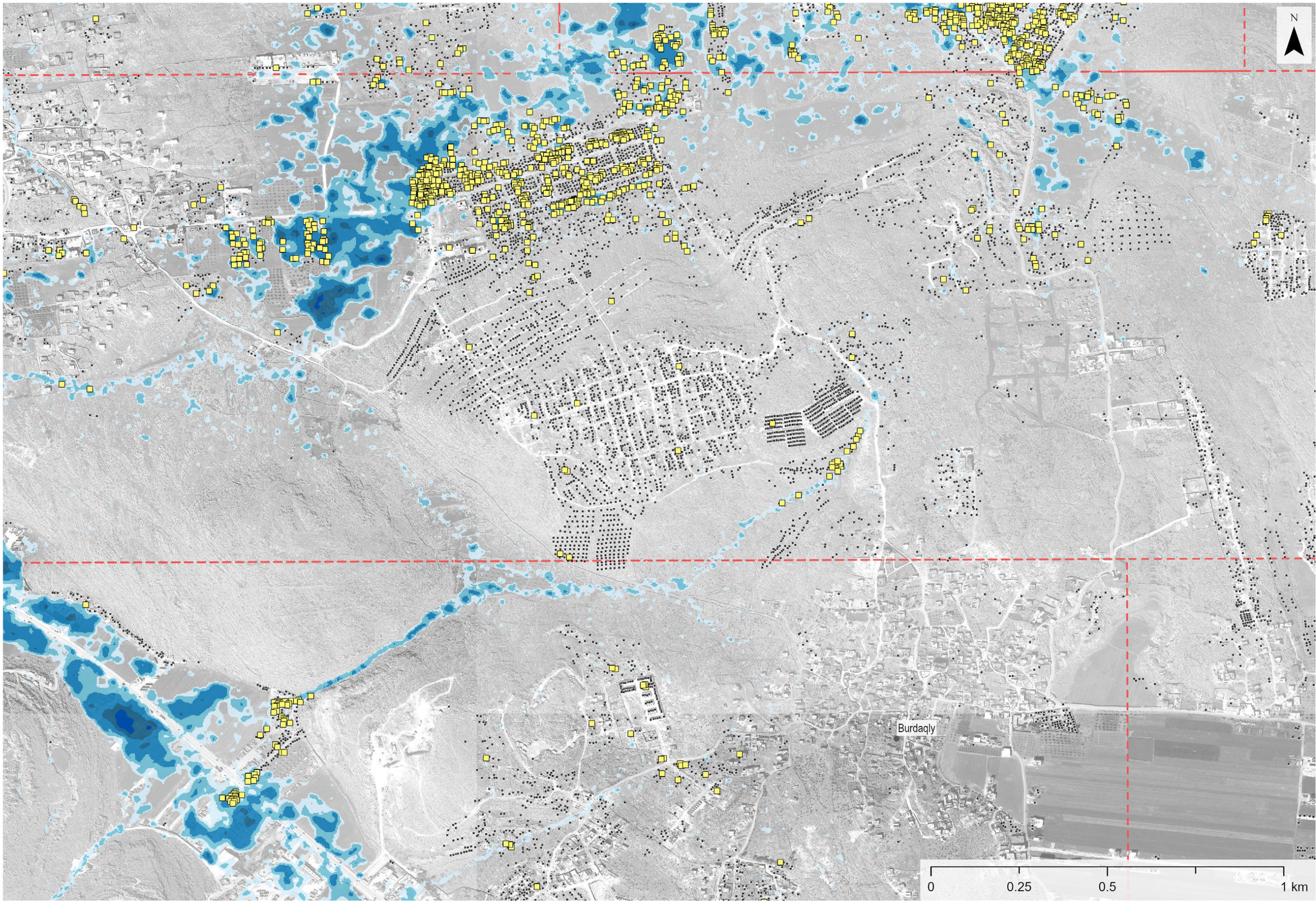
Modelled flood depth (m)

≤ 0.2 (not displayed)
≤ 0.5
≤ 1
≤ 2
≤ 3
>3
Analysis extent

Modelled flood extents calculated based on 25-year design storm derived from IDF curves for the city of Gaziantep, Turkey. Peak rainfall intensity is 143.5 mm/hr and the total two storms depth is 96.4 mm over 12 hours.

Satellite imagery:
WV01 from 26 February 2020
GE01 from 8 March 2020

Source: US Department of State, Humanitarian Information Unit, NextView license



FLOOD HAZARD CLASSIFICATION - Dana Cluster

23

shelters were found to be exposed to a flood hazard categorized as a medium severity or higher, based on modelled depth x velocity.

Breakdown of shelter exposure to flood hazards

Medium	21
High	2
Very High	0
Extreme	0

- Shelters exposed to flood hazard (medium hazard or greater)
- Shelters (August 2020)
- Camp cluster
- Community

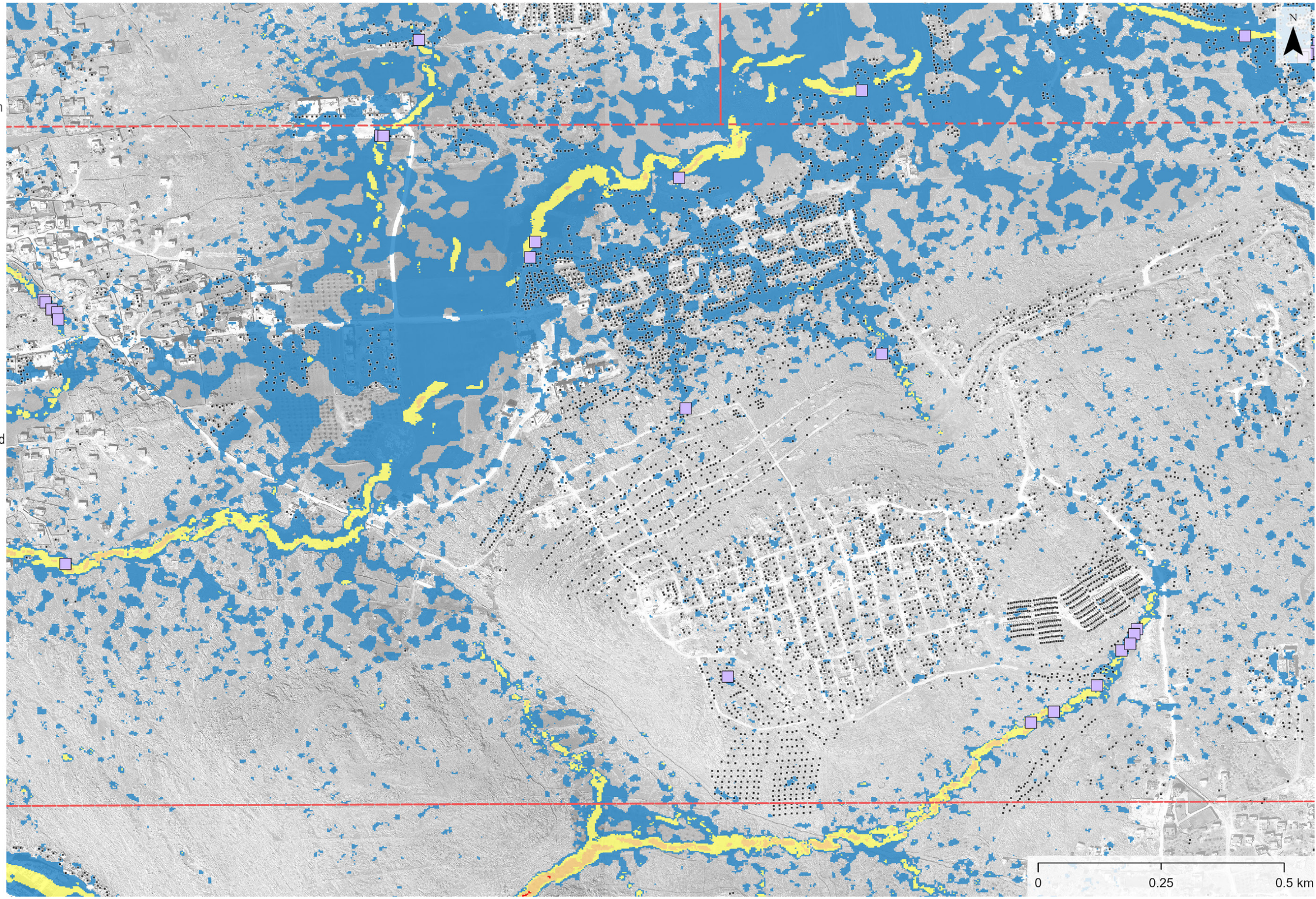
Flood hazard classification

- Low
- Medium
- High
- Very High
- Extreme
- Analysis extent

*Flood hazard classification based on simplified D*V severity grid symbolisation categories by FEMA : Guidance for Flood Risk Analysis and Mapping*

Satellite imagery:
WV01 from 26 February 2020
GE01 from 8 March 2020

Source: US Department of State, Humanitarian Information Unit, NextView license



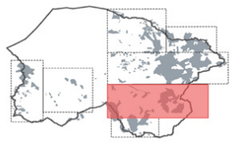
MODELLED FLOOD DEPTH RESULTS - Bab Al Hawa Cluster

114

shelters were found to be located within the modelled flood extents (where flood depth exceeds 200mm).

Breakdown of shelters within modelled flood extents

0.2 - 0.5m	84
0.5 - 1.0m	27
1.0 - 3.0m	3
>3.0m	0



Shelters flood depth >0.2m
Shelters (August 2020)
Camp cluster
Community

Modelled flood depth (m)

≤ 0.2 (not displayed)
≤ 0.5
≤ 1
≤ 2
≤ 3
>3
Analysis extent

Modelled flood extents calculated based on 25-year design storm derived from IDF curves for the city of Gaziantep, Turkey. Peak rainfall intensity is 143.5 mm/hr and the total two storms depth is 96.4 mm over 12 hours.

Satellite imagery:
WV01 from 26 February 2020
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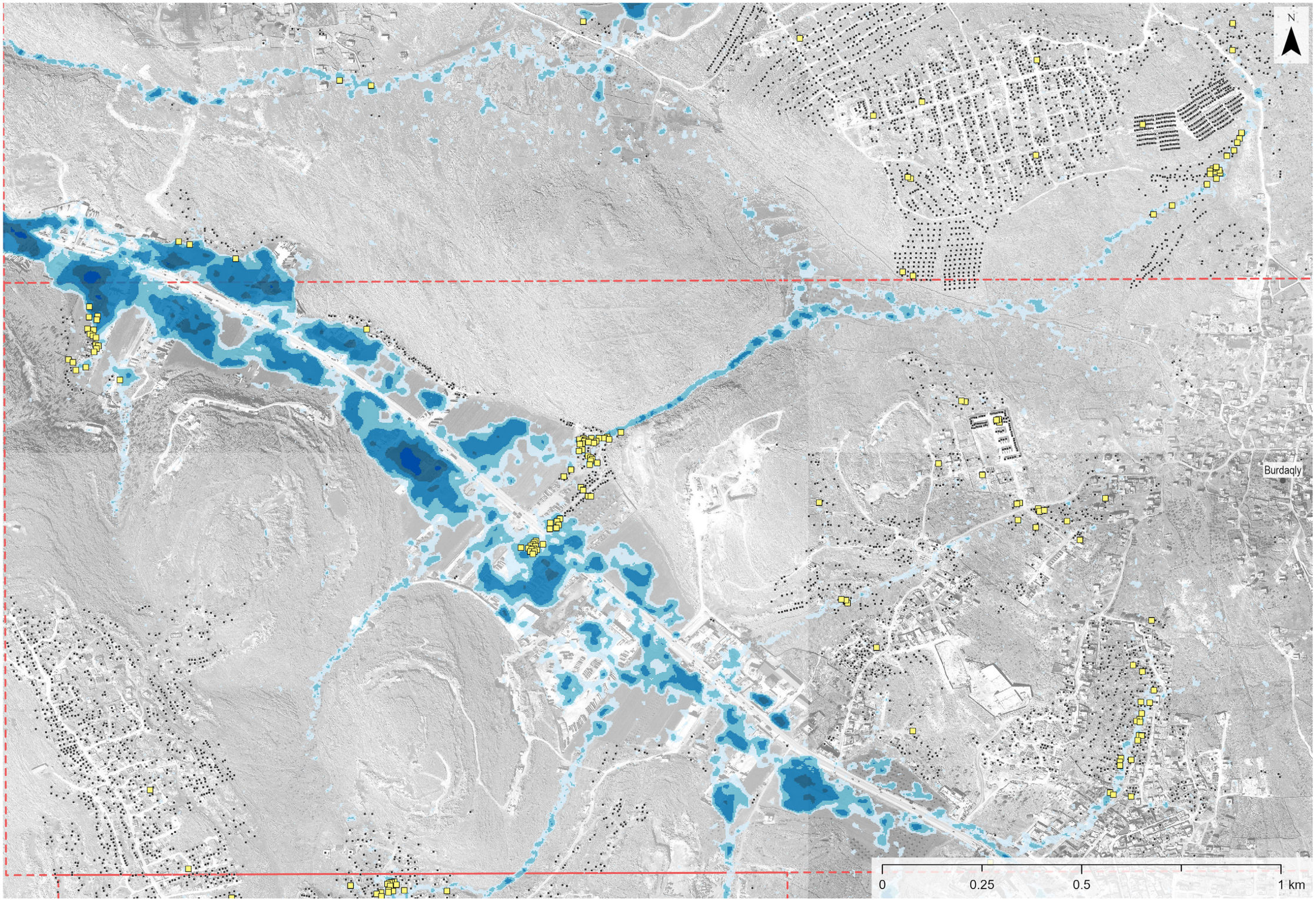
Source: US Department of State, Humanitarian Information Unit, NextView license



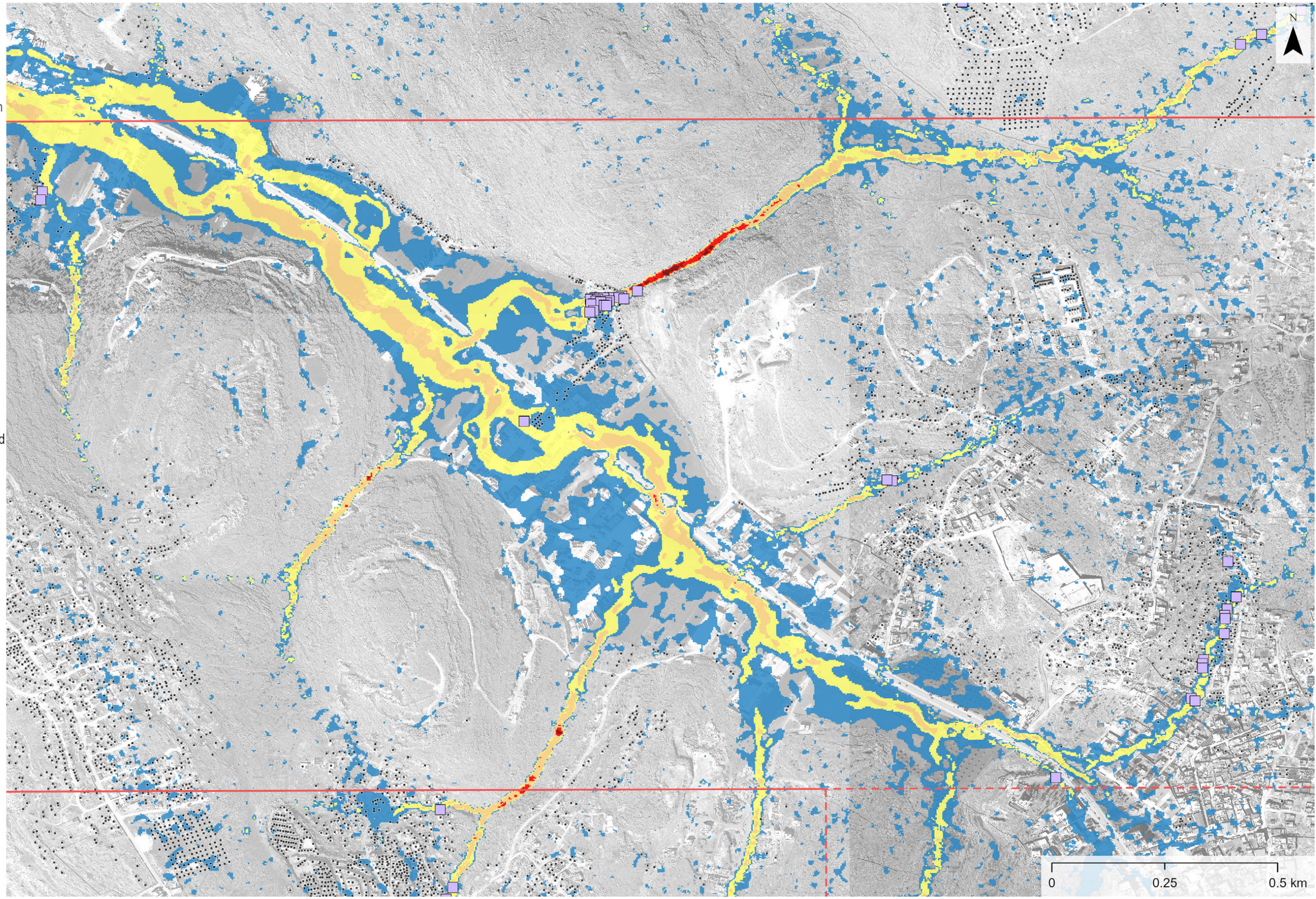
FLOOD HAZARD CLASSIFICATION - Bab Al Hawa Cluster

36

shelters were found to be exposed to a flood hazard categorized as a medium severity or higher, based on modelled depth x velocity.

Breakdown of shelter exposure to flood hazards

Medium	24
High	12
Very High	0
Extreme	0



- Shelters exposed to flood hazard (medium hazard or greater)
- Shelters (August 2020)
- Camp cluster
- Community

Flood hazard classification

- Low
- Medium
- High
- Very High
- Extreme
- Analysis extent

*Flood hazard classification based on simplified D*V severity grid symbolisation categories by FEMA : Guidance for Flood Risk Analysis and Mapping*

Satellite imagery:
WV01 from 26 February 2020
GE01 from 8 March 2020

Source: US Department of State, Humanitarian Information Unit, NextView license

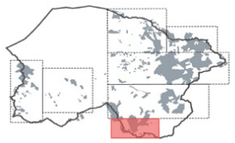
MODELLED FLOOD DEPTH RESULTS - Sarmada Cluster

61

shelters were found to be located within the modelled flood extents (where flood depth exceeds 200mm).

Breakdown of shelters within modelled flood extents

0.2 - 0.5m	49
0.5 - 1.0m	10
1.0 - 3.0m	2
>3.0m	0



Shelters flood depth >0.2m
Shelters (August 2020)
Camp cluster
Community

Modelled flood depth (m)

≤ 0.2 (not displayed)
≤ 0.5
≤ 1
≤ 2
≤ 3
>3
Analysis extent

Modelled flood extents calculated based on 25-year design storm derived from IDF curves for the city of Gaziantep, Turkey. Peak rainfall intensity is 143.5 mm/hr and the total two storms depth is 96.4 mm over 12 hours.

Satellite imagery:
WV01 from 26 February 2020
GE01 from 8 March 2020

Source: US Department of State, Humanitarian Information Unit, NextView license

N

0 0.25 0.5 km

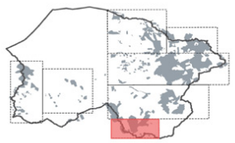
FLOOD HAZARD CLASSIFICATION - Sarmada Cluster

6

shelters were found to be exposed to a flood hazard categorized as a medium severity or higher, based on modelled depth x velocity.

Breakdown of shelter exposure to flood hazards

Medium	6
High	0
Very High	0
Extreme	0



- Shelters exposed to flood hazard (medium hazard or greater)
- Shelters (August 2020)
- Camp cluster
- Community

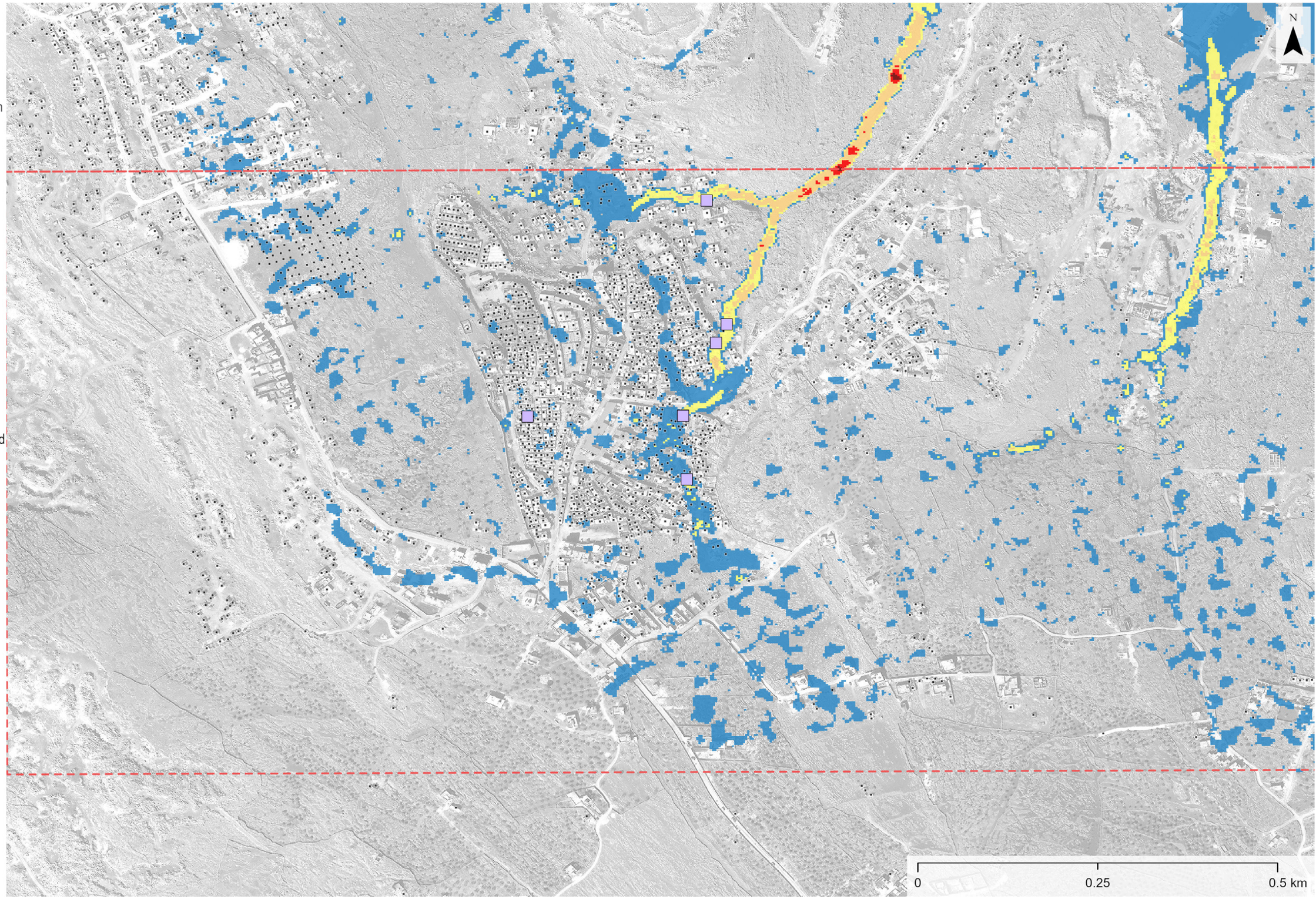
Flood hazard classification

- Low
- Medium
- High
- Very High
- Extreme
- Analysis extent

*Flood hazard classification based on simplified D*V severity grid symbolisation categories by FEMA : Guidance for Flood Risk Analysis and Mapping*

Satellite imagery:
WV01 from 26 February 2020
GE01 from 8 March 2020

Source: US Department of State, Humanitarian Information Unit, NextView license



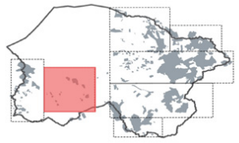
MODELLED FLOOD DEPTH RESULTS - Babsiqa Community

11

shelters were found to be located within the modelled flood extents (where flood depth exceeds 200mm).

Breakdown of shelters within modelled flood extents

0.2 - 0.5m	10
0.5 - 1.0m	0
1.0 - 3.0m	1
>3.0m	0



Shelters flood depth >0.2m
Shelters (August 2020)
Camp cluster
Community

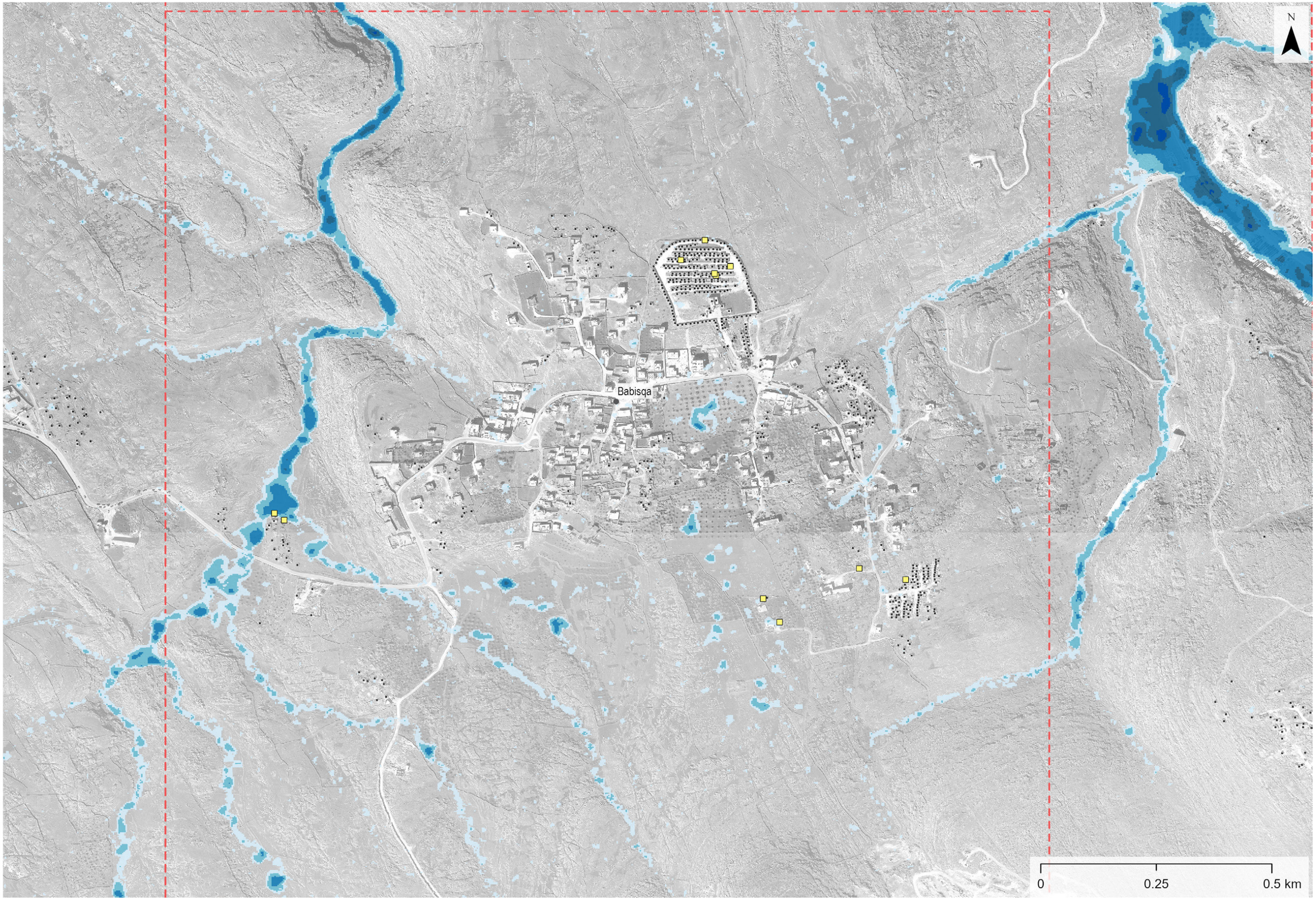
Modelled flood depth (m)

≤ 0.2 (not displayed)
≤ 0.5
≤ 1
≤ 2
≤ 3
>3
Analysis extent

Modelled flood extents calculated based on 25-year design storm derived from IDF curves for the city of Gaziantep, Turkey. Peak rainfall intensity is 143.5 mm/hr and the total two storms depth is 96.4 mm over 12 hours.

Satellite imagery:
WV01 from 26 February 2020
GE01 from 8 March 2020

Source: US Department of State, Humanitarian Information Unit, NextView license



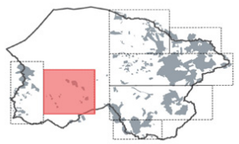
FLOOD HAZARD CLASSIFICATION - Babsiqa Community

1

shelters were found to be exposed to a flood hazard categorized as a medium severity or higher, based on modelled depth x velocity.

Breakdown of shelter exposure to flood hazards

Medium	0
High	1
Very High	0
Extreme	0



- Shelters exposed to flood hazard (medium hazard or greater)
- Shelters (August 2020)
- Camp cluster
- Community

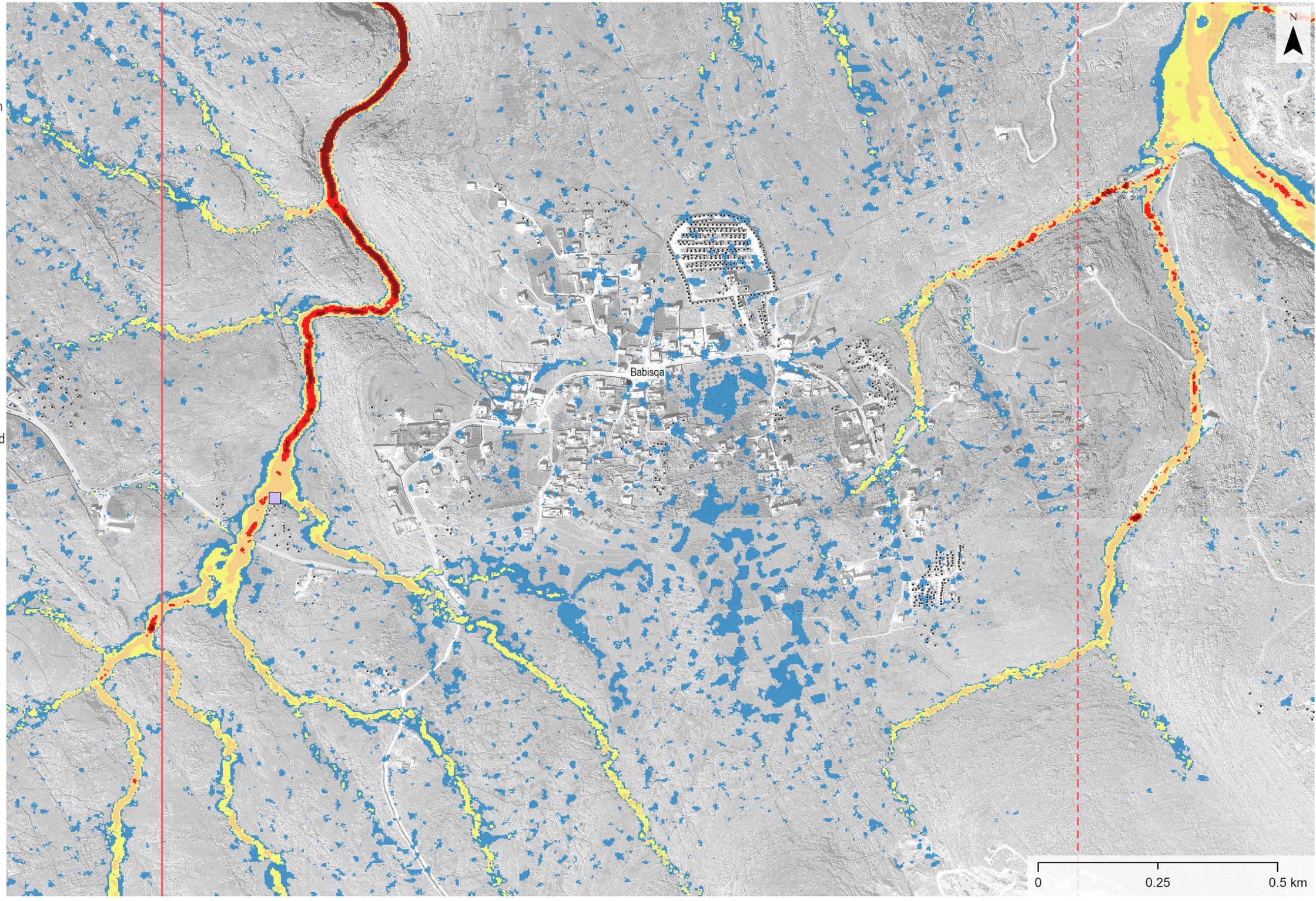
Flood hazard classification

- Low
- Medium
- High
- Very High
- Extreme
- Analysis extent

*Flood hazard classification based on simplified D*V severity grid symbolisation categories by FEMA : Guidance for Flood Risk Analysis and Mapping*

Satellite imagery:
WV01 from 26 February 2020
GE01 from 8 March 2020

Source: US Department of State, Humanitarian Information Unit, NextView license



MODELLED FLOOD DEPTH RESULTS - Al Kufir Community

48

shelters were found to be located within the modelled flood extents (where flood depth exceeds 200mm).

Breakdown of shelters within modelled flood extents

0.2 - 0.5m	40
0.5 - 1.0m	7
1.0 - 3.0m	1
>3.0m	0

Shelters flood depth >0.2m
Shelters (August 2020)
Camp cluster
Community

Modelled flood depth (m)

≤ 0.2 (not displayed)
≤ 0.5
≤ 1
≤ 2
≤ 3
>3
Analysis extent

Modelled flood extents calculated based on 25-year design storm derived from IDF curves for the city of Gaziantep, Turkey. Peak rainfall intensity is 143.5 mm/hr and the total two storms depth is 96.4 mm over 12 hours.

Satellite imagery:
WV01 from 26 February 2020
GE01 from 8 March 2020

Source: US Department of State, Humanitarian Information Unit, NextView license

N

Al Kufir

0 0.25 0.5 km

FLOOD HAZARD CLASSIFICATION - Al Kufir Community

0

shelters were found to be exposed to a flood hazard categorized as a medium severity or higher, based on modelled depth x velocity.

Breakdown of shelter exposure to flood hazards

Medium	0
High	0
Very High	0
Extreme	0

Shelters exposed to flood hazard (medium hazard or greater)

Shelters (August 2020)

Camp cluster

Community

Flood hazard classification

Low

Medium

High

Very High

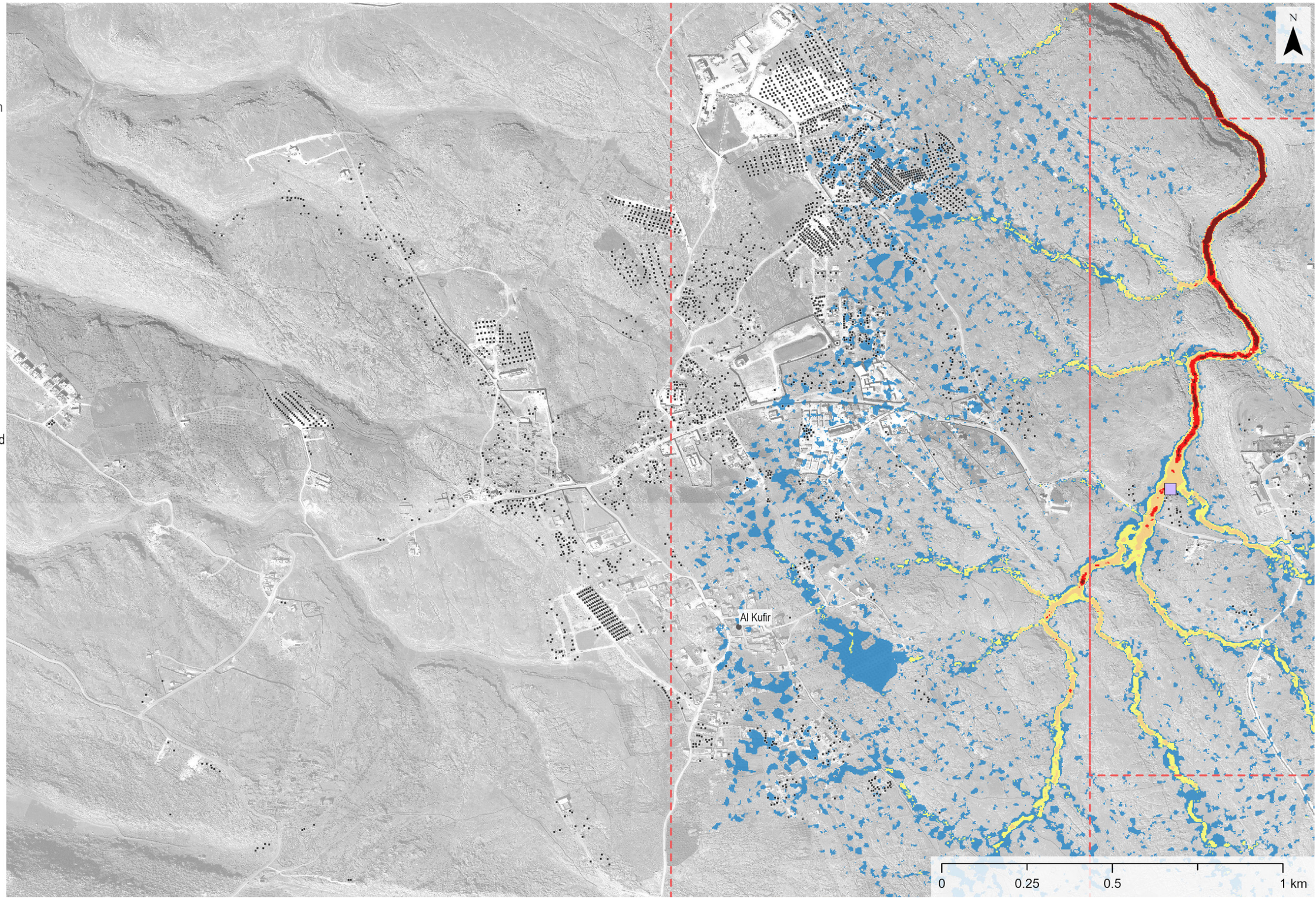
Extreme

Analysis extent

*Flood hazard classification based on simplified D*V severity grid symbolisation categories by FEMA : Guidance for Flood Risk Analysis and Mapping*

Satellite imagery:
WV01 from 26 February 2020
GE01 from 8 March 2020

Source: US Department of State, Humanitarian Information Unit, NextView license



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