T.C.
Orman ve Su İşleri
Bakanlığı

GENERAL DIRECTORATE OF STATE HYDROLIC WORKS

FLOOD-PROTECTION MEASURES (Flood Hazard Maps)

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CONTENT

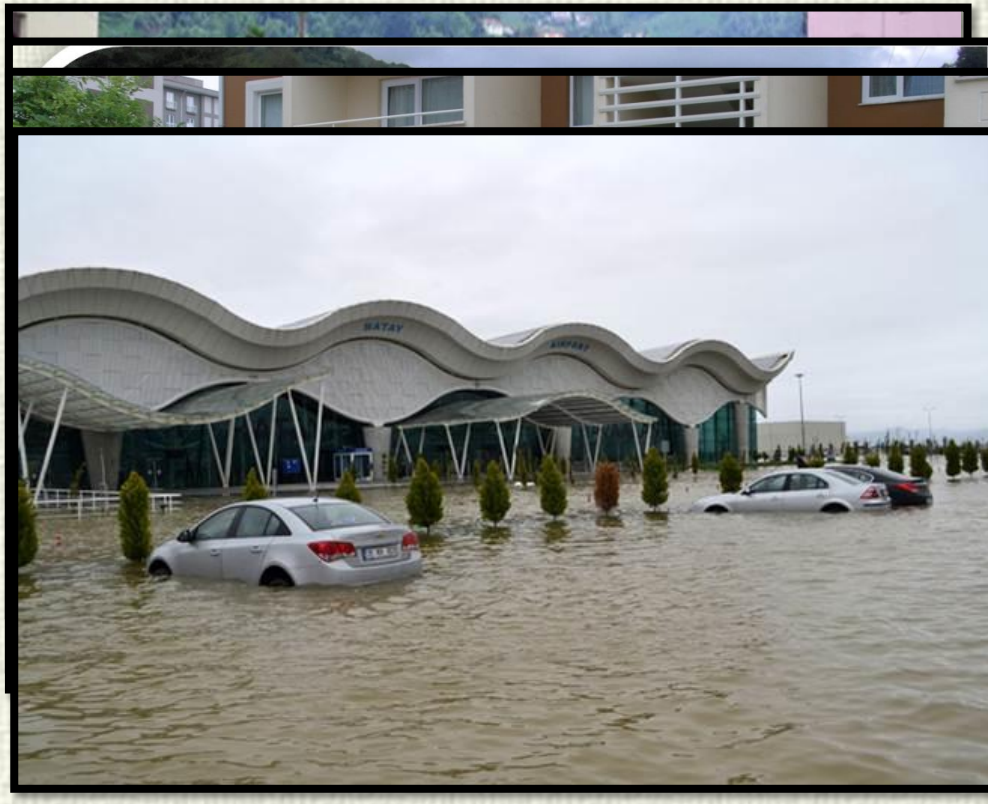
- Historical Floods
- Causes of Floods in Our Country
- Flood-Protection Measures
- Flood Hazard Maps

HISTORICAL FLOODS

Year	Flood Number	Loss of Life	The Damaged Area (ha)
1989-2000	116	311	264 000
2001 - 2012	513	237	292 000
1989-2012	**629**	**548**	**556 000**

CAUSES OF FLOODS IN OUR COUNTRY

- Riverbed interventions
- Improper transition structures (bridge, culvert etc.)
- Faulty spatial planning
- Vegetation destruction
- Increases in rainfall intensity due to climate change



FLOOD-PROTECTION MEASURES

- Structural Flood-Protection Measures

- Non-Structural Flood-Protection Measures

STRUCTURAL FLOOD-PROTECTION MEASURES

- Dams (flood-protection benefits)

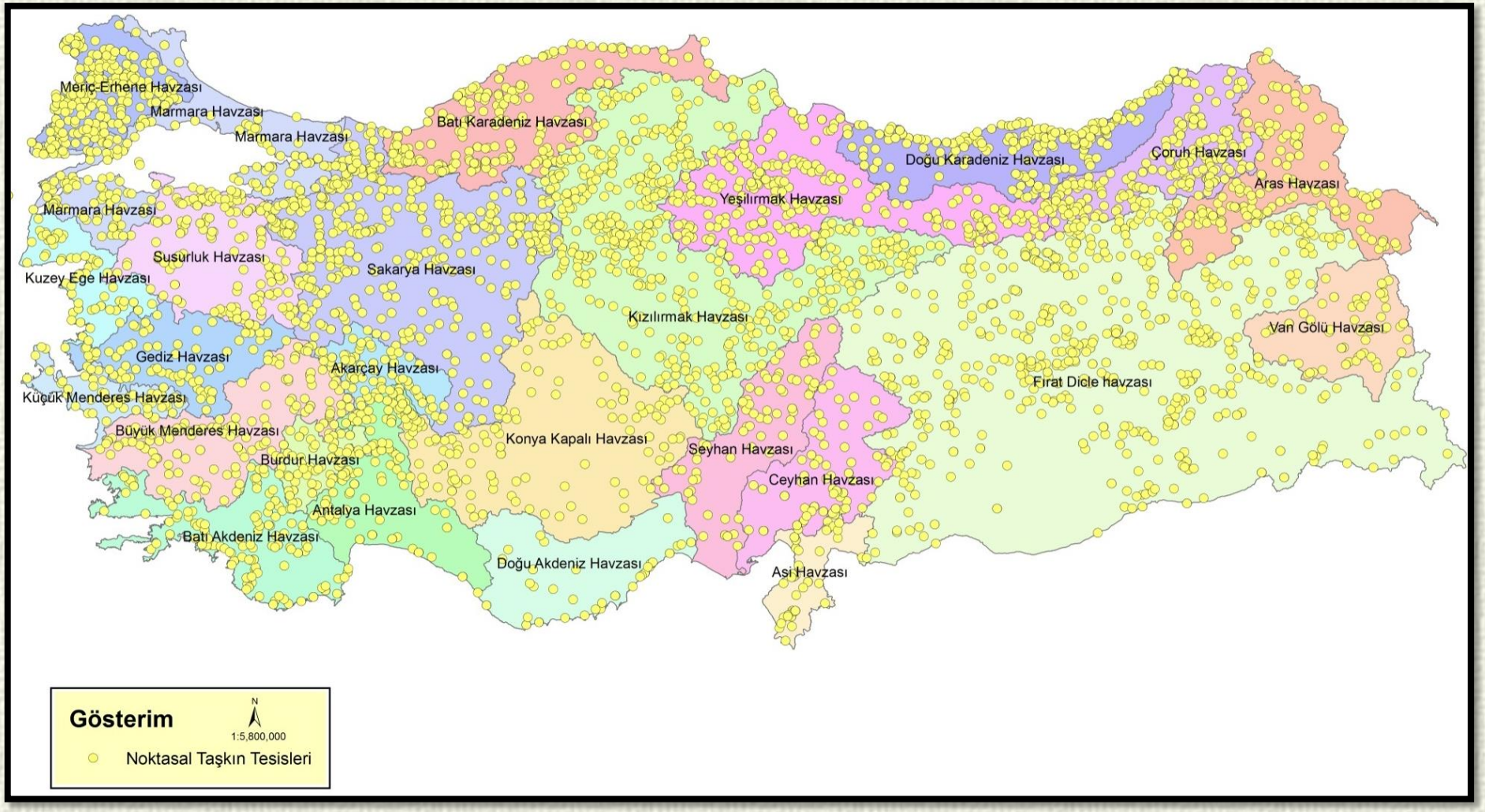
- Erosion and sediment-control measures (the upper basin measures)
  - Check dams (Islah sekisi)
  - Sediment-storage dams (Tersip bendi)
  - Ground sills (Taban kuşağı)
  - Dwarf walls (Brit)

- Downstream flood-protection measures
  - Floodwalls
  - Levees

STRUCTURAL FLOOD-PROTECTION MEASURES

	Number	The Protected Area (ha)
Flood facilities	6188	264 000
Dams	68	292 000
Total	**6256**	**556 000**

STRUCTURAL FLOOD-PROTECTION MEASURES



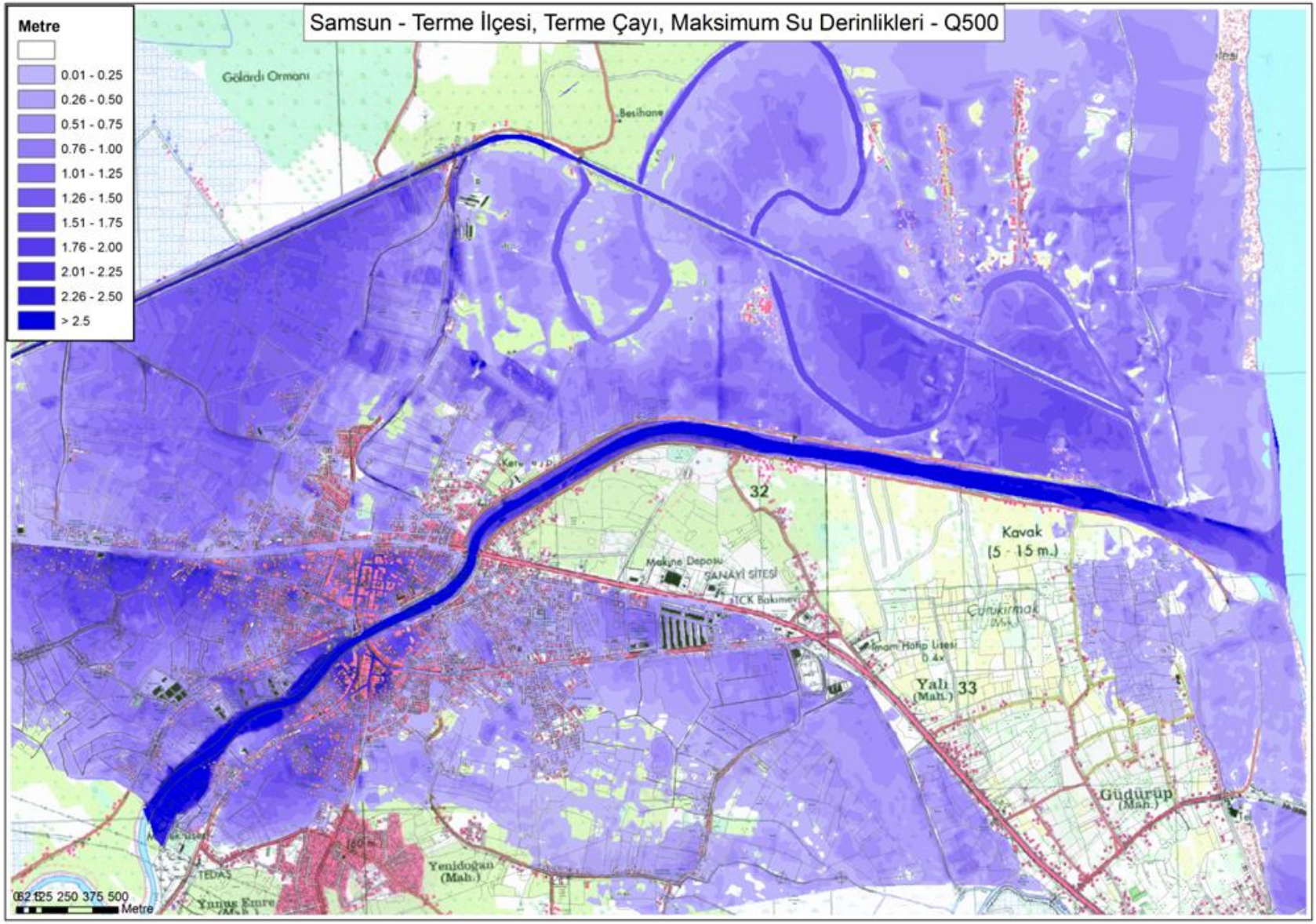
NON-STRUCTURAL FLOOD-PROTECTION MEASURES

- Land use plans
- Hydrometric and meteorological observations
- Flood forecasting and early warning systems
- Flood hazard maps
- Flood database (GIS)
- Flood action plan (2014-2018)

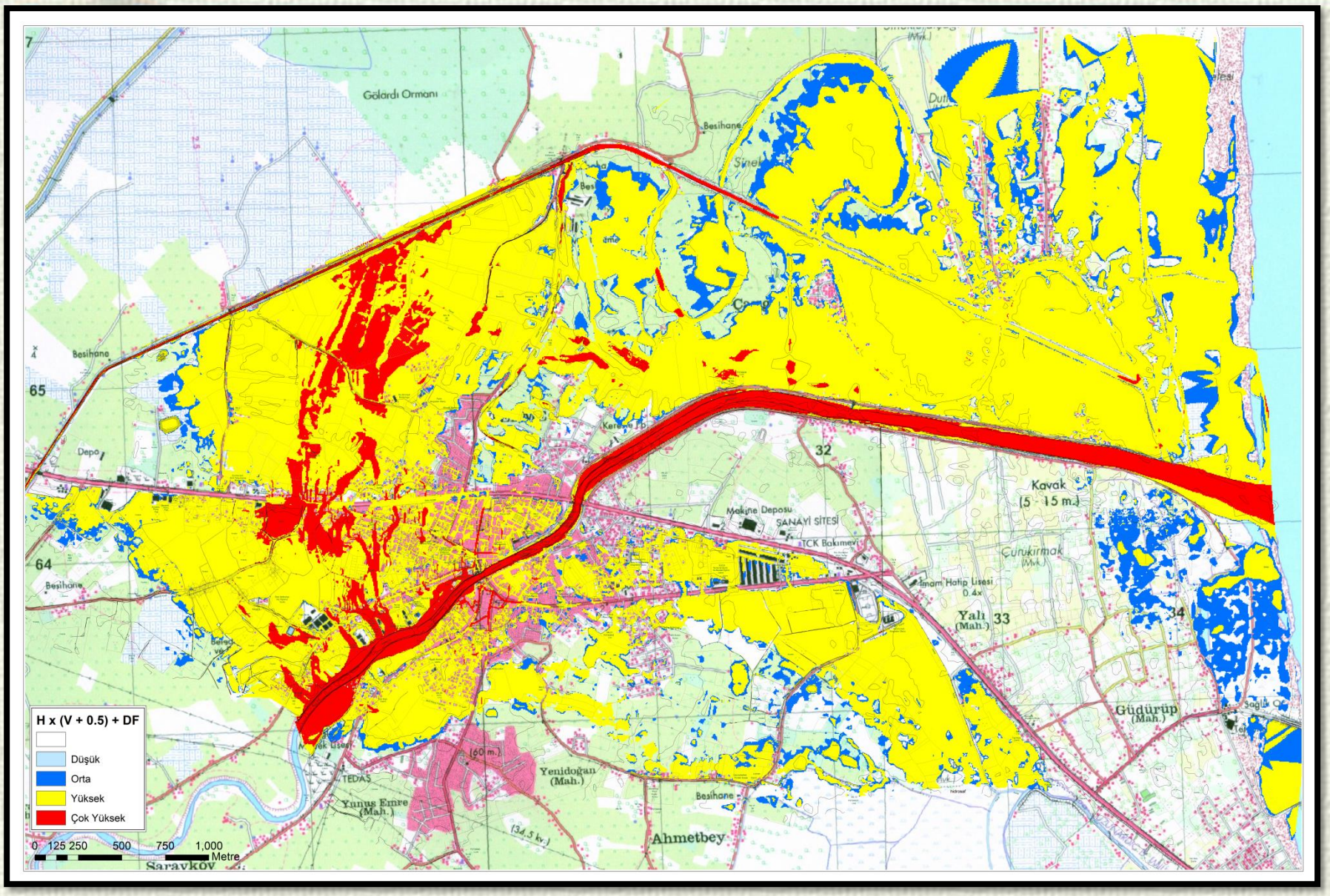
FLOOD MAPS

- Water depth maps
- Flood hazard maps
- Flood risk maps

FLOOD MAPS


Samsun - Terme İlçesi, Terme Çayı, Maksimum Su Derinlikleri - Q500
Metre
0.01 - 0.25
0.26 - 0.50
0.51 - 0.75
0.76 - 1.00
1.01 - 1.25
1.26 - 1.50
1.51 - 1.75
1.76 - 2.00
2.01 - 2.25
2.26 - 2.50
> 2.5
Gölardı Ormanı
Besihane
32
Kavak
(5 - 15 m.)
Makine Deposu
SANAYİ SİTESİ
TCK Bakımevi
Çürükırmak
İmam Hatip Lisesi
Yalı
(Mah.)
33
Güdürüp
(Mah.)
Yenidoğan
(Mah.)
TEDAŞ
Yunus Emre
0 62.5 125 250 375 500
Metre

FLOOD MAPS


H x (V + 0.5) + DF
Düşük
Orta
Yüksek
Çok Yüksek
0 125 250 500 750 1,000
Metre
Gölardı Ormanı
Besihane
Depo
Makine Deposu
SANAYİ SİTESİ
TCK Bakımevi
Kavak
(5 - 15 m.)
Çürükırmak
(Mv.)
İmam Hatip Lisesi
Yalı
(Mah.)
Güdürüp
(Mah.)
Yenidoğan
(Mah.)
Yunus Emre
(Mah.)
TEDAŞ
Ahmetbey
Saraykoy
(60 m.)
(34,5 kv.)
65
64
32
33
34

FLOOD MAPS

Flood risk maps: ← **Flood hazard maps**

- The number of people potentially affected
- Potentially affected economic activities
- Facilities will lead to pollution due to floods etc.

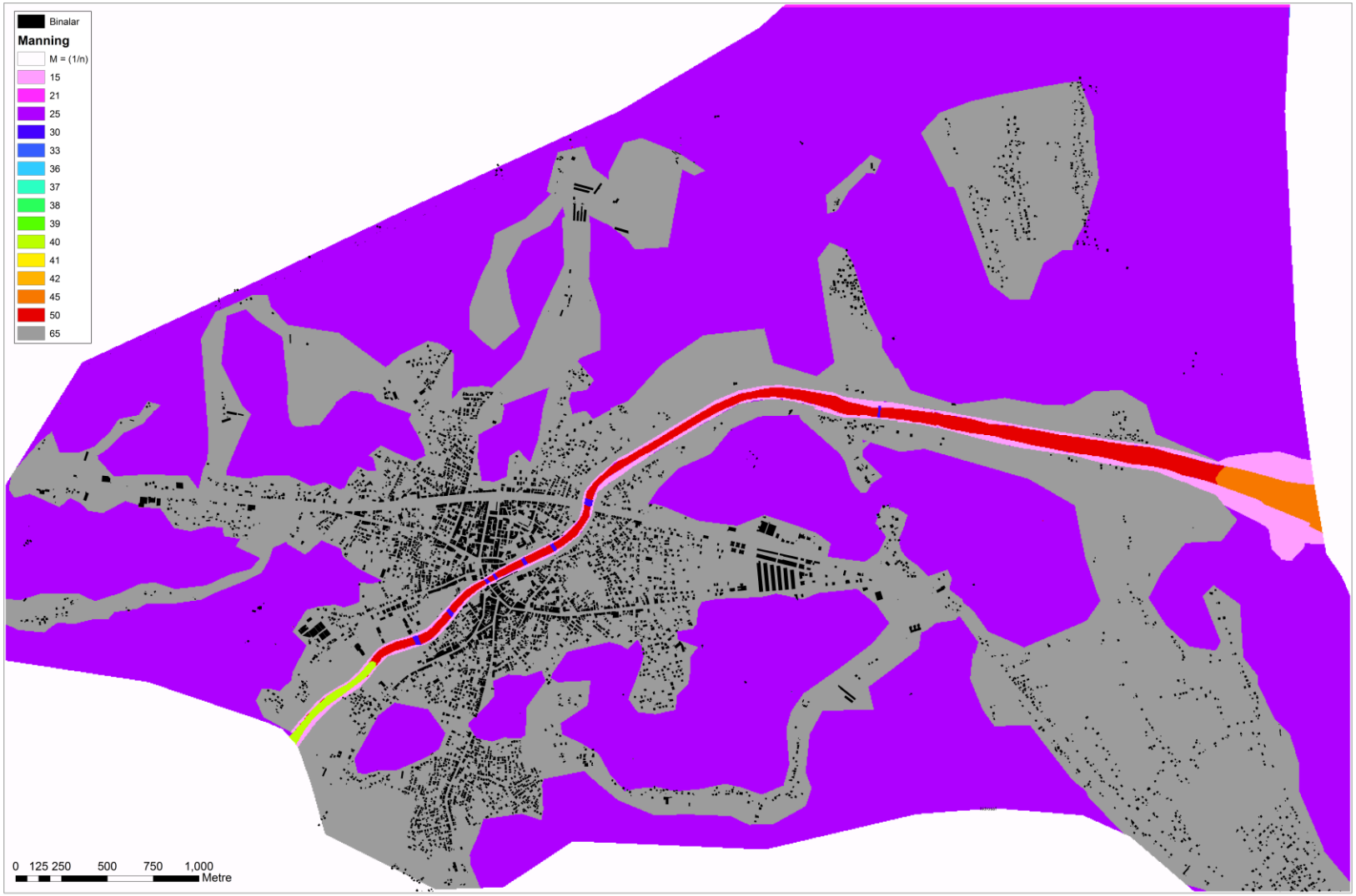
FLOOD HAZARD MAPS

- Mapping studies
- Determination of roughness coefficient studies
- Hydrological studies
- GIS studies
  - DEM + Buildings
- Hydraulic modelling studies
  - 1D Flood modelling
  - 2D Flood modelling

Mapping studies

- Scale
- Land use plan
- Bathymetric map

FLOOD HAZARD MAPS



FLOOD HAZARD MAPS

Hydrological studies

- Stream gauging station (AGİ)
- Flood frequency analysis methods

FLOOD HAZARD MAPS

Hydrological studies

Q_2

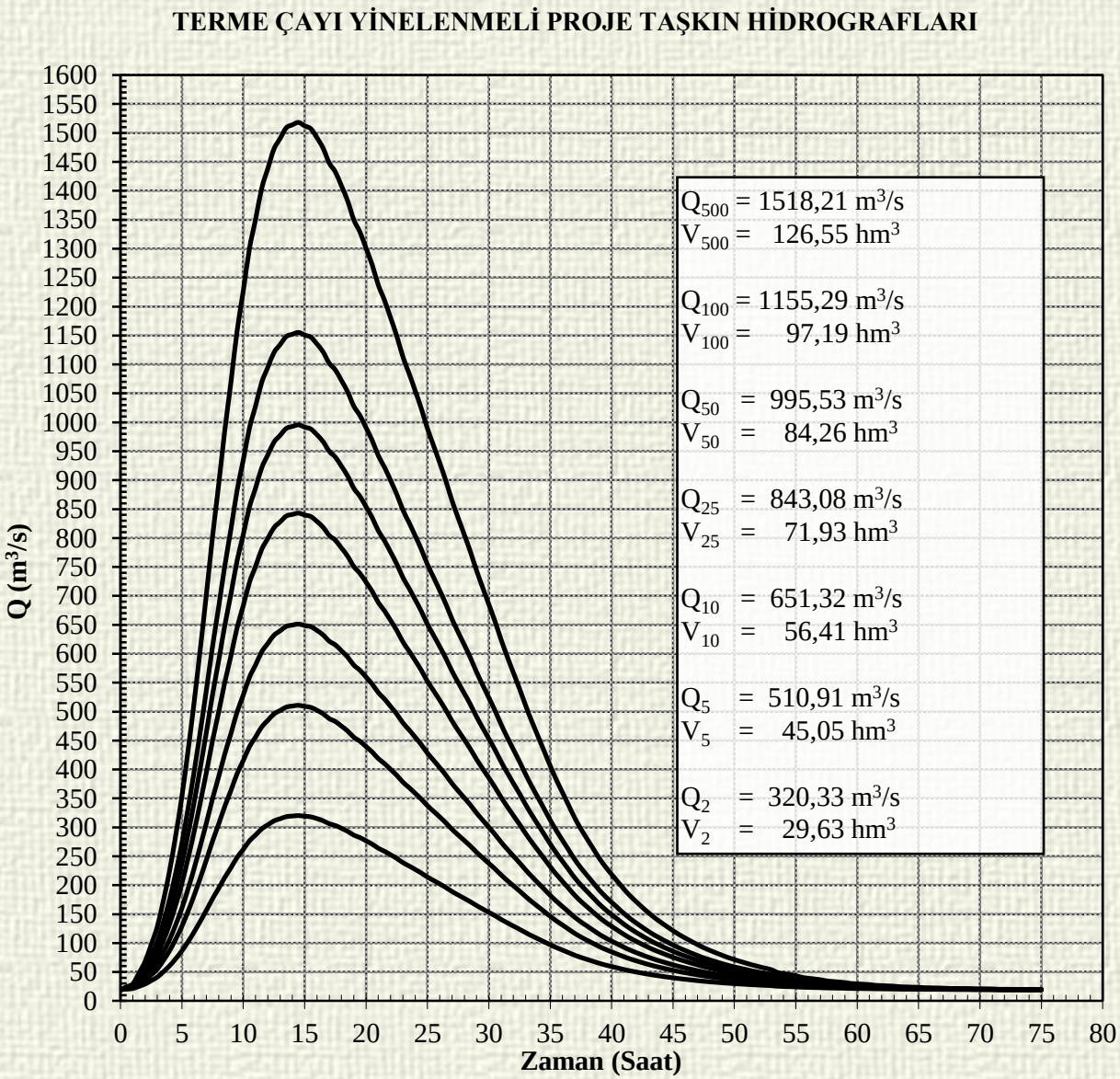
Q_5

Q_{10}

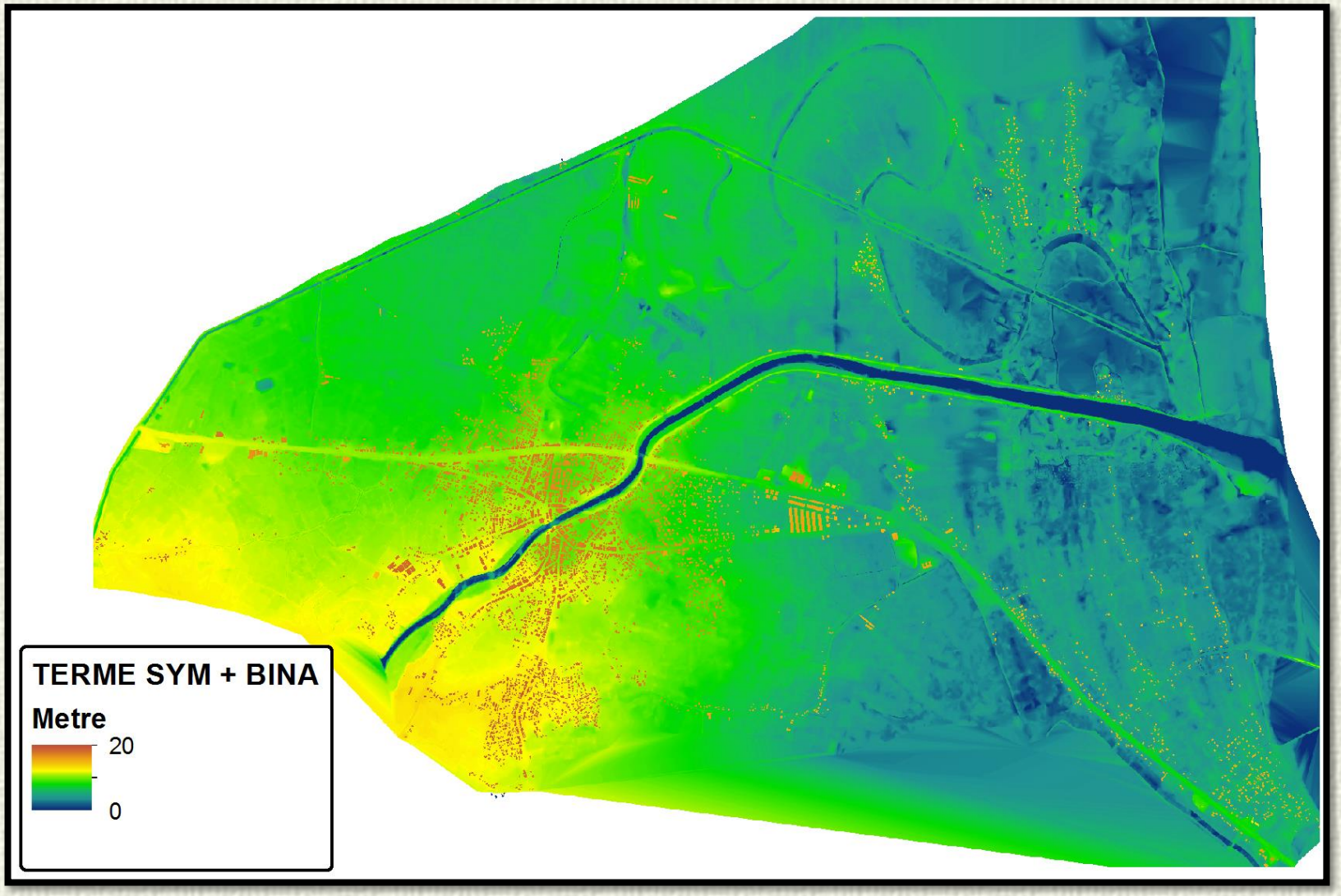
Q_{50}

Q_{10}

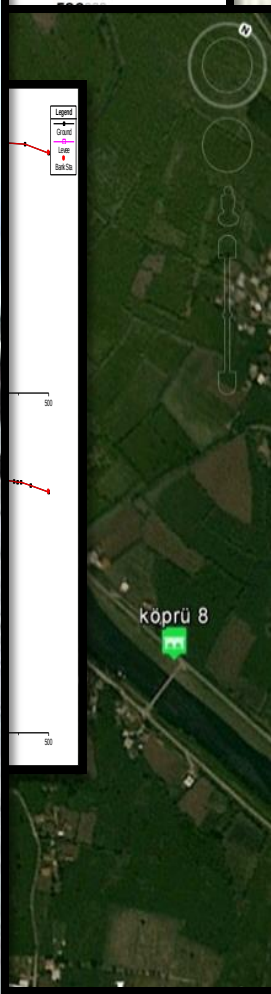
Q_{500}



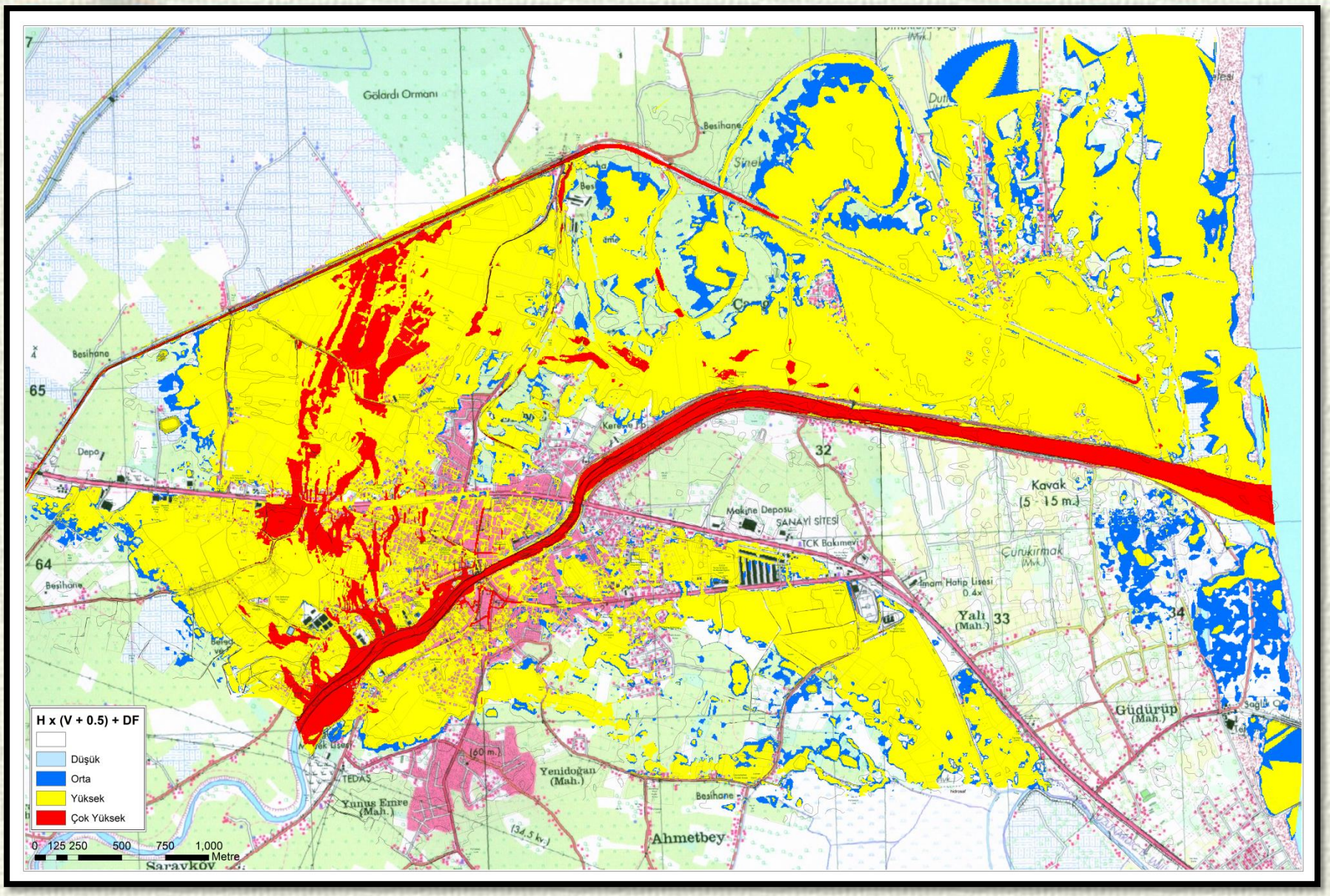
FLOOD HAZARD MAPS



FLOOD HAZARD MAPS



FLOOD HAZARD MAPS



1D AND 2D FLOOD MODELLING

	2D	1D
Data preparation time	↑	↓
Cost	↑	↓
Run time	↑	↓
Water spread area	continuous	not-continuous
Calculate direction	x, y	x

FLOOD HAZARD MAPS

Completed project:

- Determination of flood hazard areas in district centre rivers Samsun-Havza, Terme ve 19 Mayıs

FLOOD HAZARD MAPS

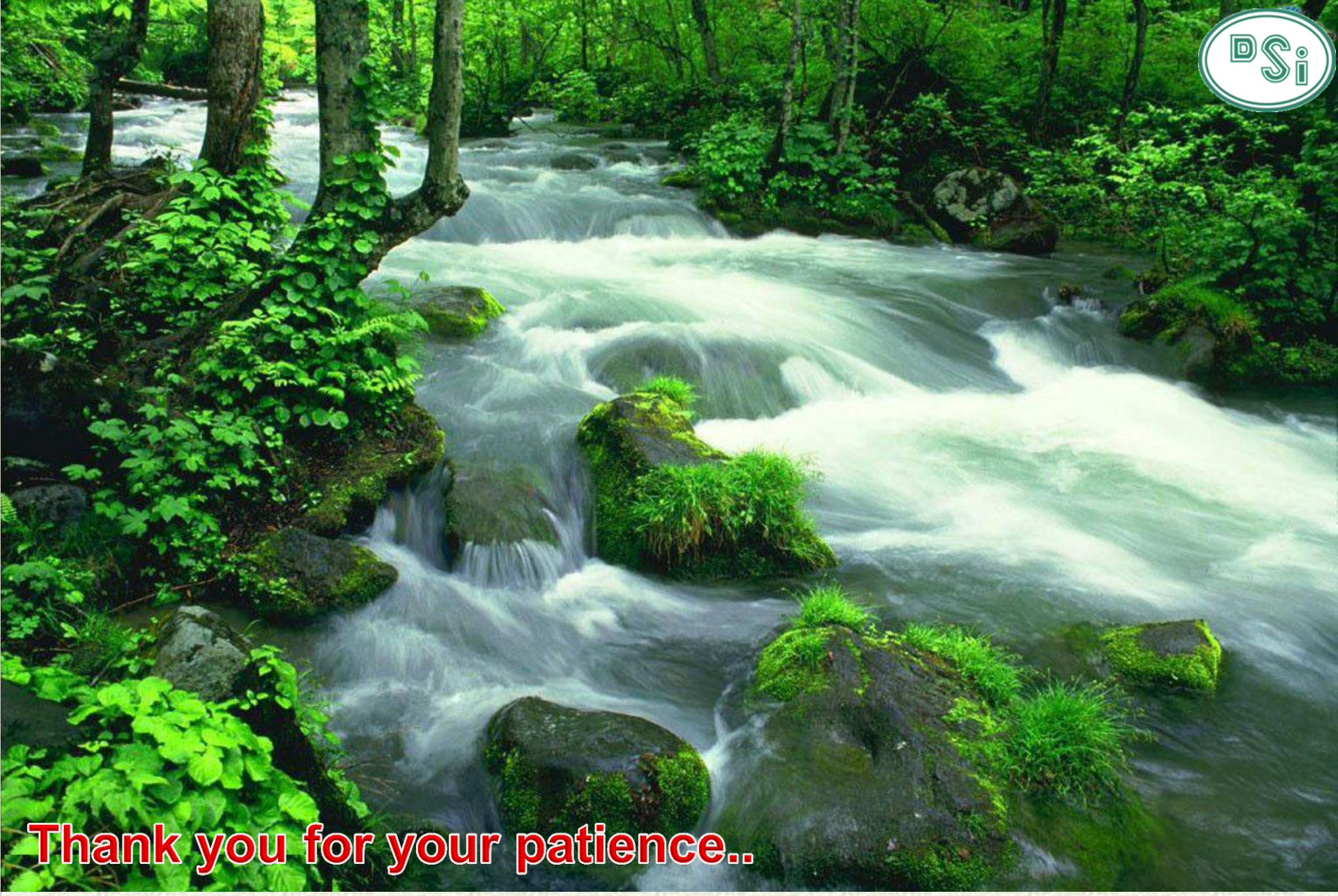
On-going projects:

- Determination of flood hazard areas Mersin-Tarsus Berdan River
- Determination of flood hazard areas Trabzon
- Determination of flood hazard areas Rize
- Determination of flood hazard areas Giresun
- Determination of flood hazard areas Gümüşhane
- Determination of flood hazard areas Bayburt

FLOOD HAZARD MAPS

Projects in our investment program:

- Determination of flood hazard areas Kastamonu
- Determination of flood hazard areas Zonguldak
- Determination of flood hazard areas Karabük
- Determination of flood hazard areas Bartın
- Determination of flood hazard areas Sivas
- Determination of flood hazard areas İzmir
- Determination of flood hazard areas Manisa
- Determination of flood hazard areas Uşak



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