



WATER MANAGEMENT IN TURKEY AND IN ISTANBUL

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WATER MANAGEMENT IN TURKEY

Turkey in General

Role of Government Agencies in Water Management

Legal Framework of Water Management

Water Resources & Shortage in Turkey

Water Need and Projection



LOCATION

Turkey is located on the crossroads of Europe and Asia, and extends over Dardanelles and Bosphorus straits allowing a natural connection between the Mediterranean and the Black Sea.



RIVER BASINS

%28 Population

Water capacity: 1500 m³/capita.year



%10 Population

Water capacity: 3000m³/capita.ye



ROLE OF GOVERNMENT AGENCIES IN WATER MANAGEMENT

PRIME MINISTRY

MINISTRY FOR DEVELOPMENT

MINISTRY OF FORESTRY AND WATER AFFAIRS

- DG Water Management
- DG for Combat against Desertification and Erosion
- DG for Nature Conservation and National Parks

- DG State Hydraulic Works
- DG Forestry
- DG Meteorology

MINISTRY OF FOOD, AGRICULTURE AND LIVESTOCK

- DG Agricultural Reform
- DG Fisheries and Aquaculture

MINISTRY OF ENERGY AND NATURAL RESOURCES

- DG Mineral Research and Exploration

MINISTRY OF ENVIRONMENT AND URBANISATION

- DG Environmental Management
- DG EIA, Licenses and Inspection
- DG Disaster Affairs

- Bank of Provinces
- DG Conservation of Natural Assets

MINISTRY OF INTERIOR

- DG Local Administrations
- DG Provincial Administrations

MINISTRY OF HEALTH

- Directorate of Public Health
- Directorate of Health Group

MINISTRY OF CULTURE AND TOURISM

- DG Promotion



ROLE OF GOVERNMENT AGENCIES IN WATER MANAGEMENT

General Directorate of WATER MANAGEMENT (2012)

General Directorate of Water Management is the major organization responsible for coordination, policy and legislation of water management in Turkey. Planning and evaluation on water use, water quality&quantity and investments on water are also exclusively under the responsibility of this GA.

General Directorate of STATE HYDRAULIC WORKS (DSİ) (1953)

DSİ is the other major organization responsible for the development and management and preservation of water resources in Turkey. Development, management and conservation of groundwater resources are also exclusively under the responsibility of DSİ.



ROLE OF GOVERNMENT AGENCIES IN WATER MANAGEMENT

LOCAL WATER INSTITUTIONS (GOVERNMENT AGENCIES)

Metropolitan Hydraulic institutions, such as İSKİ (Istanbul Municipality Waterworks) (1981), ASKİ... etc. are the local organizations responsible for the development and management and preservation of water resources in metropolitan areas.



LEGAL FRAMEWORK OF WATER MANAGEMENT

The first prominent governmental action related to the qualitative assessment of water resources is the enactment of “**Environmental Law**” in 1983. The basic theme of this law is the introduction of the “polluter pays” principle.

The first article of the law specifies its purpose as being not only the prevention and elimination of pollution but also the preservation and utilization of natural resources in the most appropriate manner.



LEGAL FRAMEWORK OF WATER MANAGEMENT

The “**Water Pollution Control Regulation**” was prepared and became effective in 1988. In this regulation, two basic approaches to water resources have been adopted.

First one of these approaches is the acceptance and treatment of water resources within the framework of an ecosystem and conservation of them in their existing conditions.

The second one being the protection and improvement of water quality in accordance with the requirements of the country. Protection of drinking water supply reservoirs through buffer zones and land use restrictions, and control on waste-water discharge practices are two critical aspects of the regulation.



LEGAL FRAMEWORK OF WATER MANAGEMENT

The concept of **Environmental Impact Assessment (EIA)** for proposed projects was introduced in the Environmental Law; and accordingly, EIA Regulation was issued in 1993.

Within the framework of this regulation, dams and groundwater utilization providing a withdrawal of more than 10 million m³/year have been subject to EIA studies. Since 1993, DSI has been carrying out EIA studies for those projects that fall into this category.



RECENT REGULATIONS

- Legislation related to Protection of watershed and preparation of watershed management plans (2012)
 - Watershed protection action plans ➡ Watershed management plans
- Legislation related to surface water quality for drinking water and water pollution control (2012)
 - National water quality monitoring network
- Legislation related to protection of ground water resources (2012)



LEGAL FRAMEWORK OF WATER MANAGEMENT

Studies on «Water Law» are surrounding;

- To integrate & coordinate the related authorities
- Basin adopted water management & allotment
- Water management in quality & quantity
- Preparation of flood management plans and integrating these plans into the spatial & development plans
- Preparation of National Water Plan
- Authorizing Water Management Supreme Board
- Setting up the national water information system
- Recognizing the ecosystem needs in water usage and water constructions
- Adaptation to the EU Water Directive



WATER RESOURCES & SHORTAGE IN TURKEY

- Total surface area of 779.452 km², of which 765.152 km² is land and the remaining 14.300 km² is water surface
- The total length of the coastline along the surrounding seas is 8.300 km
- 59% of the total population of Turkey, which is currently around 75 million, is presently dwelling in urban centers whereas the remaining 41% is living in rural areas
- The climate of Turkey is semi-arid with extremities in temperature. Climate and precipitation figures exhibit great variance throughout the country



WATER RESOURCES & SHORTAGE IN TURKEY

- With respect to the situation of the country, contrary to the general perception, Turkey is neither a country rich in freshwater resources nor the richest country in the region in this respect.
- Water rich countries are those which have 10.000 cubic meters of water per capita yearly. This is well above the 1.500 cubic meters per capita in Turkey
- Another point is that Turkey's water is not always in the right place at the right time to meet present and anticipated needs. Certain regions of Turkey such as the Black Sea region have ample but unusable fresh water, while some of the more heavily populated and industrialized regions such as the Marmara and the Aegean regions lack sufficient fresh water.



WATER RESOURCES & SHORTAGE IN TURKEY

- Annual Precipitation: 501 billion m³ (643 mm)
- Annual Surface Water Capacity: 98 billion m³
- Annual Ground Water Capacity: 14 billion m³
- Annual Total Water Capacity: 112 billion m³
- **Annual Total Usable Water: 44 billion m³**

Drinking Water Need:

- Year 2000: 5 billion m³
- Year 2030: 18 billion m³

- Population of Turkey: 75 million
- Annual Water Amount per Person: 1500 m³ / person-year



WATER LOSS AND LEAKAGE IN TURKEY

Reasons:

- Pipe damage and crack (30-40 %)
- Inefficient irrigation technology
- Uncontrolled water usage (40-60 %)
- Unstored storm water

Total  2.2 billion m³ water loss



WATER NEED AND PROJECTION

In year 2010;

- Irrigation: 32 billion m³
- Domestic Water: 7 billion m³
- Industrial Water: 5 billion m³
- Total Used Water: 44 billion m³
- Total Ratio of Water Potential: 40%



WATER NEED AND PROJECTION

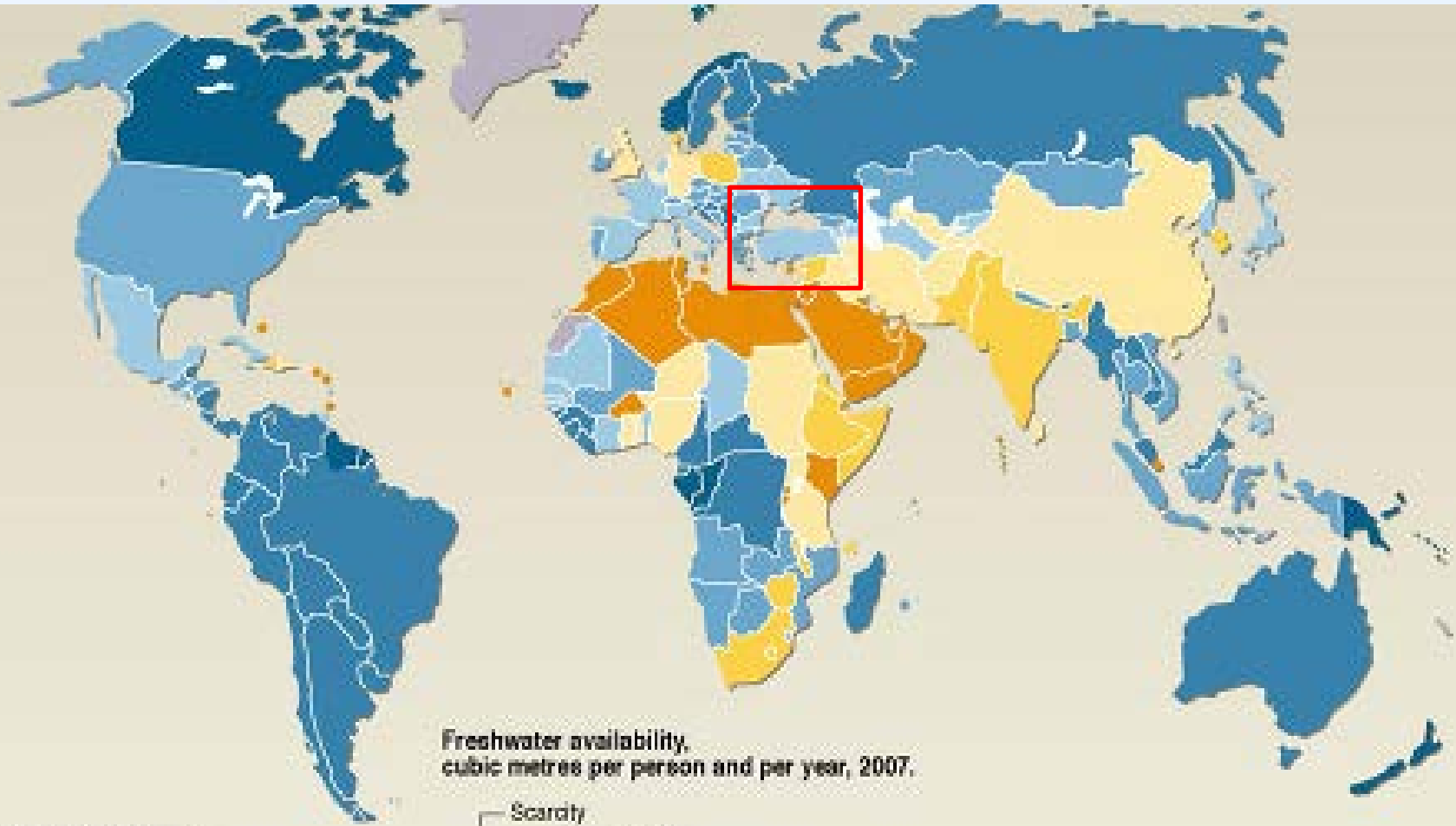
- Development of water consumption in Turkey...
(*) of 112 billion m³

YEAR	TOTAL WATER WITHDRAWAL		SECTORS		
	Million m ³	%(*)	Irrigation %	Domestic %	Industrial %
1990	30 600	28	72	17	11
2005	40 100	36	74	15	11
2030	112 000	100	65	23	12



WATER RESOURCES & SHORTAGE IN TURKEY

Freshwater availability in Turkey;



Freshwater availability,
cubic metres per person and per year, 2007.



Source: FAO, Millions uses,
World Resources Institute (WRI).

WATER NEED AND PROJECTION


- Turkey: Not a water-rich country
- Annual Water Amount per Person (m^3/year) w
- $w < 1000$ scarcity
- $1000 < w < 3000$ semi-scarcity
- $w > 10000$ water rich

For Turkey

Current $w = 1500$ ($\text{m}^3/\text{year capita}$)

2030 $w = 1100$ ($\text{m}^3/\text{year capita}$)

* Estimated calculation made as population of Turkey will be approximately 100 million in 2030



WATER NEED AND PROJECTION

- In Urban Areas:
 - The rapid growth of population and its redistribution to urban areas as well as growth in manufacturing, agriculture and tourism has intensified the pressure on the physical environment, most especially water. This is particularly problematic for developing countries.
 - Turkey needs significant amount of water to meet the needs of its growing population and to continue with its economic development. We are of the view that water resources and their potential for economic development must be managed in such a way that to avoid irreversible damage to the environment and ecosystems.



WATER NEED AND PROJECTION

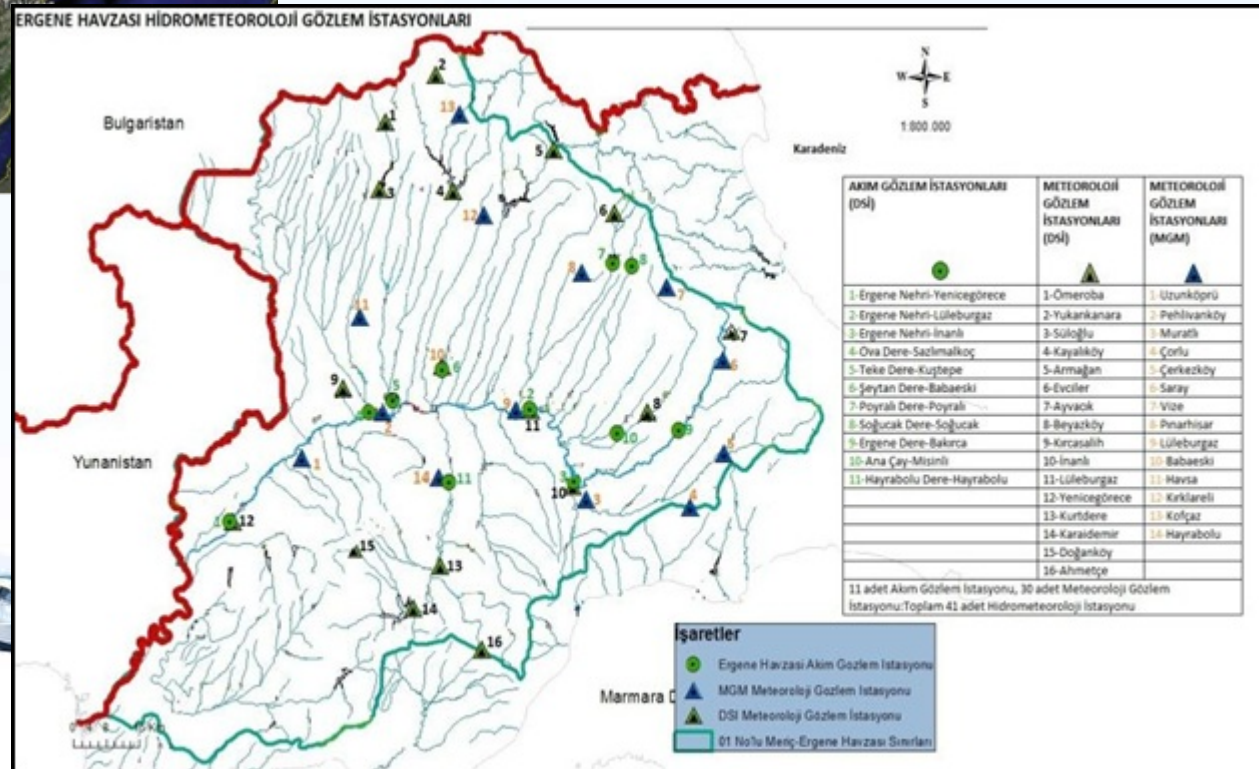
- In Rural Areas:
 - In recent decades Turkey has made great strides in water resources development for domestic use, irrigation, and flood control and power generation. The dams and reservoirs built have enabled Turkey to save water from its brief seasons of rainfall to use throughout the year for various purposes, agriculture in particular.



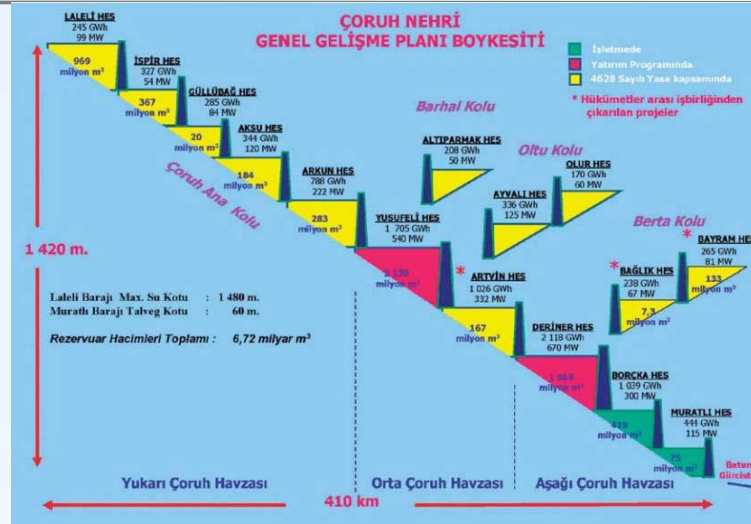
MERİÇ-ERGENE FLOOD EARLY WARNING SYSTEM PROJECT



28 flow gauge station,
88 rain gauge station,
42 weather station,
39 evaporation station,
total 191 station.



EAST BLACK SEA HEPP PROJECTS



WATER MANAGEMENT IN ISTANBUL

Sanitation

ISKI-SCADA and ISKABIS

Waste water treatment plant

Watershed protection zone

Melen Project

Ayamama Project



SANITATION

- Istanbul's wastewater system consisted of 9,602 km of sewers,
- 17 pumping stations,
- 7 pre-treatment plants and
- 5 biological wastewater treatment plants.
- 95% of the wastewater collected was being treated.
- Treated wastewaters are discharged into the Bosphorus. They are discharged into the lower layer, where the flow is towards the Black Sea in the North.
- The sewer system consists, in principle, of separate sanitary sewers and stormwater drains. However, in reality there are illegal cross-connections so that untreated wastewater reaches the stormwater drains and contributes to the pollution of drinking water reservoirs.



ISKI- SCADA SYSTEM

ISTRANJALAR (7 BARAJ)	BÜYÜKÇEKMECE GÖLÜ	TERKOS GÖLÜ	SAZLIDERE BARAJI	ALİBEY BARAJI	ELMALI BARAJI	ÖMERLİ BARAJI	DARLIK BARAJI
TOP.KAPA. : 145 milyon m3 TOP.VERİM : 235 milyon m3	KAPASİTE : 149 milyon m3 VERİM : 100 milyon m3 Max.Su.Birik.Kodu: 6,30 m	KAPASİTE : 162 milyon m3 VERİM : 142 milyon m3 Max.Su.Birik.Kodu: 4,50 m	KAPASİTE : 89 milyon m3 VERİM :55 milyon m3 Max.Su.Birik.Kodu: 22,40 m	KAPASİTE : 34 milyon m3 VERİM : 36 milyon m3 Max.Su.Birik.Kodu: 26 m	KAPASİTE : 9,6 milyon m3 VERİM : 15 milyon m3 Max.Su.Birik.Kodu: 67,50 m	KAPASİTE : 235 milyon m3 VERİM : 220 milyon m3 Max.Su.Birik.Kodu: 62 m	KAPASİTE : 107 milyon m3 VERİM : 97 milyon m3 Max.Su.Birik.Kodu: 52 m
% Doluluk 85.48 %	Göl Seviye 6.07 m	Göl Seviye 4.39 m	Göl Seviye 21.29 m	Göl Seviye 22.38 m	Göl Seviye 67.50 m	Göl Seviye 60.23 m	Göl Seviye 51.30 m
Sıcaklık 8.5 °C	Mev.Su Haçmı 142.378 Mm3	Mev.Su Haçmı 158.905 Mm3	Mev.Su Haçmı 77.798 Mm3	Mev.Su Haçmı 21.678 Mm3	Mev.Su Haçmı 9.600 Mm3	Mev.Su Haçmı 201.168 Mm3	Mev.Su Haçmı 104.036 Mm3
Yağış 0.00 kg/m2	% Doluluk 95.59 %	% Doluluk 97.92 %	% Doluluk 87.61 %	% Doluluk 63.49 %	% Doluluk 99.99 %	% Doluluk 85.47 %	% Doluluk 96.78 %
	Sıcaklık 11.2 °C	Sıcaklık 8.8 °C	Sıcaklık 10.2 °C	Sıcaklık 9.9 °C	Sıcaklık 7.9 °C	Sıcaklık 13.1 °C	
	Yağış 0.00 kg/m2	Yağış 0.00 kg/m2	Yağış 0.00 kg/m2	Yağış 0.00 kg/m2	Yağış 0.00 kg/m2	Yağış 0.00 kg/m2	Yağış 0.00 kg/m2



İSKI-ISKABIS SYSTEM



İSTANBUL
SU VE KANALİZASYON
İDARESİ



İSKİ ALTYAPI BİLGİ SİSTEMİ - İSKABİS

İSKABİS HAKKINDA

- İskabis Tanıtım
- Nasil Kullanabilirim?
- Medyada İskabis
- Yayınlarımız

UYGULAMALAR

ONLINE ALTYAPI

RAPORLAR

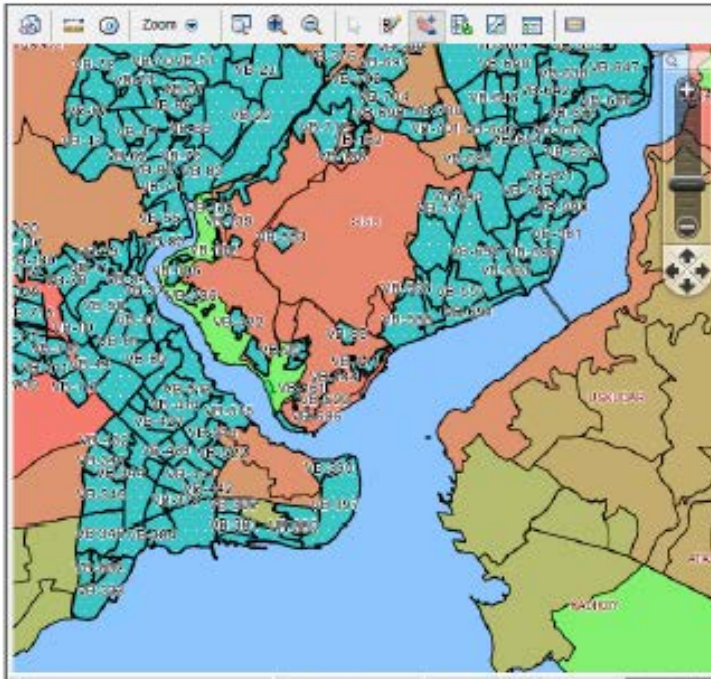
PROJE ATÖLYESİ

LINKLER



İskabis Dashboard

Duyuru & Haber
İstanbul Su ve Kanalizasyon İdaresi
takip sistemi projesi
tamamlandı.
15.08.2009
» Endüstriyel Kirlilik kontrolü
CRS Projesi kapsamında



İŞLETMELER DAİRESİ BAŞKANLIĞI

İSKABİS
İSKİ Alt Yapı Bilgi Sistemi

Adres

İçe: BİYERİMPİNGA

Mahalle: DUTLUBAHARBAĞIÇI

Sokaklar: ÇEHİR SK

Bina No: 8008

Bina Kirişik No:

Yana Adı: 42843

Eklenen Bilgi: Eklenen Sorular

İLLET_ADI	RENKALIC_ADI	SONCAL_ADI	YEREL_NO
BIYERİMPİNGA	DUTA MAH	AKEN SK	0033
BIYERİMPİNGA	DUTA MAH	ORMAN SK	0025
BIYERİMPİNGA	DUTA MAH	SABA SK	0026
BIYERİMPİNGA	DUTA MAH	YAGLI SK	0021
BIYERİMPİNGA	DUTA MAH	AKEN SK	0040
BIYERİMPİNGA	DUTA MAH	ÇEHİR SK	0027
BIYERİMPİNGA	DUTA MAH	BAL SK	0005
BIYERİMPİNGA	DUTA MAH	GELİNEK SK	0041
BIYERİMPİNGA	DUTA MAH	HENDİÇ SK	0027
BIYERİMPİNGA	DUTA MAH	BAL SK	0011
BIYERİMPİNGA	DUTA MAH	ÇEHİR SK	0026
BIYERİMPİNGA	DUTA MAH	HALI SK	0011
BIYERİMPİNGA	DUTA MAH	KUÇUK ÇEHİR SK	0001
BIYERİMPİNGA	DUTA MAH	ÇEHİR SK	0001
BIYERİMPİNGA	DUTA MAH	ÇEHİR SK	0008
BIYERİMPİNGA	DUTA MAH	CEHİR SK	0026
BIYERİMPİNGA	DUTA MAH	KUÇUK SK	0041
BIYERİMPİNGA	DUTA MAH	HENDİÇ SK	0001
BIYERİMPİNGA	DUTA MAH	TÜL SK	0007
BIYERİMPİNGA	DUTA MAH	BAL SK	0029

Toplam Kayıt: 31

Kaçınca Yansız Adres ve Kirişlik Bilgisi

VB-114

SIRA	X	Y
1001	487462.08	454017.34

NO	Adres	Adres	Adres
1001	487462.08	454017.34	

NO	Adres	Adres	Adres
1001	487462.08	454017.34	

WASTE WATER TREATMENT PLANTS

14 waste water treatment plant



WASTE WATER TREATMENT PLANTS

6 drinking water treatment plant

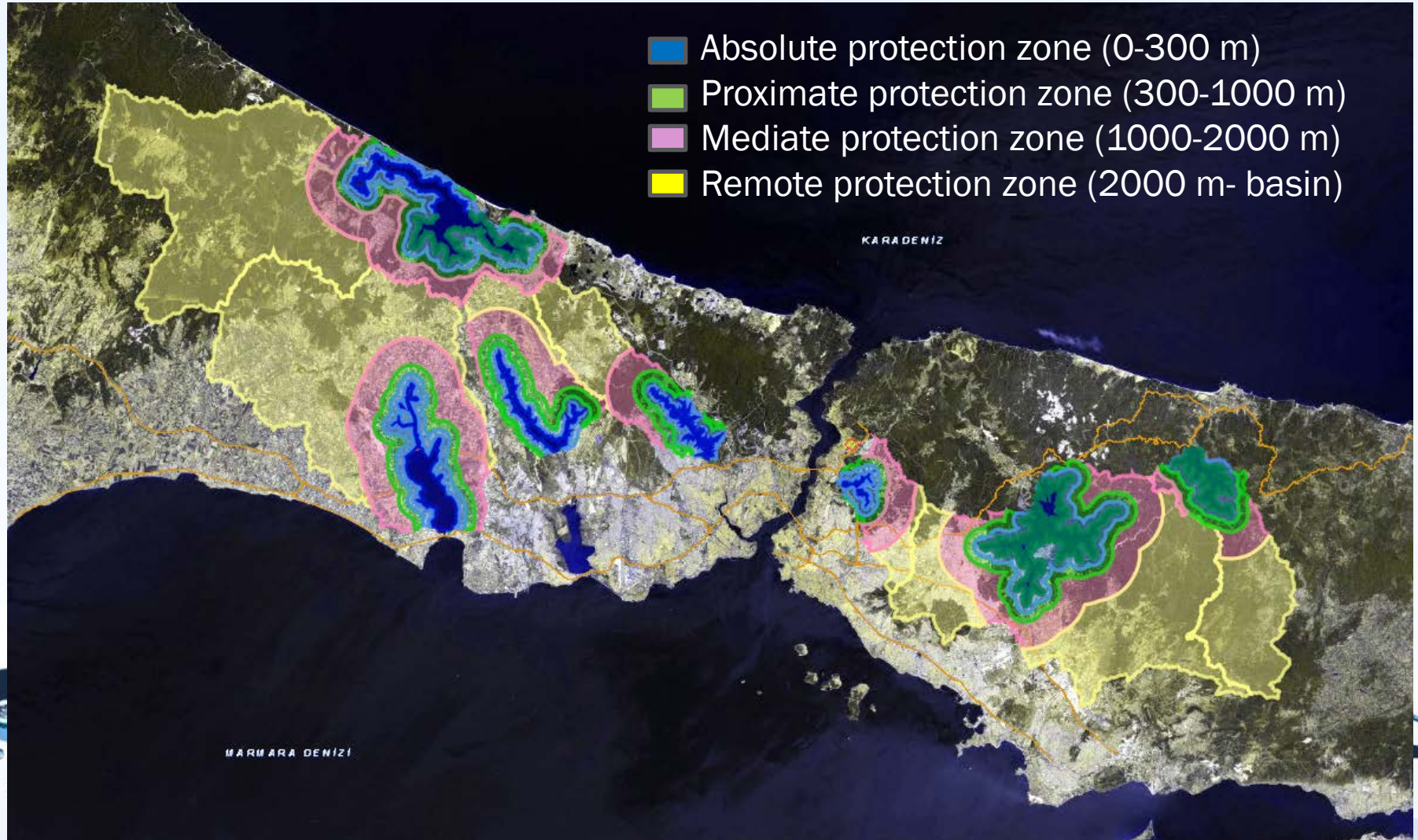


WATER PROBLEMS IN ISTANBUL

- Unplanned urbanization
- Uncontrolled settlements in protection zones
- Flooding
- Inadequate green land
- Inadequate and damaged infrastructure
- Combined sewer and storm water system

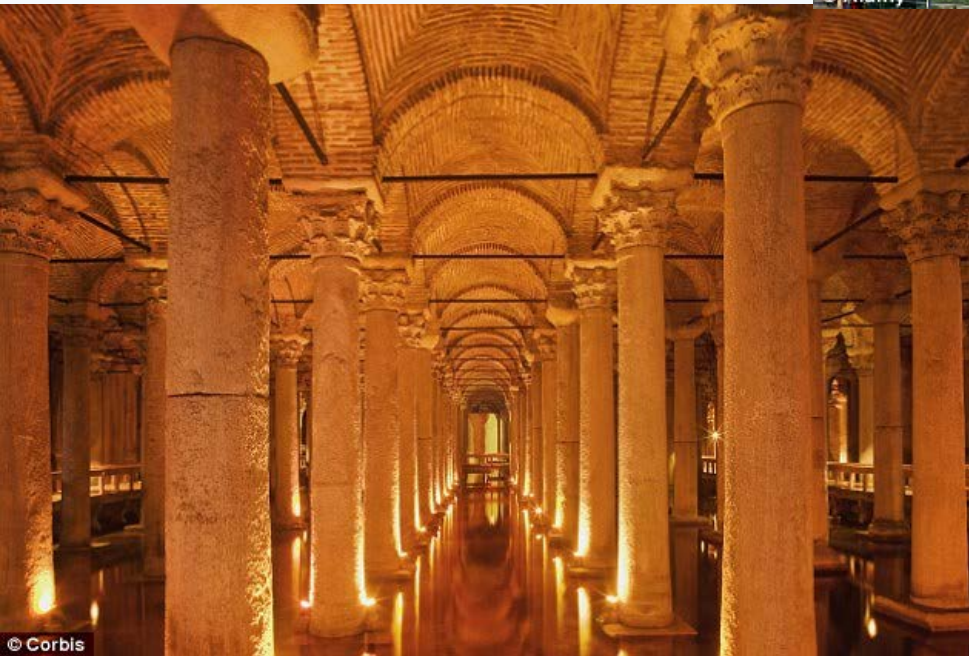


WATER RESOURCES AND PROTECTION ZONE IN ISTANBUL



HISTORICAL

Basilica Cistern



Bozdoğan (Valens) Aqueduct

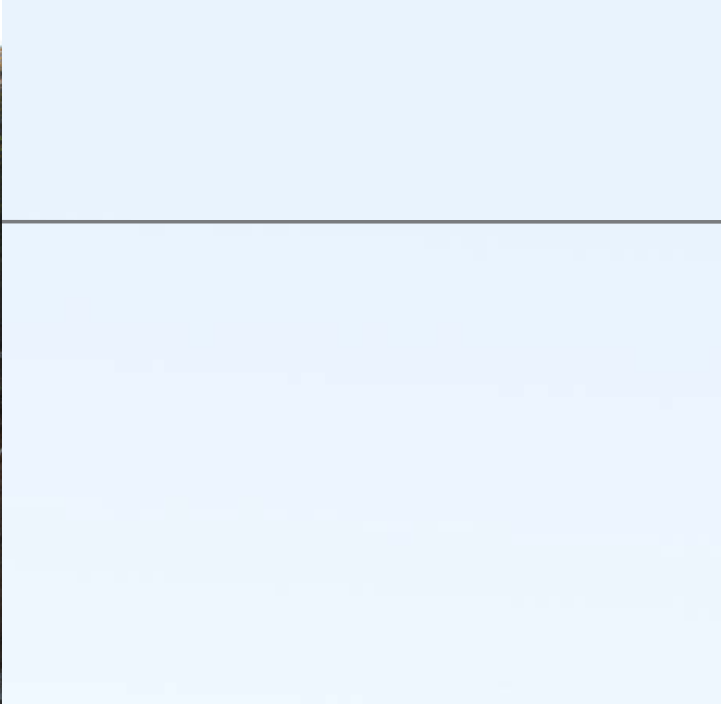


MELEN PROJECT

Water from Düzce city is transported to Istanbul via a pipeline of 189 km in length, which begins from the Asian side, passes under the Bosphorus Strait with a 5.5 km long tunnel and 135 m under the sea and reaches the European side of the city.

Water reservoir: 1.1 billion m³/year

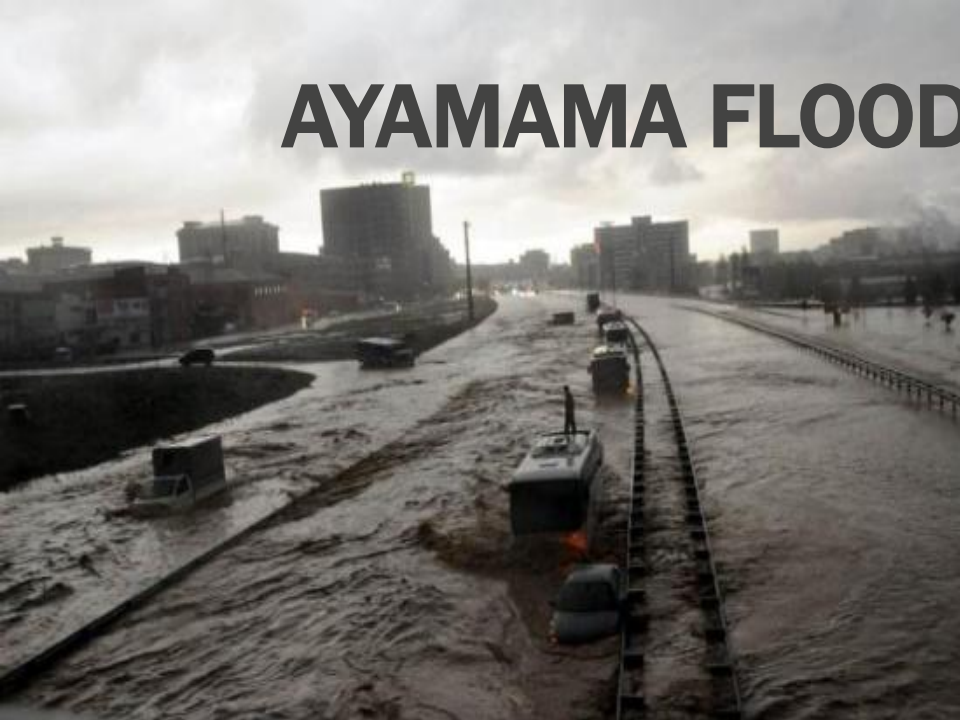




MELEN DAM (2016)



AYAMAMA FLOODING EVENT (2009)



AYAMAMA STREAM ENLARGMENT



A scenic landscape photograph of a mountain valley. In the foreground, a dark, reflective surface shows ripples from rain. The middle ground features a wide river flowing through a valley, with a suspension bridge crossing it. The background consists of large, rugged mountains under a bright sky. The word "THANKS" is written in red, bold, sans-serif capital letters across the center of the image. A diagonal rain effect is overlaid on the entire scene.

THANKS