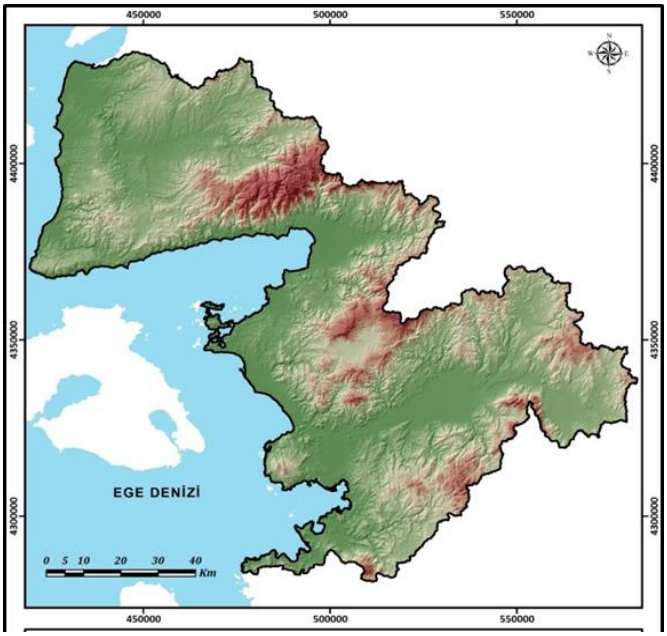
KUZEY EGE RIVER BASIN

KUZEY EGE RIVER BASIN

The basin border starts from the Çanakkale Strait in the north, passes through the drainage divisions of Kayalıdağ (879 m), Kazdağ (1766 m) and Kocakatran Mountains; follows the borders of Havran, Bergama, Savaştepe, Soma and Kırkağaç districts in the east; passes through the Kılıçdağ and Dumanlıdağ (1098 m) drainage divisions in the south and connects to the Aegean Sea near the town of Foça.



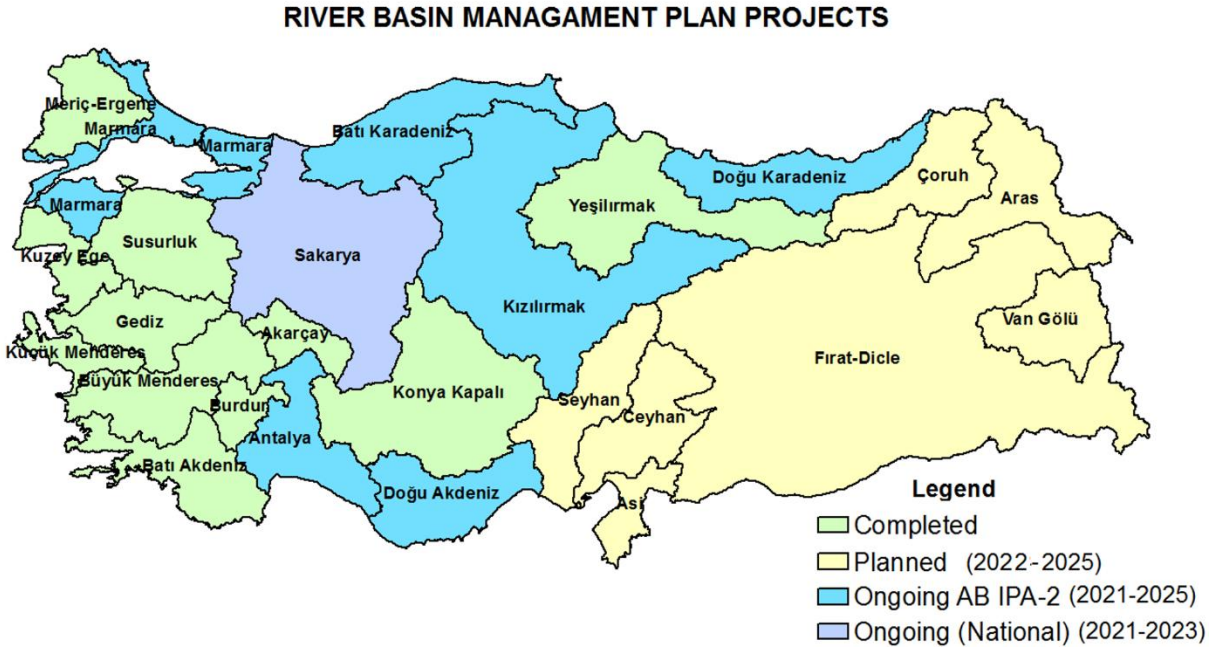
The basin area is approximately 9,861 km2 and covers approximately 1.3% of Turkey's surface area. Balıkesir, Çanakkale, Manisa and İzmir provinces are located in the North Aegean Basin. The spatial information of the provinces within the borders of the basin is given in the table below.

Provinces and their areas in the basin

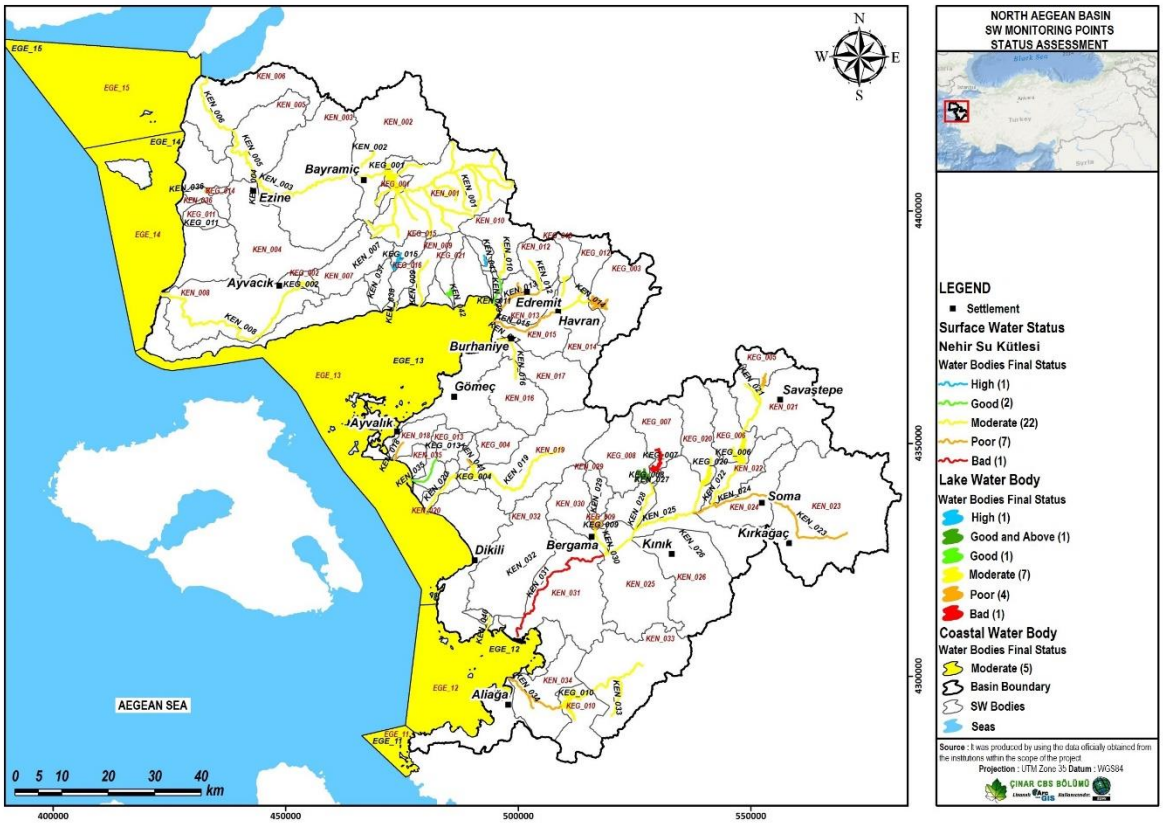
Provinces	***Area of the Province (km2)***	***Part of the Province in The Basin (km2)***	***Ratio of the Part in The Basin to the Total Province Area (%)***	***Distribution of the Basin to the Provinces (%)***
Balıkesir	14583	2242	15,37	22,74
Çanakkale	9817	3077	31,34	31,20
İzmir	11891	3013	25,34	30,55
Manisa	13339	1529	11,46	15,51
TOTAL	**49630**	**9861**	**-**	**100,00**

RIVER BASIN MANAGEMENT PLAN

Kuzey Ege River Basin Management Plan (RBMP) was completed in 2020. Measures determined within the scope of RBMP are followed through the National Water Information System (USBS) in 2021.

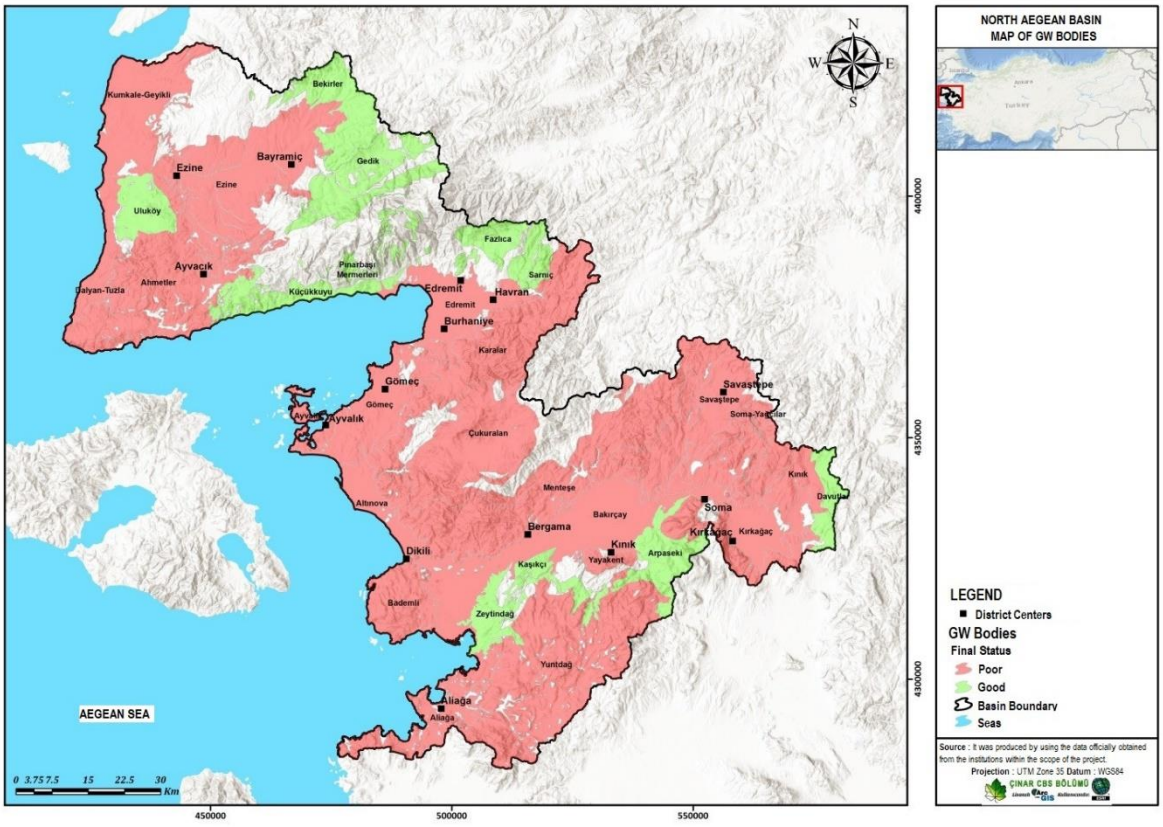


In the Kuzey Ege Basin; There are a total of 69 surface water bodies, of which 43 are river water bodies, 21 are lake water bodies and 5 are coastal water bodies.



Kuzey Ege Basin Surface Water Bodies Overall Status

There are 31 groundwater bodies (GWB) in Kuzey Ege Basin.



Kuzey Ege Basin Groundwater Bodies Overall Status

1079 measures have been determined in order to ensure that all water bodies in the Kuzey Ege Basin are in good status and that the ones that are in good status are protected. The main groups of measures are listed below.

- Construction of Water Water Treatment Plant with Secondary Treatment
- Construction of Water Water Treatment Plant with Package Treatment
- Improvement of existing UWWTPs
- Maintenance/repair of existing WWTPs
- Construction, Improvement or Repair of Septic Tanks
- New WWTP Construction in OIZs
- Improvement of treatment in industrial WWTP
- Application of best available techniques by industries
- Installation of oil trap units in fuel stations
- Determining the discharge standards of industrial facilities for specific pollutants and priority substances, transposing them to the legislation
- Construction of gasification facility for liquid and solid wastes from Olive Oil Production activities
- Transfer of olive oil factories from 3-phase system to 2-phase system
- Construction of a New Landfill Site
- Constructing a Transfer Station
- Rehabilitation of unsanitary landfills
- Building a landfill facility in the mining field

- Reinjection of geothermal water used in geothermal power plants
- Installing meters in geothermal wells and plants
- Investigative Monitoring of Pollutant Parameters Exceeding Environmental Objectives (EQSs and Protected Area Environmental Targets) for determination of pressures
- Monitoring in fish farms
- Development of Groundwater Level Monitoring Network and Groundwater Quality Control Network and Improvement of Existing Monitoring Networks, Monitoring and Inspection of Groundwater Levels and Groundwater Chemistry.
- Preparation of Hydrogeological Survey Report
- Compliance with allocations in registered wells
- Detection and prevention of illegal wells
- Improvement of drinking water supply systems and reduction of water losses
- Re-use of urban wastewater in irrigation and of industrial wastewater in industry
- Preparation and monitoring of drinking water basin protection plans
- Construction of Fish Passages
- Implementation of Environmental Flow Regime
- Use of metered measuring systems
- Rehabilitation of irrigation areas
- Measures for the protection of habitats and species have been proposed in areas allocated for the conservation of economically important aquatic species.
- Monitoring and inspection in areas designated as recreation and bathing waters
- Combating Invasive Species and Control of Fishing
- Good Management Practices in Aquaculture Facilities in coastal water bodies
- Waste management in port enterprises
- Construction of Animal Manure Warehouses in Animal Farm
- Terracing on irrigated lands whose slope exceeds 20%
- Preparation of Guidance Document on Good Practices in Fish Farms
- Good Agricultural Practice Code: Green Belt
- Good Agricultural Practice Code: Vegetative Barrier
- Good Agricultural Practice Code: Pesticide Management and raising awareness of the farmer
- Good Agricultural Practice Codes: Crop Rotation

WATER QUALITY

Surface Water Status

As a result of monitoring studies in rivers, lakes and coastal water bodies, their ecological and chemical status has been evaluated and their overall status has been determined. Accordingly, out of 69 water bodies, 2 are assigned as bad, 11 as poor and 34 as moderate status. There are 6 surface water bodies achieving the requirements related to the environmental objectives (good and above status) in the current situation.

Status	River Water Body Number	Lake Water Body Number	Coastal Water Body Number	Total Water Body Number
HIGH	1	1	-	2
GOOD AND ABOVE	-	1	-	1
GOOD	2	1	-	3
MODERATE	22	7	5	34
POOR	7	4	-	11
BAD	1	1	-	2
NO MONITORING	10	6	-	16
TOTAL	43	21	5	69

Groundwater Status

As a result of monitoring studies in groundwater bodies, their overall status was determined by evaluating their both quantitative and qualitative chemical status. Accordingly, out of a total of 31 water bodies, 11 are classified as good and 20 are classified as poor.

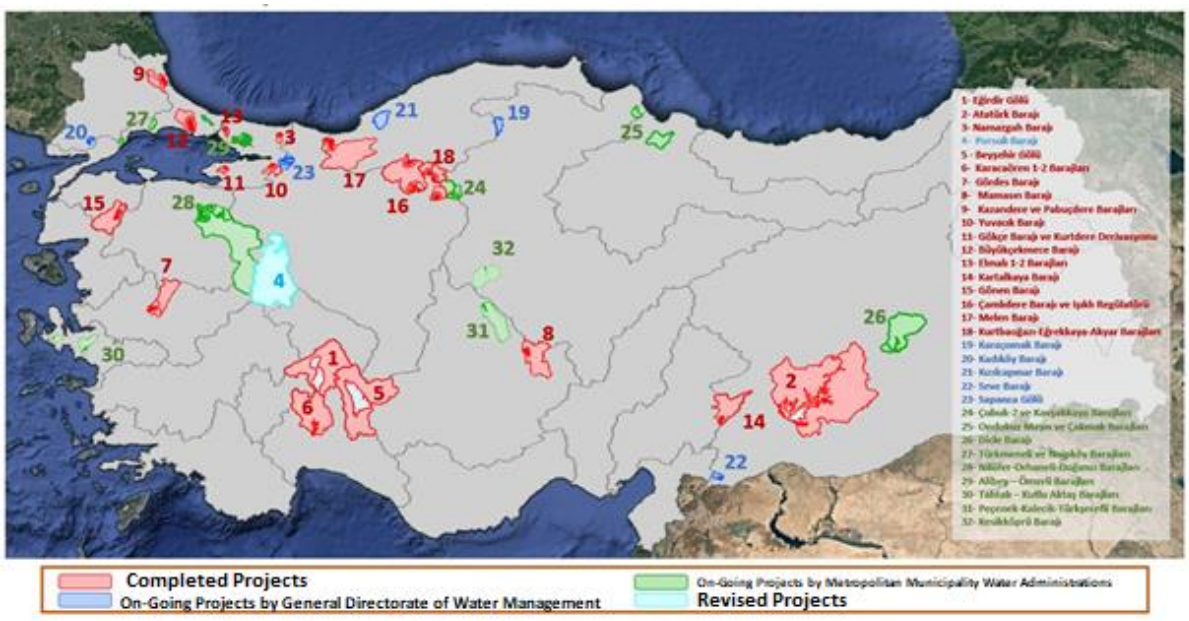
GWB Status	Quantitative Status		Qualitative Status		Overall Status	
GOOD	26	% 83	12	% 38	11	% 35
POOR	5	% 17	19	% 62	20	% 65

DRINKING WATER PROTECTION PLANS

The purpose of drinking water protection plans is to determine basin-specific protection areas and principles based on scientific data to improve and sustainably manage the quality and quantity of drinking water sources.

According to the Regulation on the Protection of Drinking-Water Basins:

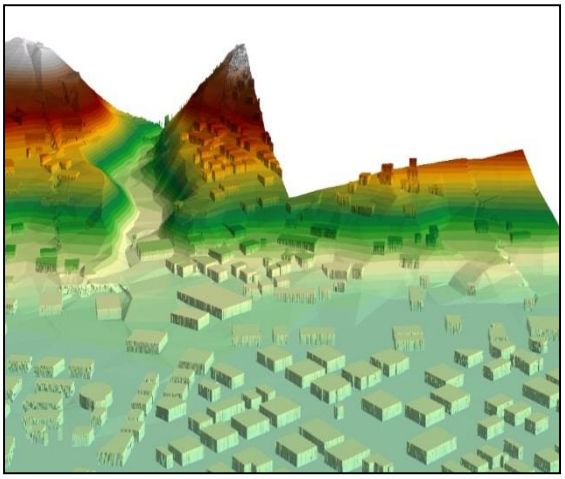
- Protection plans for surface water sources that provide drinking water to metropolitan municipalities are prepared by the general directorates of water and sewage administrations of metropolitan municipalities in coordination with Ministry;
- Protection plans for surface water sources that provide drinking water to settlements outside of metropolitan municipalities are prepared by Ministry.

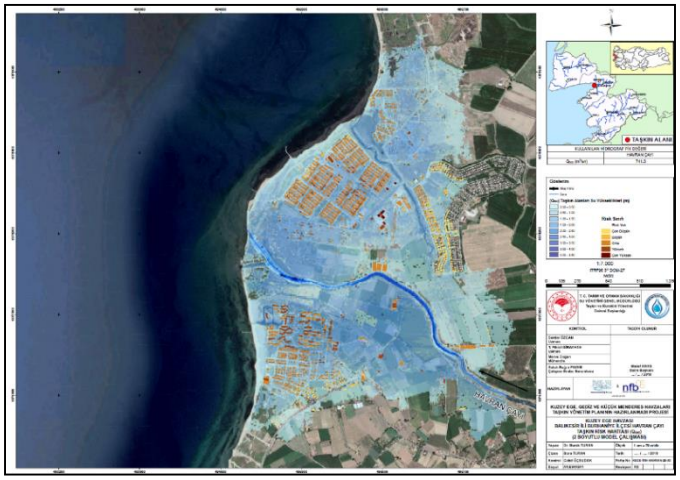


FLOOD MANAGEMENT PLAN

Kuzey Ege River Basin Flood Management Plan (FMP) was completed in 2019.

Flood Hazard and Flood Risk maps are generated within the scope of Kuzey Ege River Basin Flood Management Plan. The necessary measures to be taken to prevent risks before, during, and after floods have been determined using these maps, as have the responsible institutions and the time of implementation of the measures.





To mitigate the effects of potential flood events in the Kuzey Ege River Basin, 255 measures have been identified under the following groups of mitigation measures within the scope of the Flood Management Plan.

- Improvement of bridges
- Cleaning of stream beds
- Improvement of culverts
- Improvement of walls
- Upper basin measures
- Data-Information Collection/ Production
- Education/ Informing/ Raising Awareness
- Stream rehabilitation
- Flood forecasting and early warning system

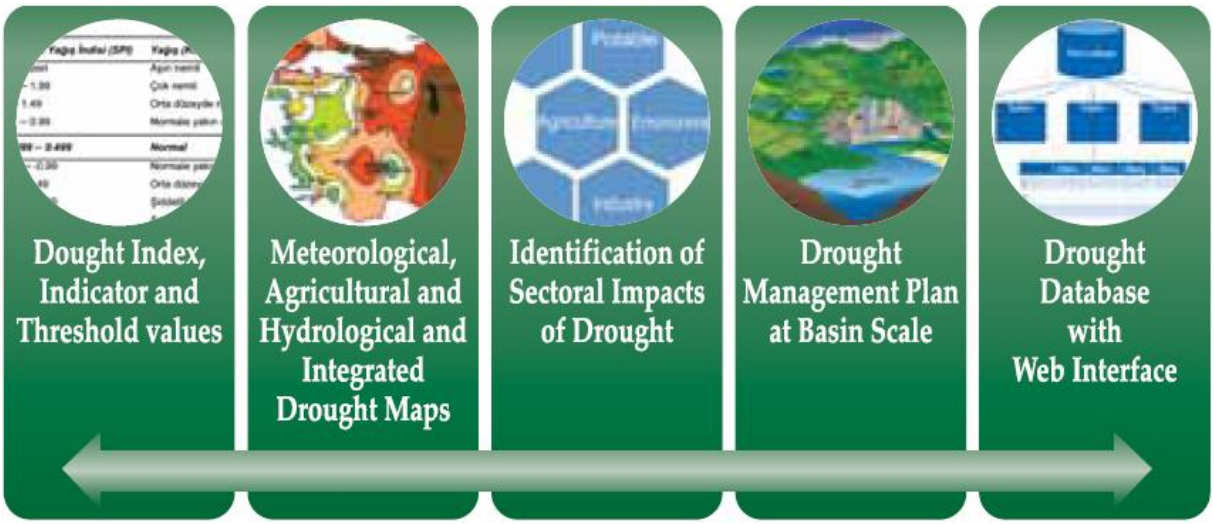
Mitigation measures determined within the scope of the plan are still being tracked via the Flood and Drought Plans Tracking Web Application in 2019 and the National Water Information System (USBS) in 2020.

DROUGHT MANAGEMENT PLAN

Drought Management Plans (DMPs) are being prepared at the basin level for all of the water user sectors, including agriculture, in order to minimize the negative effects of possible drought risks and be prepared for drought. The aim of DMPs is to mitigate and prevent the negative impacts of possible droughts by determining the measures to be taken during water scarcity and the measures to be taken before, during, and after the drought periods in order to solve the drought problem as quickly as possible. Drought analyses, climatic and hydrological studies, sectoral vulnerability analyses, and drought maps are used to plan and direct studies such as recovery and intervention.

Kuzey Ege Basin DMP was started at 2016 and completed at 2018. The follow-up of the implementation of the measures included in the completed Drought Management Plans is carried out in 6-month periods and 6 years after the completion of the project, the update project of the same basin is made. Because of this reason, Kuzey Ege Basin DMP will be revised at 2024.

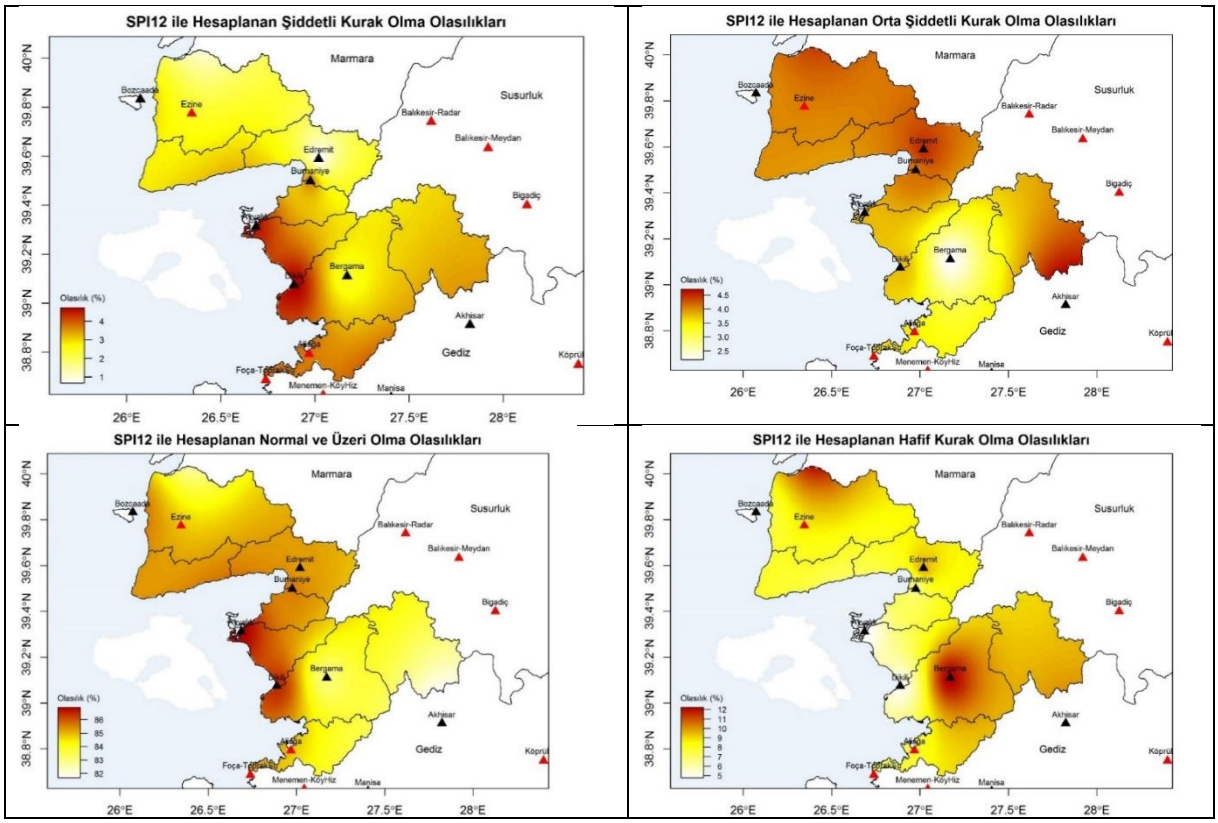
Studies During the Preparation of Drought Management Plans:



In order to prevent damage caused by possible droughts in the Kuzey Ege Basin, 27 measures have been determined under the measure groups of reducing water use/loss and Improving the Monitoring and Measurement Network within the scope of the Drought Management Plan.

Measures determined within the scope of the plan started to be followed via the Flood and Drought Plans Tracking Web Application as of 2019, and the National Water Information System (USBS) as of 2020.

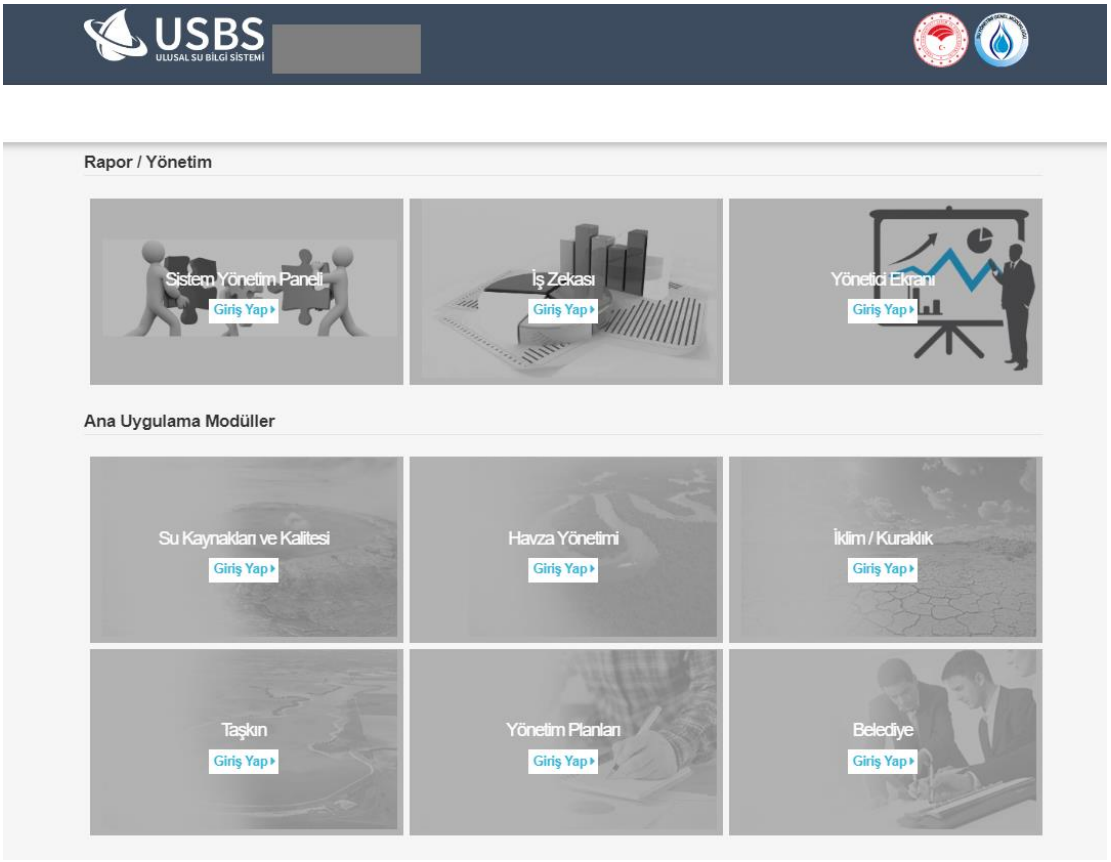
Possible Drought Risks in the Basin



MONITORING, INVENTORY and WATER INFORMATION SYSTEM

Actions that are taken about water quality and quantity as follows:

- To acquire the data that has been produced for various purposes by different organizations,
- To enhance the quality of data,
- To prevent the production of data repeatedly,
- To enhance the accessibility of data,
- To determine and complete the missing/incomplete data,
- To set and apply a watershed-scale and sustainable monitoring system.



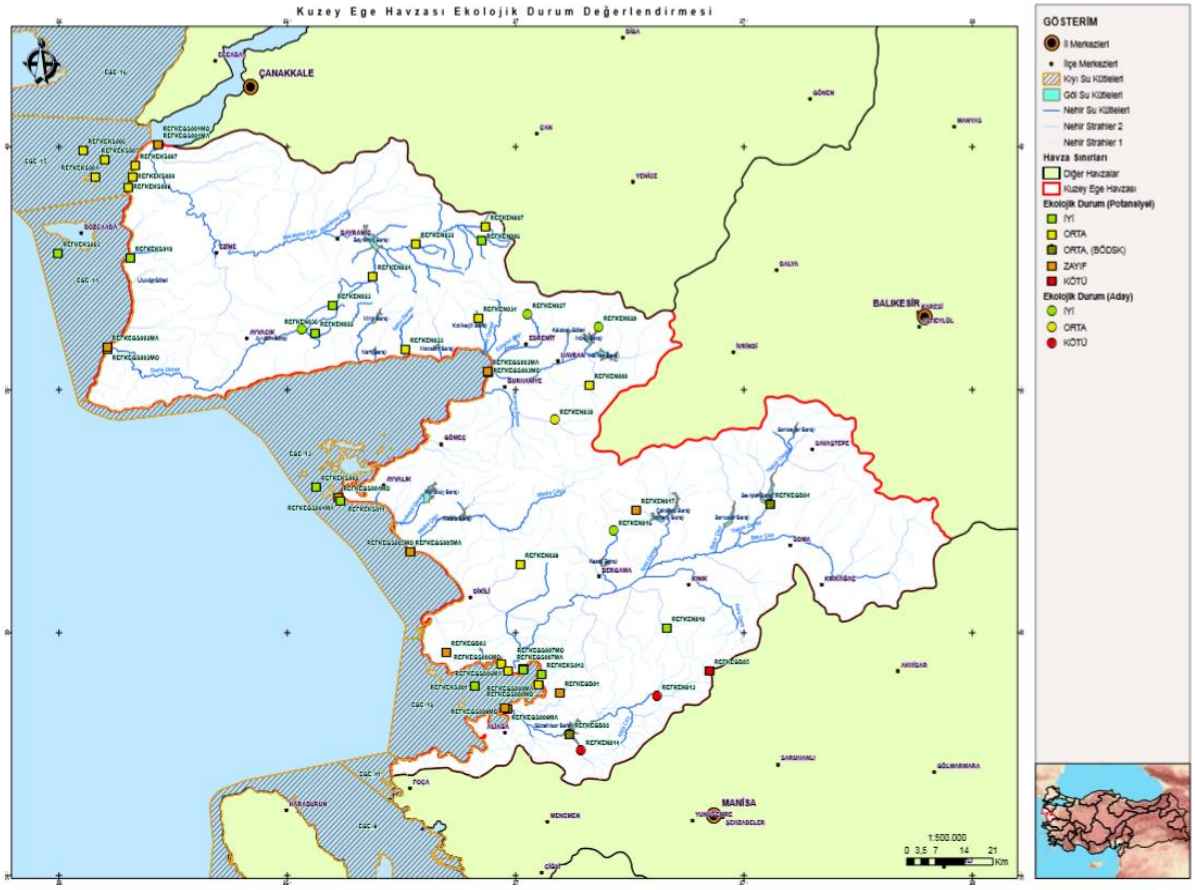
Graphical User Interface of National Water Information System (TRNWIS)

For the purpose of ecological-based assessment of water quality; biological, physicochemical, and hydromorphological monitoring studies were conducted in 25 basins across the country as part of the Project for the Establishment of a Reference Monitoring Network in Türkiye to identify natural and/or near-natural reference (unpolluted) sites that were not or minimally impacted by anthropogenic activities, and pristine water sources were identified.

Within the scope of the study, monitoring studies were carried out in a total of 54 locations in the North Aegean River Basin, including 19 rivers, 5 lakes (3 natural, 2 heavily modified), 18 transitional waters, and 12 coastal waters, and 48 reference (unpolluted) water sources were identified. In addition, the ecological status of the monitored water bodies in the North Aegean River Basin was determined as a result of the monitoring activities.

In the scope of monitoring activities, the smallest possible taxonomic level of all biological quality elements was identified and in this context 32 fish, 129 phytobenthos, 251 phytoplankton, 957 macroinvertebrate, 74 macroalgae/angiosperm and 24 macrophyte species were identified in the North Aegean River Basin.

Additionally, for each biological quality element, the Reference Monitoring Network and Reference Monitoring Programs have been established, which include the monitoring stations determined in the reference sites, the parameters to be monitored at these stations, and the monitoring frequencies. In line with these monitoring programs, monitoring activities will be carried out regularly.



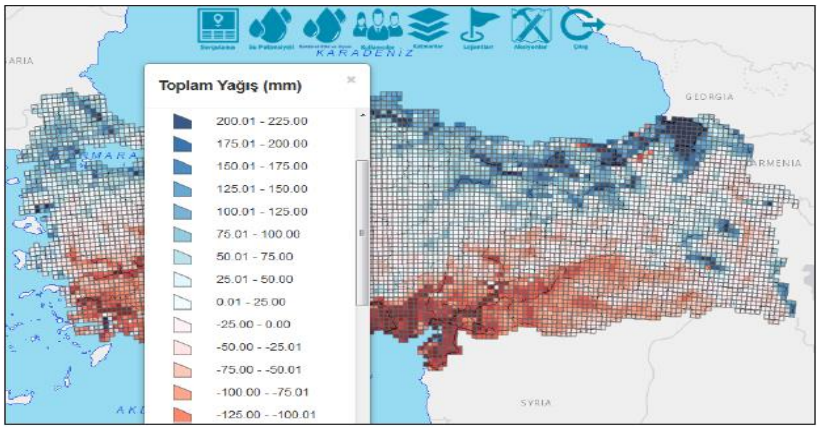
Ecological Status Assessment Results in the North Aegean River Basin

WATER REUSE

In the fight against possible water scarcity in our country in the future, it is necessary to develop practices related to the economical and planned use of existing water resources. One of these strategies, the option of reusing used water, is one of the most important methods of using water sparingly. With the recovery and use of used water, it is planned to reduce the need for existing water resources and to provide significant water savings. In the "Project for the Evaluation of Reuse Alternatives of Used Water", which was prepared specifically for 25 river basins in our country, both the reuse of wastewater treated in wastewater treatment plants and the water returned from agriculture were evaluated. With the evaluation, used water resources and reuse alternatives were determined. Used water resources was determined as waste water treated in wastewater treatment plants, drainage water returning from agriculture, cooling water and rain water.

IMPACTS OF CLIMATE CHANGE

The project on impacts of climate change on water resources was finalized in 2016.



According to the climate change projections made for 2015-2100 period:

it is expected that there will be a continuous increase in average temperatures. It is expected that the average temperature of the basin, which was **15,9ºC** according to 1971-2000 observations, will **increase** by **at least 1,5°C**, **maximum 4,6ºC** in 2071-2100 period. It is expected that temperature increases for this period will predominate in the **eastern** parts of the basin.

According to the observations of 1971-2000, the average annual precipitation amount of the reference period of the basin was determined to be **615 mm**. According to the 30-year projection results, there is no significant increase or decrease tendency for the total precipitation parameter and it is predicted that the basin will receive **15% less** rainfall compared to the reference period in **2071-2100**. It is expected that rainfall decreases for this period will predominate in the **southern** parts of the basin.

DSİ (Directorate General for State Hydraulic Works) data were used for hydrological model studies and the mean gross water potential of the basin for the reference period was determined to be **2.379 million ^{3}/year**. With the effect of climate change, it is predicted that in the period **2041-2070**, the gross water potential of the basin could **decrease up to 60%**. However, in the same period, it is expected that the annual amount of water available will not meet the total water need, and the **water deficit** will be around **75 million m^3/year**.

As a result of the hydrogeological studies carried out, the hydrogeological reserve of groundwater of the basin was determined to be **19 km^3**. The technically and economically usable amount of this reserve, the possible reserve is calculated to be **10 km^3**. It is estimated that at the end of the century under the effects of the climate change, the hydrogeological reserve of the basin will decrease by **11%** and possible reserve by **21%**.