BATI AKDENİZ RIVER BASIN

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Batı Akdeniz Basin consists of group of precipitation areas that empty the southern Anatolian waters into the Aegean and Mediterranean. Starting from the north; bordered by the Laba Mountain, Beşparmak Mountain, Marçal Mountains, Sandıras Mountain, Bor Mountain, Honaz Mountain, Eşler Mountain, Çalbalı Mountain and Tahtalı Mountain drainage divides, by the Mediterranean Sea and the Aegean Sea. The basin area is approximately 21,032 km^2 according to GIS data, 20,953 km^2 according to State Hydraulic Works and the ratio of the of the basin is to Türkiye is 2.7%.

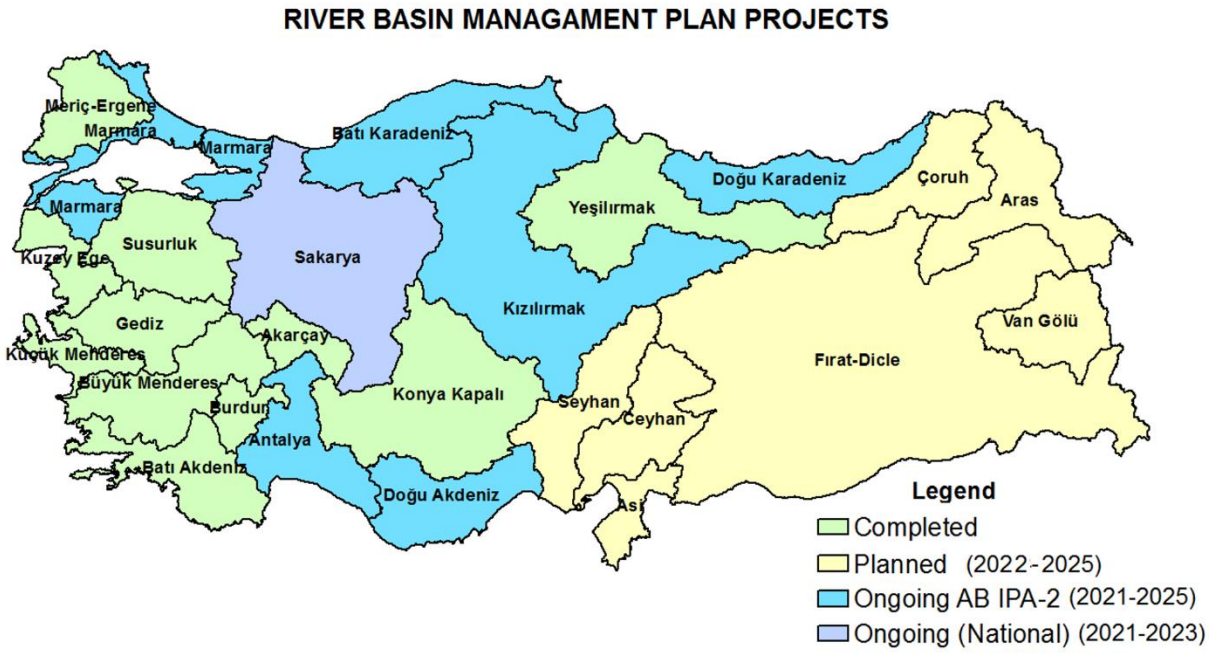
Batı Akdeniz River Basin Map

Information of the Provinces in the Basin

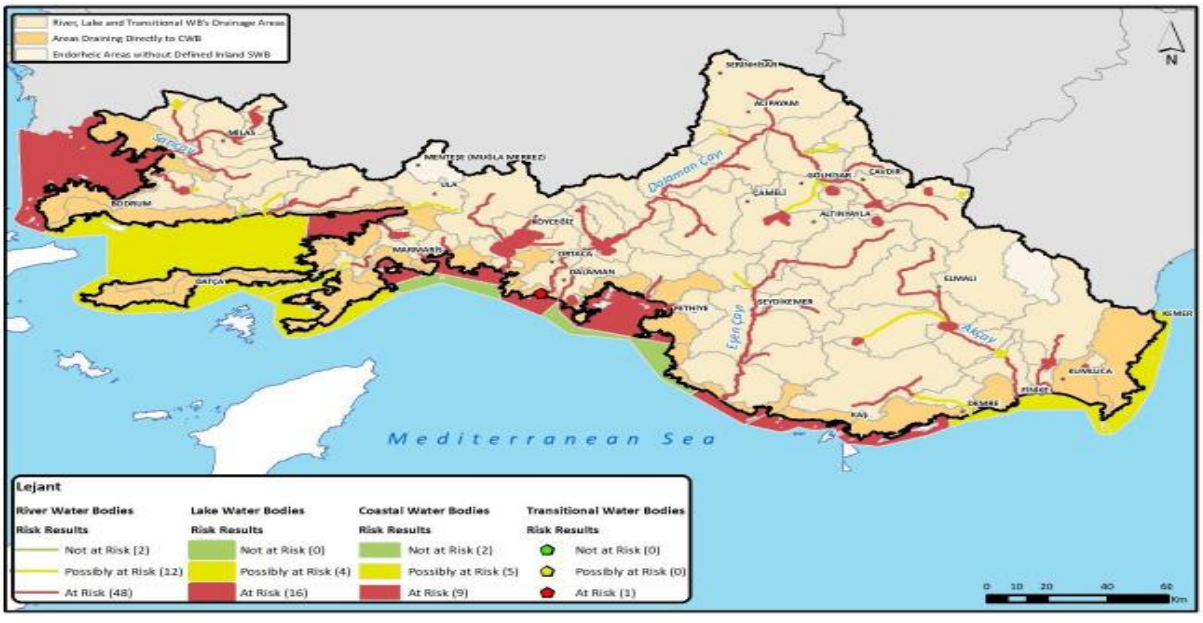
Province	***Area of the Province (ha)***	***Part of the Province in The Basin (ha)***	***Ratio of the Part in The Basin to the Total Province Area (%)***	***Distribution of the Basin to the Provinces (%)***
Antalya	2.050.469	677.173,51	33	32,2
Aydın	794.369,23	2.566,75	0,3	0,1
Burdur	702.360,34	148.240,01	21,1	7,0
Denizli	1.177.935,78	257.253,37	21,8	12,2
Muğla	1.272.099,84	1.017.957,84	80	48,4

RIVER BASIN MANAGEMENT PLAN

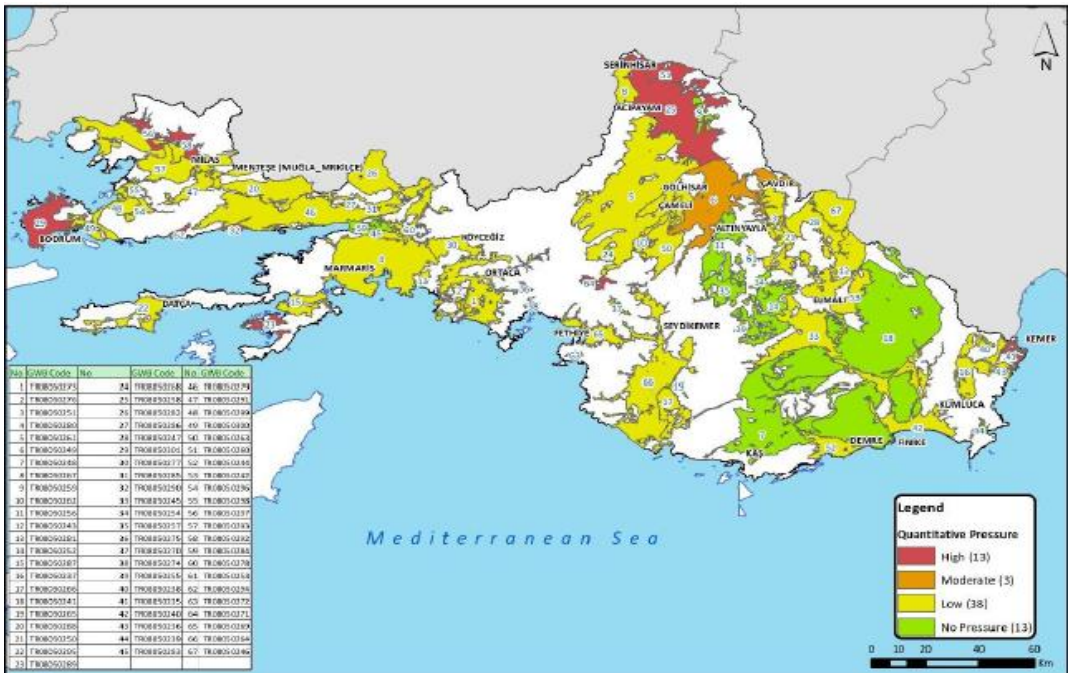
The Batı Akdeniz Basin River Basin Management Plan (RBMP) was prepared in 2021 and started to be followed through the Turkish National Water Information System (TRNWIS).



In the Batı Akdeniz Basin; There are a total of 99 surface water bodies, including 62 river water bodies, 20 lake water bodies, 1 transitional water body, and 16 coastal water bodies. The risk assessment related to surface waters is given below.



There are 67 groundwater bodies in the Batı Akdeniz Basin. Pressures in terms of quantity in groundwater are shown in the figure below.



2868 measures have been determined in order to ensure that all water bodies in the Batı Akdeniz Basin are in good condition and that the ones that are in good condition are protected. The main groups of measures are listed below.

- Construction of a Sanitary Landfill
- Construction of Animal Manure Storage Tank in Animal Farm/Facility
- Implementation of the Good Agricultural Practices Code Communiqué on the Prevention of Nitrate Pollution in Waters Caused by Agricultural Activities
- Detection of existing unregistered wells and prevention of opening new ones
- Improvement of Wastewater Treatment Plants
- Transfer of olive oil factories from 3-phase system to 2-phase system
- Closure of unsanitary landfills
- Combating Invasive Species and Control of Fishing
- Modernization of irrigation
- Crop rotation in agricultural areas
- Implementation of Environmental Flow Regime
- Construction of Fish Passes
- Reducing loss/leakage rates by reducing pressure on transmission lines
- Construction of Wastewater Treatment Plants with Appropriate Treatment
- Construction of sewer infrastructure
- Construction of Secondary Treatment and Wastewater Treatment Plant
- Construction of gasification facility for liquid and solid wastes from Table Olive and Olive Oil Production activities

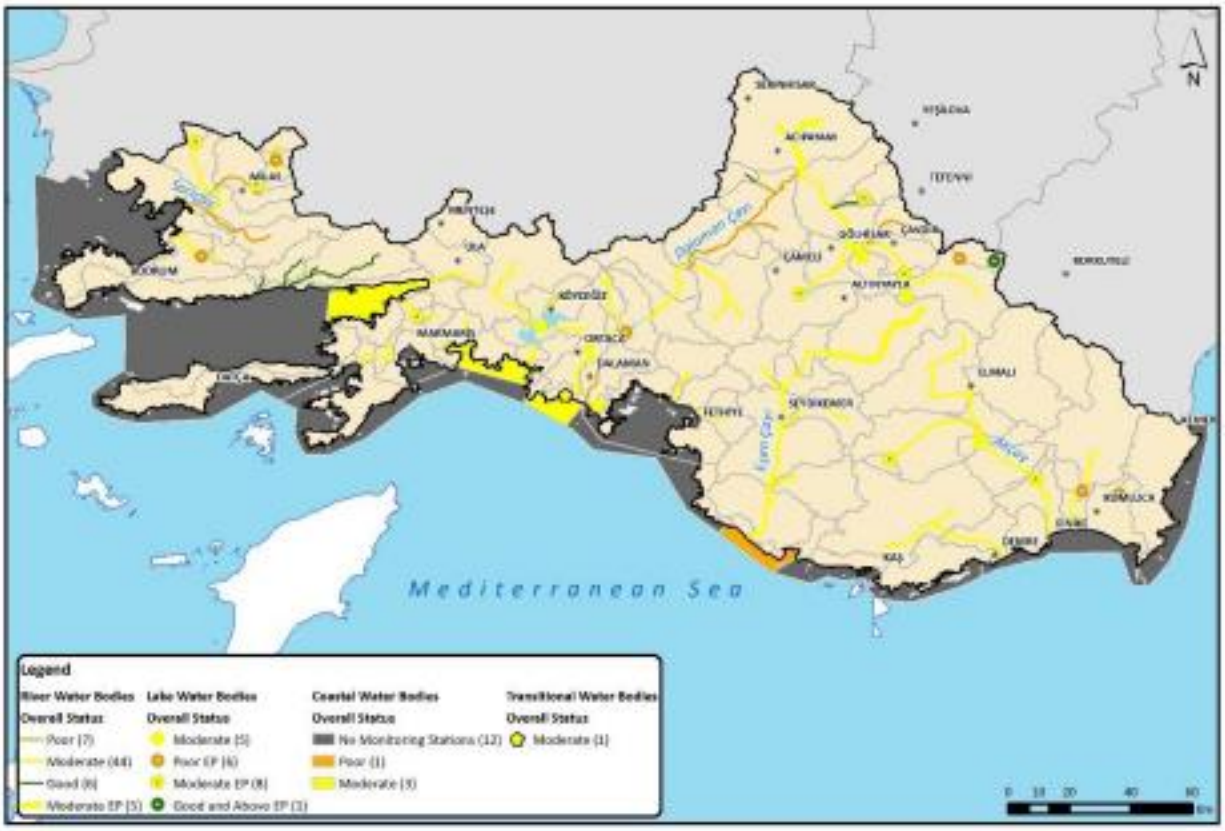
WATER QUALITY

Surface Water Status

As a result of monitoring studies in rivers, lakes, coastal and transitional water bodies, their ecological and chemical status has been evaluated and their overall status has been determined. Accordingly, out of 87 water bodies, 14 are assigned as poor, 66 as moderate and 7 as good status.

Water Body Category	Good Status/ Potential and above	Moderate Status/ Potential	Poor Status/ Potential	Bad Status/ Potential
Rivers	6	49	7	-
Lakes	1	13	6	-
Coastal WB	-	3	1	-
Transitional WB	-	1	-	-
TOTAL	**7**	**66**	**14**	-

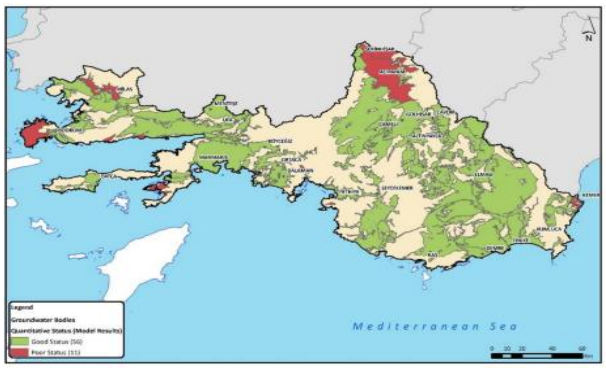
The overall status of surface water bodies is presented in below map.

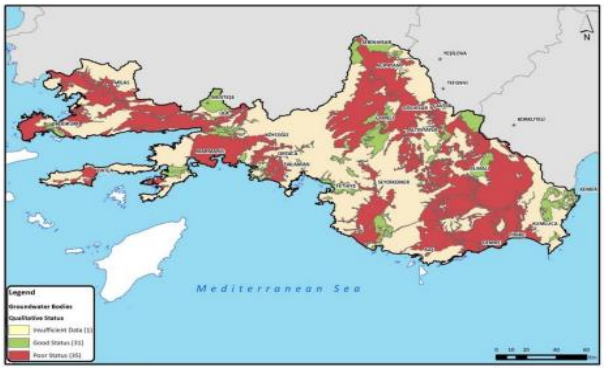


Groundwater Status

In the Batı Akdeniz Basin, a total of 67 groundwater bodies were determined by completing the "Project for the Determination and Evaluation of the Quantity and Quality Characteristics of Groundwater in Burdur and Batı Akdeniz Basins". Within the scope of the Project, 157 quality parameters were monitored from 139 points and 114 points were monitored for 4 periods in terms of quantity. As a result of the evaluations, 8 water bodies were determined both in terms of quantity and quality, 3 water bodies only in terms of quantity, 17 water bodies only in terms of quality, a total of 28 water bodies were determined as poor and 26 water bodies were in good condition.

The quality and quantity status of the Batı Akdeniz Basin groundwater bodies are shown below.





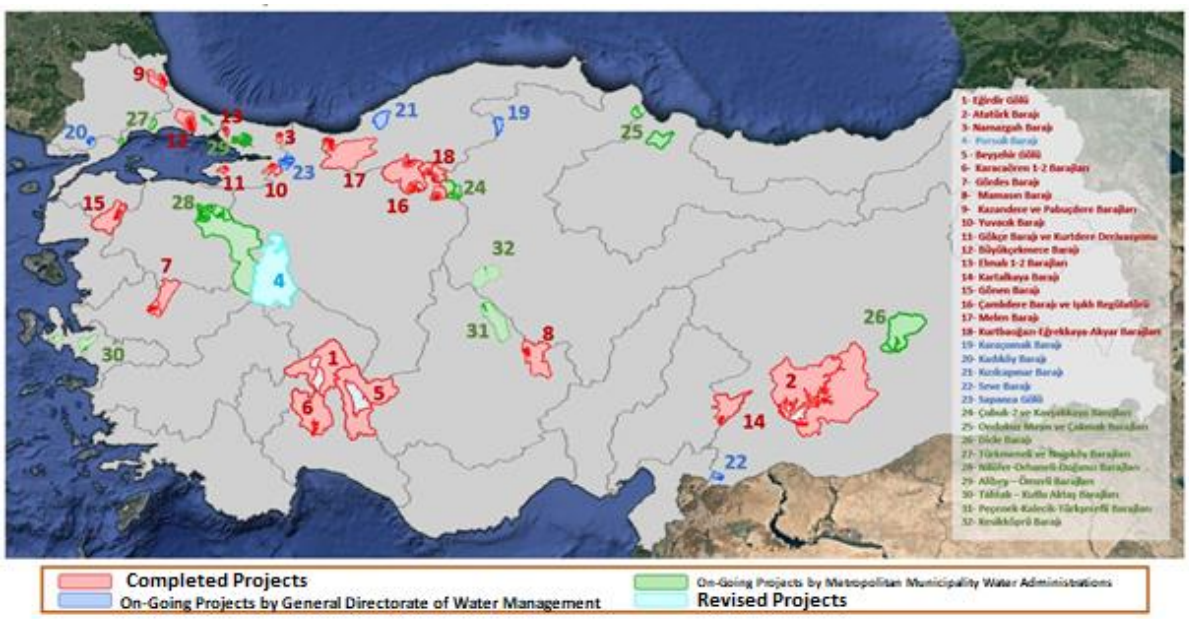
Classification	Quantitative Status		Chemical Status		Overall Status	
Good Status	54	81%	31	46%	26	39%
Poor Status	13	19%	35	53%	40	60%
Insufficient Data	0		1	1%	1	1%

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.

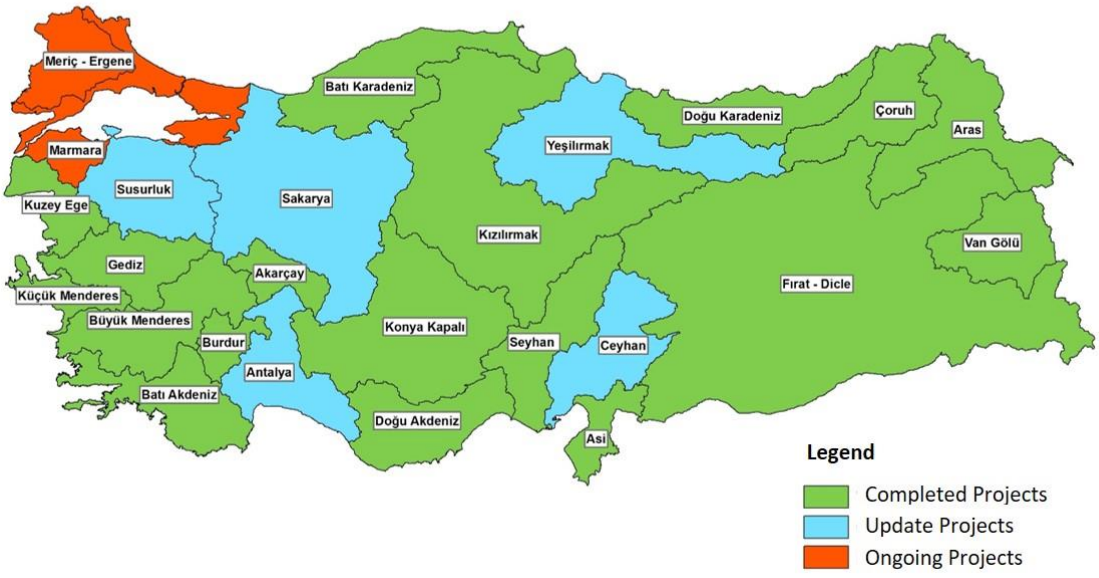
According to the Regulation on the Protection of Drinking-Water Basins:

- 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.

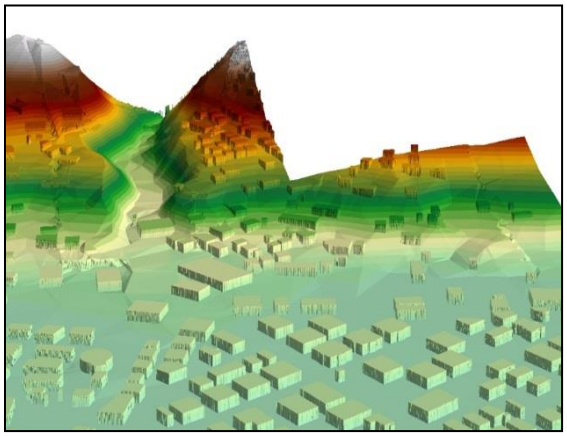


FLOOD MANAGEMENT PLANS

Batı Akdeniz River Basin Flood Management Plan (FMP) started in 2016 and the plan was completed in 2019.



Flood Hazard and Flood Risk maps are generated within the scope of Batı Akdeniz 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 Batı Akdeniz Basin, 450 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 banks well
- Improvement of culverts
- Improvement of walls
- Upper basin measures
- Data-Information Collection/ Production
- Education/ Informing/ Raising Awareness
- Disaster and Emergency Response Capacity
- Dam Failure
- Improving related legislations
- Stream rehabilitation
- Planning
- Crop pattern management
- Insurance System
- Improvement of the performance of regulators
- Agricultural applications
- Flood forecasting and early warning system

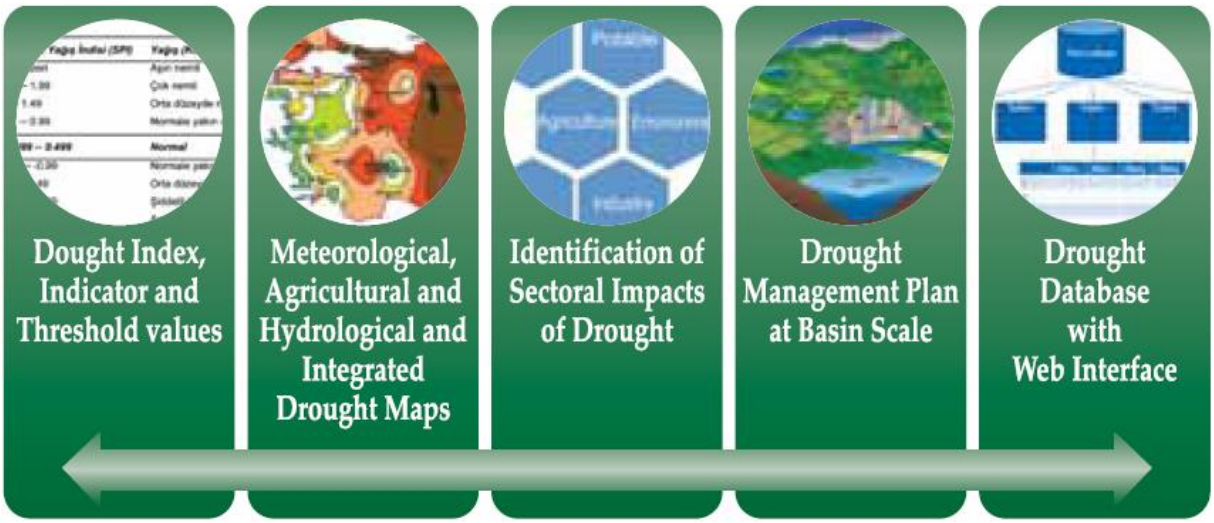
Mitigation measures determined within the scope of the plan are still being tracked via the Flood and Drought Plans Tracking Web Application in 2019 and the National Water Information System (USBS) in 2020.

DROUGHT MANAGEMENT

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.

Batı Akdeniz Basin DMP was completed at 2018.

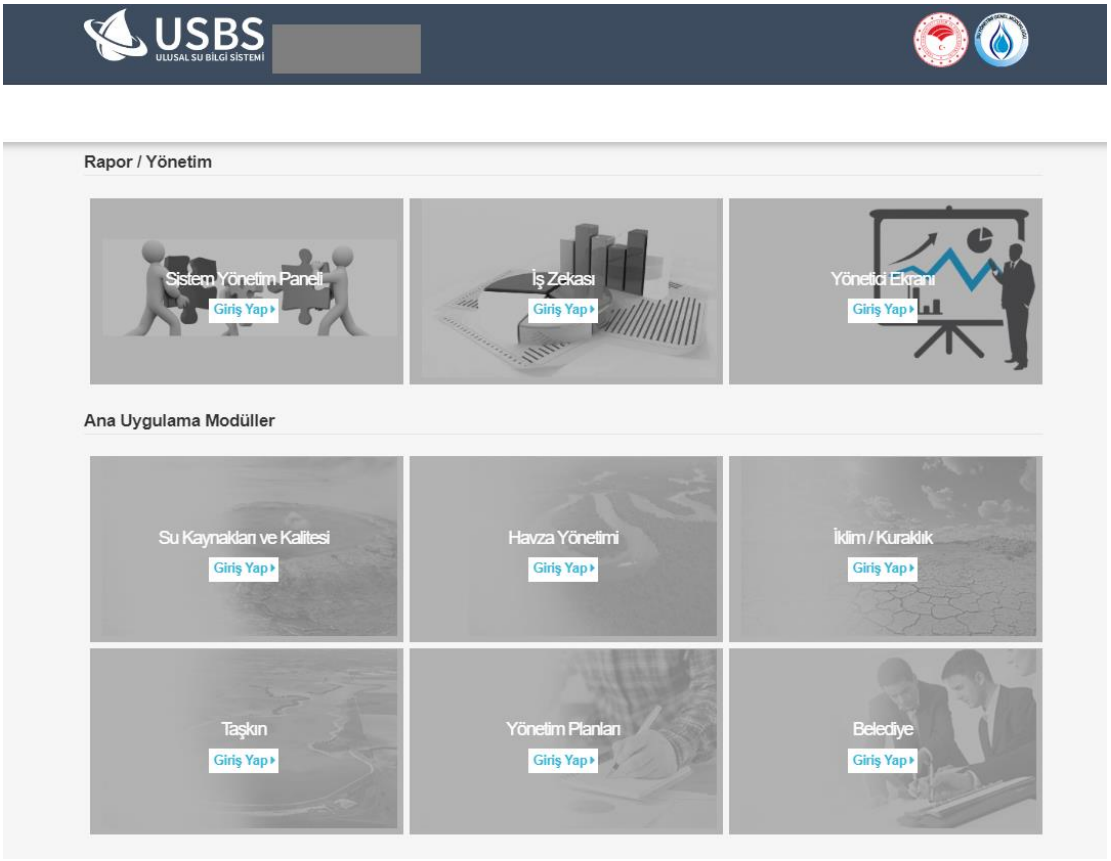
Studies During the Preparation of Drought Management Plans:



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.



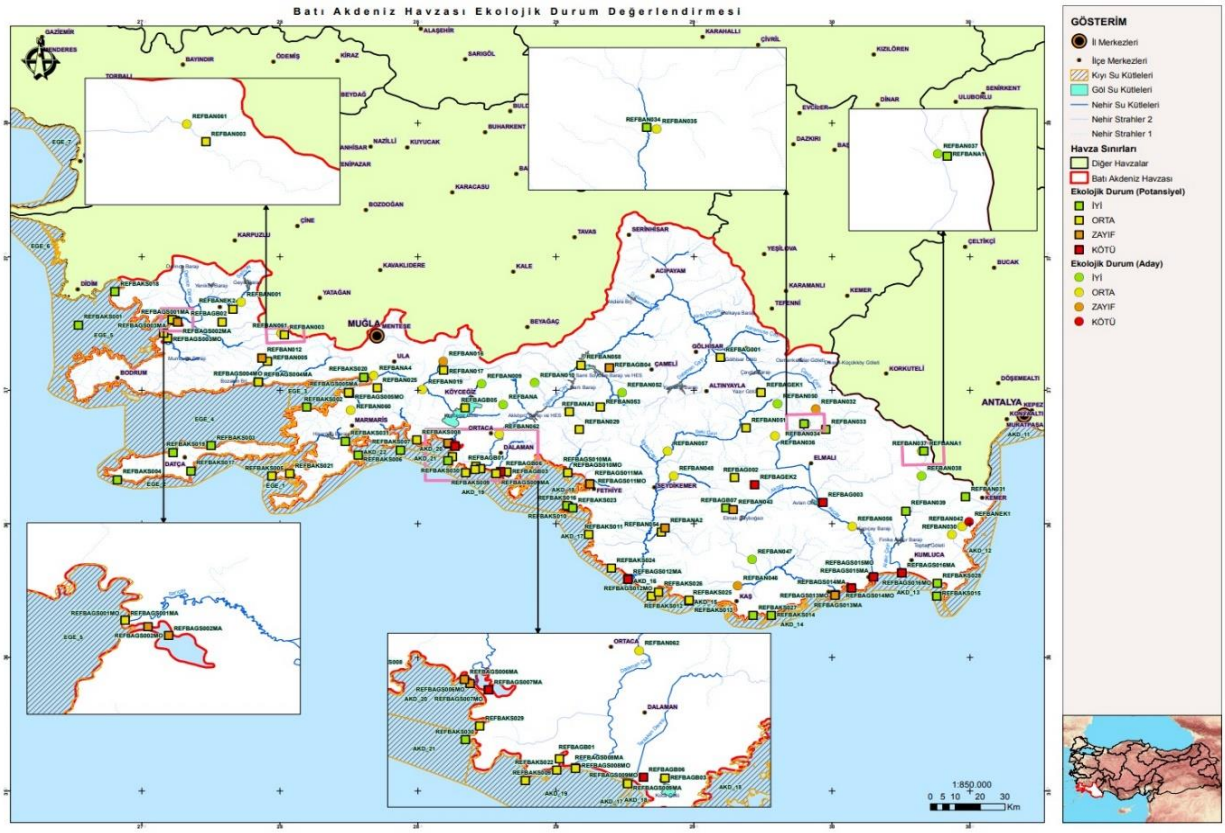
Graphical User Interface of National Water Information System (TRNWIS)

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 124 locations in the West Mediterranean River Basin, including 48 rivers, 13 lakes (natural), 32 transitional waters, and 31 coastal waters, and 101 reference (unpolluted) water sources were identified. In addition, the ecological status of the monitored water bodies in the West Mediterranean 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 37 fish, 171 phytobenthos, 634 phytoplankton, 1236 macroinvertebrate, 173 macroalgae/angiosperm, and 125 macrophyte species were identified in the West Mediterranean River Basin.

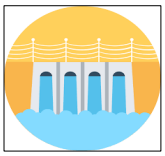
Additionally, for each biological quality element, the Reference Monitoring Network and Reference Monitoring Programs have been established, which include the monitoring stations determined in the reference sites, the parameters to be monitored at these stations, and the monitoring frequencies. In line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



Ecological Status Assessment Results in the West Mediterranean 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. As a result of the calculations, the reuse potential, usage areas and gains of the used waters in the Batı Akdeniz basin are given in the following figure.



2,2 hm^3 Water Storage

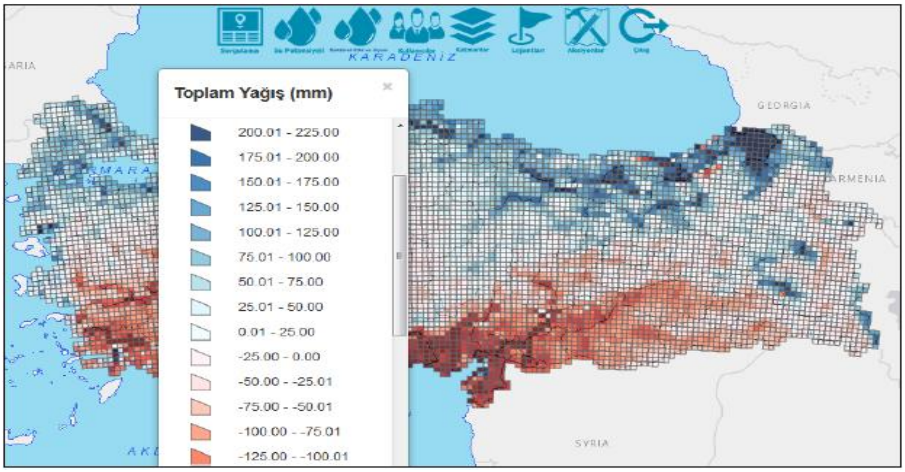
7,458 ha Agricultural Area Irrigation

1,7 hm^2 Landscape Irrigation

24 hm3 Environmental Restoration

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 **16,2ºC** according to 1971-2000 observations, will **increase** by **at least 1,8°C**, **maximum 4,9ºC** in 2071-2100 period. It is expected that temperature increases for this period will predominate in the **northeastern** 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 **731 mm**. According to the results of the projection carried out, there is a **decrease tendency** in the total precipitation compared to the reference period (1971-2000), and it is predicted that the basin will receive **28% 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 **9.403 million ^{3}/year**. With the effect of climate change, it is predicted that in the period **2071-2100**, the gross water potential of the basin could **decrease up to 50%**. Despite this, it is expected that the total water need of the basin can be met until 2100 and there will be no water deficit in the basin.

As a result of the hydrogeological studies carried out, the hydrogeological reserve of groundwater of the basin was determined to be **70 km^3**. The technically and economically usable amount of this reserve, the possible reserve is calculated to be **43 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 **13%** and possible reserve by **22%**.