



MANAGEMENT OF EUTROPHICATION IN TURKEY



Project For Determination Of Sensitive Areas And Water Quality Objectives For The Basins In Turkey



Ministry of Forestry and Water Affairs
General Directorate of Water Management

May, 2016


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OUTLINE

EUTROPHICATION IN WFD

MANAGEMENT OF
EUTROPHICATION IN
TURKEY



EUTROPHICATION IN WFD



Article 6

Register of protected areas

1. Member States shall ensure the establishment of a register or registers of all areas lying within each river basin district which have been designated as requiring special protection under specific Community legislation for the protection of their surface water and groundwater or for the conservation of habitats and species directly depending on water. They shall ensure that the register is completed at the latest four years after the date of entry into force of this Directive.

2. The register or registers shall include all bodies of water identified under Article 7(1) and all protected areas covered by **Annex IV.**

3. For each river basin district, the register or registers of protected areas shall be kept under review and up to date.


ANNEX IV

PROTECTED AREAS


1. The register of protected areas required under Article 6 shall include the following types of protected areas:

- (i) areas designated for the abstraction of water intended for human consumption under Article 7;
- (ii) areas designated for the protection of economically significant aquatic species;
- (iii) bodies of water designated as recreational waters, including areas designated as bathing waters under Directive 76/160/EEC;
- (iv) nutrient-sensitive areas, including areas designated as vulnerable zones under Directive 91/676/EEC and areas designated as sensitive areas under Directive 91/271/EEC; and**
- (v) areas designated for the protection of habitats or species where the maintenance or improvement of the status of water is an important factor in their protection, including relevant Natura 2000 sites designated under Directive 92/43/EEC⁽¹⁾ and Directive 79/409/EEC⁽²⁾.

2. The summary of the register required as part of the river basin management plan shall include maps indicating the location of each protected area and a description of the Community, national or local legislation under which they have been designated.




EUTROPHICATION IN WFD





For eutrophication
assessment
methodolgy


➔

COMMON IMPLEMENTATION STRATEGY
FOR THE WATER FRAMEWORK DIRECTIVE
(2000/60/EC)




Guidance Document No. 23
GUIDANCE DOCUMENT ON EUTROPHICATION ASSESSMENT
IN THE CONTEXT OF EUROPEAN WATER POLICIES



T.C.
Çevre ve Şehircilik
Bakanlığı


MANAGEMENT OF EUTROPHICATION IN TURKEY





EUROPEAN COMMISSION

The Project On Determination Of Sensitive Areas And Water Quality Objectives On The Basis Of Watershed In Turkey

- Identification of Water Bodies
- Identification of Pressures and Impacts
- Identification of Potential Sensitive Areas
- Monitoring Activities in Potential Sensitive Areas
- Identification of Sensitive Water Bodies and Areas
- Identification of Water Quality Objectives
- Identification of Measures






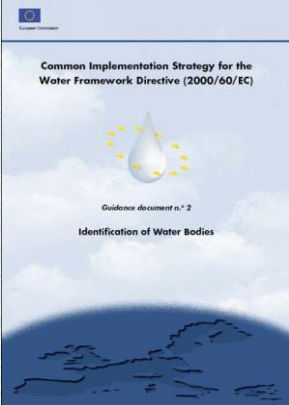


T.C.
Çevre ve Şehircilik
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Identification of Water Bodies



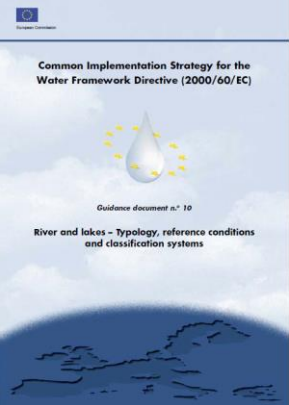
EUROPEAN COMMISSION



Common Implementation Strategy for the
Water Framework Directive (2000/60/EC)

Guidance document n° 2

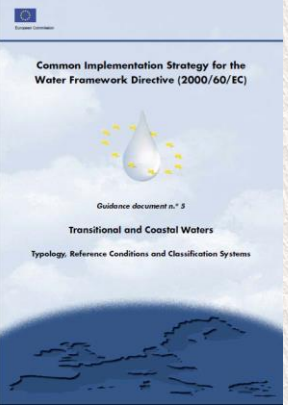
Identification of Water Bodies



Common Implementation Strategy for the
Water Framework Directive (2000/60/EC)

Guidance document n° 10

River and lakes - Typology, reference conditions
and classification systems




Common Implementation Strategy for the
Water Framework Directive (2000/60/EC)


Guidance document n° 3

Transitional and Coastal Waters


Typology, Reference Conditions and Classification Systems




Identification of Water Bodies (Acceptances)



- ✓ Minimum Water Body Area: 100 km² for rivers, 50 Ha for lakes and ponds
- ✓ Point Pressure, Equivalent Population > 10000 people; Diffuse Pressure, Agricultural Area > 60%
- ✓ Strahler scale was used but Strahler 1 and 2 were ignored
- ✓ If the rivers are in drinking water sub-basin or within the boundaries of protected area, it was determined as water body regardless of the Strahler scale.
- ✓ If the majorly changed part on the river is more than 10% of the water body, such part will be evaluated as a separate water body by being separated from the current water body.
- ✓ The geology layer is in 5 sub-types as calcareous, alkaline, siliceous, alluvial and mixed, it was evaluated in 2 categories as high mineral (calcareous and alkaline) and low mineral (siliceous) in the determination.



Basins - Number of Water Bodies




Basin Name	River	Lake	Total	Basin Name	River	Lake	Total
Akarçay	29	11	40	Gediz	85	11	96
Antalya	52	20	72	Kızılırmak	108	71	179
Aras	48	14	62	Konya	56	34	90
Asi	33	7	40	Northern Aegean	36	10	46
Western Med.	53	23	76	K.Menderes	34	11	45
Western Black Sea	67	22	89	Marmara	165	40	205
Burdur	15	11	26	Meriç-Ergene	78	37	115
B.Menderes	78	48	126	Sakarya	155	58	213
Ceyhan	80	22	102	Seyhan	61	18	79
Çoruh	32	13	45	Susurluk	106	37	143
Eastern Med.	67	11	78	Van	21	16	37
Eastern Black Sea	52	6	58	Yeşilırmak	69	40	109
Fırat-Dicle	225	61	286				

In 25 River Basin


Number of Rivers: 1805

Number of Lakes: 652

TOTAL: 2457



Determination of Typology




Rivers


- Flow Regime (seasonal/continuous)
- Elevation
- Inclination
- Geology
- Drainage Area
- Precipitation

Lakes

- Elevation
- Area
- Depth
- Geology



Basins - Number of Typologies




Basin Name	River	Lake	Total
Akarçay	11	6	17
Antalya	21	6	27
Aras	10	2	12
Asi	14	5	19
Western Med.	19	10	29
Western Black Sea	13	8	21
Burdur	7	4	11
B.Menderes	17	10	27
Ceyhan	22	12	34
Çoruh	8	5	13
Eastern Med.	22	8	30
Eastern Black Sea	12	4	16
Fırat-Dicle	30	13	43

Basin Name	River	Lake	Total
Gediz	9	4	13
Kızılırmak	15	13	28
Konya	22	11	33
Northern Aegean	8	3	11
K.Menderes	9	4	13
Marmara	6	5	11
Meriç-Ergene	4	3	7
Sakarya	24	11	35
Seyhan	22	8	30
Susurluk	15	8	23
Van	4	4	8
Yeşilırmak	14	8	22


In 25 River Basin

Number of Typologies in Rivers: 23

Number of Typologies in Lakes: 56



Identification of Potential Sensitive Areas



STAGE 1

- SWAT Model results

STAGE 2 (General Screening Approach)

- For lakes:
 - TSI (TN, TP and Chlorophyll-a) calculated based on the model
- For rivers:
 - Water quality monitoring results
 - Pressure-effect analysis (point, diffuse and morphological)
 - Sensitivity Index (based on basin)

STAGE 3

- Expert Opinions



Monitoring Activities in Potential Sensitive Areas






For lakes
300 ha > 2 points
300 ha < 1 point


For rivers
Minimum One Point
for each Potential
Sensitive Area

↓

600 monitoring
points



Physicochemical Monitoring Activities in Potential Sensitive Areas




Monitoring parameters:


- pH
- Temperature
- Dissolved Oxygen
- Chlorophyll-a
- Secchi Disk
- Suspended Solid
- Total Organic Carbon
- Total Nitrogen
- Nitrate
- Ammonium
- Total Phosphorus
- Phosphate

Monitoring frequency:

- 4 sampling/year (seasonal)



Biological Monitoring Activities in Potential Sensitive Areas



Monitoring parameters:

- Lakes : Phytoplankton in deep lakes
Phytoplankton and macrophyte in shallow lakes
- Rivers : Macro-invertebrates

Monitoring frequency:

- Lakes : Once a year (15th of September-15th of October)
Cyanobacteria in fall season when they increase
- Rivers : Once a year
In spring when the diversity is high:
 - March-May for (first week of June at the latest) Aegean and Mediterranean
 - June-July for East and Black Sea

