

Protocols for Surface Water Sampling

River is the main source of drinking water for many cities. However, they often get polluted due to the discharge of untreated sewage and effluents from domestic and industrial activities.

Basic Quality Parameters to be measured:

Following parameters need to be tested for surface water samples

Sr.No	Tests		Unit	Measurement Method
1	Colour	Colour	-	
2	Odour	Odour	-	
3	Temperature	Temperature	°C	
4	pH	pH	-	pH meter
5	EC	Electrical conductivity	μS/cm	Conductivity meter
6	DO	Dissolved oxygen	mg/l	DO Meter or Winkler modified method
7	TS	Total solids, by volume	% and mg/l	
8	TDS	Total dissolved solids, by volume	% and mg/l	Gravimetry
9	Ammonical Nitrogen (NH ₄ -N)	Ammonical Nitrogen	mgN/l	Colorimetry
10	Nitrate Nitrogen (as N)	Nitrate Nitrogen	mgN/l	Colorimetry
11	BOD ₃	BOD ₃ at 27° degree Centigrade	mg/l	DO consumption in 3 days at 27 °C
12	COD	Chemical oxygen demand	mg/l	Potassium dichromate method
13	Chlorides (as cl)	Chlorides	mg/L	Argentometric titration
14	Total coliforms	Total Coliform	No./100 mL	MPN or MF method
15	Faecal coliforms	Faecal coliforms	No./100 mL	MPN or MF method

Frequency of sampling:

	Parameters to be measured	Frequency	Location
1	Field Observation: Weather, Approximate depth of main streams/depths of water table, Colour and intensity, Odor, Visible effluent discharge. Human activities around station, Station Details	Monthly/Quarterly (Jan, April, July & Oct)	All Location
2	Core Parameters: Temperature, pH, Conductivity DO, BOD, Nitrate –N, ammonia-N Total Coliform, Faecal Coliform.	Monthly/Quarterly (Jan, April, July & Oct)	All Location
3	Bio Monitoring Saprobity Index, Diversity Index, P/R Ratio	Three times in a year (Oct, Jan, April)	Selected Location

4	General Parameters: COD, TKN, Total Dissolved solids, Total fixed solids, Total Suspended Solids, Turbidity, Hardness, Fluoride Boron, Chloride sulphate, Total Alkalinity, P-alkalinity, Phosphate, Sodium, Potassium, Calcium, Magnesium	Once a year (April)	All Location
5	Trace Metals: Arsenic, Nickel, Copper, Mercury, Chromium, Cadmium, Zinc, Lead, Iron	Once a year (April)	Selected Location
6	Pesticide: Alpha BHC, Beta BHC, Gama BHC(Lindane), OP DDT, PP DDT, Alpha Endosulphan, Dieldrin, Carbaryl, (Carbmate), 2.4 D. Aldrin, Malathian, Methyl, Parathian, Anilophos, Cloropyriphos	Once a year (April)	Selected Location

Sampling site selection:

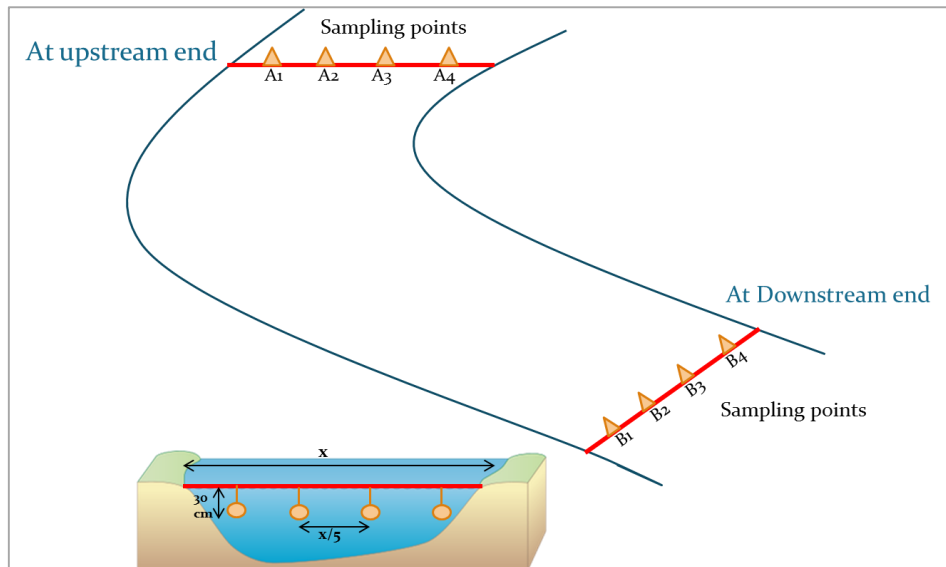
1. Sampling site will be selected at location which are easily accessible in all the seasons.
2. For flowing water, samples to be collected from following location:

Sr. No.	Location	Time of taking samples	Type of Samples	Remark
1	At Dam site	Any time of day	Grab Sample	Unpolluted sample
2	At entry point of city (upstream end) preferably at jackwell	7 am	Grab composite samples	To gauge pollution in river water before entry into city
3	At downstream point of city	Two samples (7am and 5 pm)	Grab Composite samples	To gauge pollution discharge from city

3. For still waters, more than one sample locations may be needed if:
 - a. Reservoir is greater than 20 km long
 - b. Major inflows occur within lake at different locations,
 - c. Lake is divided into significant sub-lake units by causeways with narrow connectors.

Sampling Procedure:

1. Samples to be collected from varying distance at sampling location of flowing river, 30 cm below the water surface.
2. Equal quantity of samples need to be collected from equidistant points (A1, A2, A3, A4) of sampling location and then mixed together to obtain composite samples.



Other information to be collected:

1. Details of volume of water released from Dam location to be taken from Dam authority
2. Flow velocity to be measured at both upstream and downstream points

Other considerations:

Sample container to be closed to prevent volatilization or contamination. Samples will be kept cool to prevent microbial activity and samples will be analysed within eight hours from the time of collection, or if this is not possible, the sample should be preserved by refrigeration or freezing, or by the addition of chemical fixative, depending on the standard method for the parameters to be measured.

Type of containers and sample preservation method shall be as per Monitoring Protocol for water quality by Maharashtra Pollution Control Board (MPCB).

Refer guidelines for water quality monitoring by Central pollution control board (CPCB) for detailed procedure of sampling, laboratory analysis, sample storage and analysis. (<http://mpcb.gov.in/envtdata/GuidelinesforWQMonitoring%5B1%5D.pdf>)