# Water Quality Assessment Based on the Phytoplankton Composition of Buyukcekmece Dam Lake and its Influent Streams (Istanbul), Turkey

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## Abstract

**Purpose:** In this study, water quality and pollution status of Buyukcekmece Dam Lake and its influent streams (Karasu, Izzettin, Eskice, Ahlat, Beylikçayı, Çekmece, Çakmaklı and Tahtaköprü), which is the second largest drinking water resources of Istanbul (Turkey), were analayzed. For this purpose, some physicochemical parameters, nutrient concentrations and phytoplankton composition were investigated of the lake and its streams.
**Methods:** Water samples were collected seasonally from 9 sampling sites by using Nansen bottles in May 2017, Agust 2017, November 2017 and February 2018. Water temperature, dissolved oxygen, pH, salinity and electrical conductivity were measured with the WTW Multi 340i /set multiparameter in the study area. Nutrient concentrations ($NO_2$, $NO_3$, and $PO_4$) of the water were analyzed according to standard methods at the laboratory. Phytoplanktonic organisms were identified in reference to the literature, including several comprehensive reviews on the subject.
**Results:** Phytoplankton composition of the lake and its feeding streams consists of Bacillariophyta (20), Charophyta (6), Chlorophyta (12), Cryptophyta (2), Cyanobacteria (7), Euglenozoa (8), Miozoa (2) and Ochrophyta (1) divisions members. As a result of measurements, the minimum and maximum values of some physicochemical parameters and nutrients were as follows; water temperature (8.0-27.9ºC), dissolved oxygen (2.01-8.42 mg/L), pH (7.32-8.85), salinity (1-7‰), electrical conductivity (623-1817 µS/cm), nitrite (0.0137-3.382 mg/L), nitrate (0.000-4.134 mg/L) and orthophosphate (0.084-69.726 mg/L).
**Conclusions:** The results indicated that the basin of Buyukcekmece Dam Lake shows close feature to eutrophic conditions. It is required that, Buyukcekmece Dam Lake and its creeks should be taken under protection continuously for improving its water quality by relevant authorities. Therefore, detailed studies on phytoplankton including physicochemical parameters and nutrients have to be carried out for controlling the water quality of the lake.

**Key words:** Phytoplankton, physicochemical parameters, nutrients, water pollution, Buyukcekmece Dam Lake, influent streams.

## 1. Introduction

Generally physical, chemical and biological parameters are examined together to reveal the water quality of aquatic systems. Especially phytoplankters one of the biological parameters are frequently used as functional groups [1, 2]. Forming the first ring of the food chain and effecting very fast to changes in waters are the reasons of preferring this group as bioindicators in many studies.

Buyukcekmece Dam Lake, the most affected reservoir by anthropogenic pollution in Istanbul, is the second largest drinking water source. Due to the lake is used for providing irrigation water to cultivated areas, run off from these areas is the additional source of antropogenic nutrient load of the lake [3]. Also, Buyukcekmece Dam Lake and its surroundings are used as a recreation area. Istanbul Metropolitan Municipality has planning works to allow new residential areas, industrial and commercial activities in the Buyukcekmece Basin. In parallel with this planning, an increase is expected in the pollution load of the dam lake. Therefore, it has become compulsory to plan and implement the protection of the Buyukcekmece Dam Lake Basin [4].

The phytoplankton composition of Buyukçekmece Dam Lake was carried out by Temel [3] in an earlier study and Aktan et al. [5] investigated the effect of environmental factors on the growth and size structure of two dominant phytoplankton species in the reservoir. It is known that poured streams to the lakes, constitute a serious pollution load. There isn't any detailed studies including the phytoplankton community and related environmental variables of the influent streams of Buyukcekmece Dam Lake. The aim of this study is to determine the pollution level which were brought by the streams to the lake by using phytoplankton composition and some physicochemical parameters and create consideration for taking necessary precautions against the ecological problems in this lake ecosystem.

### *1.1. Study Area*

Buyukcekmece Dam Lake is located in the south of the Thrace peninsula, within the boundaries of Istanbul and near to the Sea of Marmara (Figure 1). It is 50 km away from the center of Istanbul Metropolitan. The dam was built on Karasu River by ISKI (Water and Sewerage Administrative Center of Istanbul) in 1985 [5]. Buyukcekmece Dam with a total drainage area of 620 $km^2$, has a precipitation area of approximately 95 $km^2$ and a lake surface area of 25-30 $km^2$ depending on the precipitation. It is the second largest drinking water reservoir of Istanbul with a volume of 160 million $m^3$. This shallow dam lake has an average depth of 6 km and it is the most affected reservoir in Istanbul by anthropogenic pollution. The lake, which bordered on industrial and residential areas, is exposed to the effects of the use of pesticides and artificial fertilizers originating from agricultural activities. Also, it is under threat with the most intensive traffic of the main arteries in Istanbul, such as TEM and E5 [4, 5].

The lake is feeding by Çekmece, Hadımköy, Kayan, Kavuk, Hamzalı, Örcünlü, Eski, Tahtaköprü, Köy, Kesliçiftliği, Kızılcaali, Damlı, Ayvalı, Şeytan, Karasu, Tavşan, İnter, Delice, Akalan, Tepecik, Kadınlar, Kestanelik, İnceğiz, Gökçeali and İzzettin creeks. Kavuk and Tepecik creeks combine to constitute the Karasu River near to the lake. Especially Karasu, Sarısu and Çakıl creeks have important amount of water flow to the lake and the others have a very low flow rate [4].

### *1.2. Climate*

Marmara climate, which the winters are rainy and the summers are hot, is dominant in the region. Unlike the typical Mediterranean regime, it is seen that the summer drought has lost its severity due to its close proximity to the Black Sea. Temperatures range from an average of 23°C in July-August to 5°C in January-February. According to 14 year evaluation between 1967 and 1981 of DSI, the annual average rainfall was 573.1 mm. The effect of Azor anticyclone in summer changes the wind direction in winter due to the effects of Siberian high-pressure center and temporary barometer depressions [4].

## 2. Materials and Methods

The presented study was carried out at 9 sampling sites including the lake and its feeding streams in May 2017 (spring), Agust 2017 (summer), November 2017 (autumn) and February 2018 (winter) (Table 1). Samples were collected seasonally by using Nansen bottles from each sampling points. The samples were fixed with Lugol's iodine solution for phytoplankton identification and counting. Phytoplankton counting were made with a Nikon TMS inverted microscope at a magnification of 400 according to Lund et al. [6]. The taxonomic identification of phytoplankters were done in reference to Hustedt [7, 8], Desikachary [9], Prescott [10, 11], Patrick & Reimer [12, 13], Huber-Pestalozzi [14], Krammer & Lange-Bertalot [15] and John et al. [16]. All the recorded species were checked in algabase cite [17]. Water temperature, dissolved oxygen, pH, salinity and electrical conductivity were measured with the WTW Multi 340i/set multiparameter in the field. Nitrite ($NO_2$), nitrate ($NO_3$) and orthophosphate ($PO_4$) concentrations in the water were analyzed at the laboratory according to standard methods [18] and the chlorophyll-*a* concentrations were estimated according to Parsons and Strickland [19].


**Fig.1** Map of Buyukcekmece Dam Lake and sampling stations

**Table 1.** Coordinates and characteristics of sampling stations.

| STATIONS | | COORDINATES | CHARACTERISTICS |
|---|---|---|---|
| 1 | Karasu Stream | 41°08'28.2"N 28°29'06.8"E | This stream constitutes the main water source of the lake and there are many agricultural activities (wheat, barley, oats, and corn) around it. |
| 2 | İzzettin Stream | 41°08'46.1"N 28°31'13.5"E | The second important feeding stream of the lake. |
| 3 | Eskice Stream | 41°09'04.1"N 28°31'22.3"E | Shallow creek with low water flow. |
| 4 | Ahlat Stream | 41°06'37.5"N 28°32'08.6"E | Shallow creek with low water flow. |
| 5 | Beylikçayı Stream | 41°06'15.9"N 28°33'33.1"E | This effective water source is located in the north-east of the lake. |
| 6 | Çekmece Stream | 41°03'31.4"N 28°34'52.7"E | There are situated agricultural areas around this very small creek. |
| 7 | Çakmaklı Stream | 41°03'22.8"N 28°35'14.8"E | Shallow creek with low water flow. |
| 8 | Tahtaköprü Stream | 41°03'22.8"N 28°35'14.8"E | It is located in the west part of the lake. |
| 9 | Büyükçekmece Dam Lake | 41°04'28.1"N 28°32'49.2"E | It is selected from the centre of the lake. |

## 3. Results and Discussion

### 3.1. Phytoplankton Composition

A total of 58 taxa belonging to Bacillariophyta (20), Charophyta (6), Chlorophyta (12), Cryptophyta (2), Cyanobacteria (7), Euglenozoa (8) Miozoa (2) and Ochrophyta (1) divisions were identified. The list of recorded taxa of phytoplankton was given in Table 2 and the distribution of phytoplankton groups was shown in Figure 2. According to the species diversity, Bacillariophyta division was found the richest group and *Anabaena spiroides* of Cyanabacteria was recorded the dominant species in terms of phytoplankton density.

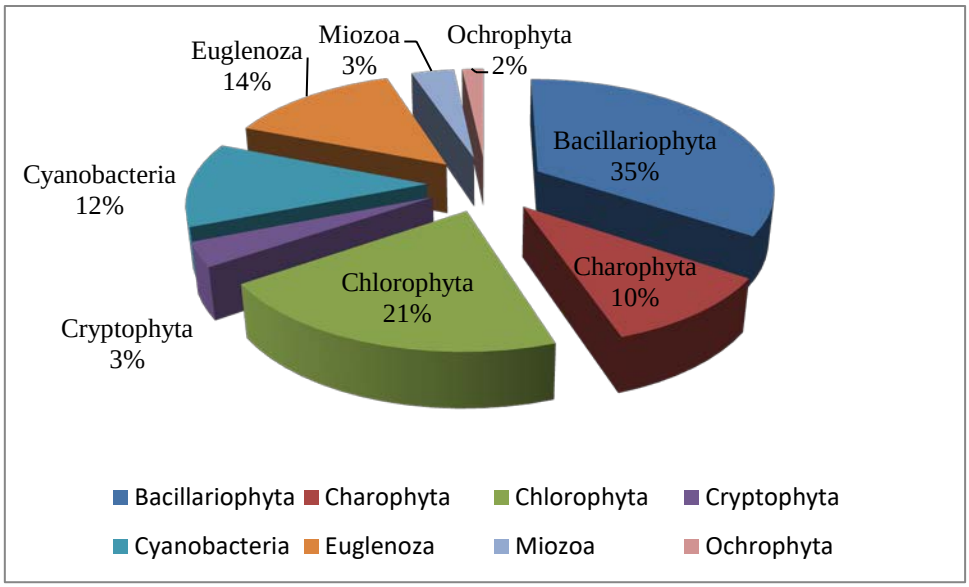


**Fig. 2** Percentage of recorded species as their divisions

**Table 2.** List of recorded taxa of phytoplankton.

| **DIVISIO: BACILLARIOPHYTA** | **DIVISIO: CRYPTOPHYTA** |
|---|---|
| *Amphora ovalis* (Kütz.) Kützing | *Cryptomonas ovata* Ehrenberg |
| *Aulacoseira italica* (Ehr.) Simonsen | *Plagioselmis nannoplanctonica* (Skuja) G.Novarino, I.A.N.Lucas & Morrall |
| *Cocconeis placentula* Ehrenberg | |
| *Cyclotella atomus* Hustedt | **DIVISIO: CHLOROPHYTA** |
| *Cyclotella ocellata* Pantocsek | *Ankistrodesmus falcatus* (Corda) Ralfs |
| *Cyclotella meneghiniana* Kützing | *Coelastrum microporum* Nägeli |
| *Cymbella affinis* Kützing | *Kirchneriella* sp. |
| *Cymbella tumida* (Brebisson) Van Heurck | *Scenedesmus arcuatus* (Lemmermann) Lemmermann |
| *Cymbella ventricosa* (C.Agardh) C.Agardh | *Scenedesmus dimorphus* (Turpin) Kützing |
| *Diatoma vulgaris* Bory | *Scenedesmus ecornis* (Ehr.) Chodat |
| *Fragilaria crotonensis* Kitton | *Scenedesmus quadricauda* (Turpin) Brebisson |
| *Melosira varians* C.Agardh | *Scenedesmus* sp. |
| *Meridion circulare* (Greville) C.Agardh | *Sphaerocystis* sp. |
| *Navicula cryptocephala* Kützing | *Pandorina morum* (O.F.Müller) Bory |
| *Navicula cuspidata* (Kütz.) Kützing | *Pediastrum boryanum* (Turpin) Meneghini |
| *Navicula lanceolata* Ehrenberg | *Pediastrum duplex* Meyen |
| *Nitzschia acicularis* (Kütz.) W.Smith | |
| *Pleurosigma* sp. | **DIVISIO: EUGLENOZOA** |
| *Ulnaria acus* (Kütz.) Aboal | *Euglena acus* (O.F.Müller) Ehrenberg |
| *Ulnaria ulna* (Nitzch) Compere | *Euglena ehrenbergii* G.A. Klebs |
| | *Euglena gracilis* G.A. Klebs |
| **DIVISIO: CHAROPHYTA** | *Euglena viridis* (O.F.Müller) Ehrenberg |
| *Cosmarium formosulum* Hoff | *Phacus orbicularis* K.Hübner |
| *Closterium acutum* Brebisson | *Trachelomonas hispida* (Perty) Stein |
| *Closterium incurvum* Brebisson | *Trachelomonas volvocino* (Ehr.) Ehrenberg |
| *Staurastrum crenulatum* (Nägeli)Delponte | *Strombomonas* sp. |
| *Staurastrum brachiatum* Ralfs ex Ralfs | |
| *Closterium strigosum* Brebisson | **DIVISIO: MIOZOA** |
| | *Peridium bipes* Stein |
| **DIVISIO: CYANOBACTERIA** | *Prorocentrum micans* Ehrenberg |
| *Anabaena spiroides* Klebahn | |
| *Aphanizmenon flosaquae* Ralfs ex Bornet & Flahault | **DIVISIO: OCHROPHYTA** |
| *Chroococcus limneticus* Lemmermann | *Dinobryon sertularia* Ehrenberg |
| *Merismopedia glauca* (Ehr.) Kützing | |
| *Microcystis aeruginosa* (Kütz.) Kützing | |
| *Oscillatria princeps* Vaucher ex Gomont | |
| *Oscillatora tenuis* C.Agardh ex Gomont | |
| | |

Bacillariophyta was represented by 20 taxon and most common diatoms were recorded as *Amphora ovalis, Aulacoseira italica*, *Cyclotella meneghiniana* and *Nitzschia acicularis. Aulocoseira italica* and *Cyclotella* spp. of centric diatoms are recorded usually in vertical mixed mesotrophic small- medium lakes with tolerance to light deficiency and sensitive to a rise in pH. *Nitzschia acicularis* of pennate diatoms are habitants of shallow enriched waters and streams with sensitivity to nutrient deficiency [1, 2]. Charophyta was represented by 6 taxon. *Cosmarium formosulum* and *Closterium acutum* of desmids were recorded frequently during the study. While *C. formosulum* is a habitant of mesotrophic epilimnia, *C. acutum* is found generally in eutrophic epilimnia of waters [1, 2]. Chlorophyta was represented by 12 species. It was stated that *Scenedesmus dimorphus* and *S. quadricauda* of green alga are sensitive to low light and presents in shallow, highly enriched ponds, lakes and rivers [1, 2].

Cryptophyta was represented by *Cryptomonas ovata* and *Plagioselmis nannoplanctonica. C. ovata* is presented in small enriched lakes [1, 2]. This cryptomonads have been reported as dominant species in Buyukcekmece Dam Lake by Aktan et al. [5]. In the presented study, *P. nannoplanctonica* was recorded rarely in low numbers. Cyanobacteria was represented by 7 species. It is reported that *Anabaena spiroides, Merismopedia glauca, Microcystis aeruginosa* and *Oscillatoria tenuis* of blue-green algae are indicated eutrophic conditions. Particularly, *A. spiroides* and *M. aeruginosa* show high organic matter level and agricultural enriched eutrophic and also hypereutrophic waters [1, 2]. Additionally, toxin-producing Cyanobacteria like *M. aeruginosa*, pose a big threat both to the lake ecosystem and public health. Also, they could be very dangerous for migratory birds [20]. Euglenozoa was represented by 9 species. It was stated that species of *Euglena* genus are found commonly in shallow mesotrophic and polluted lakes [1, 2]. *Euglena gracilis* was determined as a subdominant species in eutrophic featured Kuçukcekmece Lagoon [21]. Miozoa was represented by *Prorocentrum micans* and *Peridiniım bipes* which are found both in freshwaters and marine systems. It was expressed that these dinoflagellates are presented from oligotrophic to eutrophic waters in a wide range. Also, this species are considered to be harmful algae because of they cause excessive blooms under appropriate conditions and cause red-tides [22]. This species recorded frequently but in low numbers in the presented study. Ochrophyta was represented only by *Dinobryon sertularia* a member of small, oligotrophic, poor based lakes and heterotrophic pools [1, 2].

***3.1.1. Karasu Stream (St.1):*** A total of 23 taxa were identified belonging to 7 divisions in Karasu Stream. Bacillariophyta was recorded the dominat group and Euglenozoa was the subdominant division in station 1. *Nitzschia acicularis* of diatoms was found the dominant species.

***3.1.2. İzzettin Stream (St.2)*:** A total of 12 taxa were identified belonging to 5 divisions in İzzettin Stream. Cyanobacteria was recorded the dominat group and Chlorophyta was the subdominant division in station 2. *Anabaena spiroides* of blue-green algae was found the dominant species both in spring and summer seasons.

***3.1.3. Eskice Stream (St.3):*** A total of 38 taxa were identified belonging to 7 divisions in Eskice Stream. Cyanobacteria was recorded the dominat group and Chlorophyta was the subdominant division in station 3. *Anabaena spiroides* was the dominant and *Merismopedia glauca* was the subdominant species.

***3.1.4. Ahlat Stream (St.4):*** A total of 17 taxa were identified belonging to 6 divisions in Ahlat Stream. Bacillariophyta was recorded the dominat group; Euglenozoa and Cryptophyta were the subdominant divisions in station 4. While *Cyclotella meneghiniana* was the dominant species; *Nitzschia acicularis, Cryptomonas ovata, Euglena acus* and *E. viridis* were recorded as important species.

***3.1.5. Beylikçayı Stream (St.5):*** A total of 33 taxa were identified belonging to 7 divisions in Beylikçayı Stream. Cyanobacteria was recorded the dominat group and Chlorophyta was the subdominant division in station 5. *Oscillatoria tenuis* was the dominant and *Sphareocystis* sp. was the subdominant species.

***3.1.6. Çekmece Stream (St.6):*** A total of 15 taxa were identified belonging to 5 divisions in Çekmece Stream. Cyanobacteria was recorded the dominat group and Bacillariophyta was the subdominant division in station 6. *Aphanizomenon flosaquae* was the dominant and *Aulocoseira italica* was the subdominant species.

***3.1.7. Tahtaköprü Stream (St.7):*** A total of 14 taxa were identified belonging to 5 divisions in Tahtaköprü Stream. Bacillariophyta was recorded the dominat group and Cyanobacteria was the subdominant division in station 7. *Nitzschia acicularis* was the dominant and *Merismopedia glauca* was the subdominant species.

***3.1.8. Eskice Stream (St.8):*** A total of 33 taxa were identified belonging to 7 divisions in Eskice Stream. Bacillariophyta was recorded the dominat group and *Cyclotella meneghiniana* was recorded as the dominant species. *Scenedesmus quadricauda* of Chlorophyta, *Cryptomonas ovata* of Crytophyta and *Euglena viridis* of Euglenozoa was recorded in high numbers in station 8.

***3.1.9. Buyukcekmece Lake (St.9):*** A total of 26 taxa were identified belonging to 7 divisions in Buyukcekmece Lake. Cyanobacteria was recorded the dominat group and *Anabaena spiroides* was recorded the dominant species. *Aphanizemenon flosaquae* and *Oscillatoria tenuis* of blue-green algae were recorded subdominant species.

### 3.2. Physicochemical Parameters and Chlorophyll-*a* Concentrations

As a result of measurements, the minimum and maximum values of some physicochemical parameters and nutirents were as follows; water temperature (8.0-27.9 ºC), dissolved oxygen (2.01-8.42 mg/L), pH (7.32-8.85), salinity (1-7‰), electrical conductivity (623-1817 µS/cm), nitrite (0.0137-3.382 mg/L), nitrate (0.000-4.134 mg/L) and orthophosphate (0.084-69.726 mg/L). Measured chlorophyll-*a* concentrations varied between 0.20 µg/L and 82.91 µg/L (Table 3). The average of dissolved oxygen concentrations was measured as 6.21 mg/L (in normal limits) and shows class of II water quality according to water pollution control regulations of Turkey [23]. In terms of pH values, the water of the lake and its feeding streams have slightly alkaline characteristics and indicated I and II water quality classes. Electrical conductivity values were measured higher (623- 1817 µS/cm) than the standard limits of the protocols assigned for protection of surface water sources against pollution [24]. According to nitrite concentrations, the water is of class I water quality. Maximum concentrations of orthophosphate was measured in İzzettin Stream (st. 2), except February 2018. Because of station 2 is located in the residential area, the main source of phosphate load is stems from the inputs of domestic waste and sewage. According to chlorophyll-*a* concentrations (0.202-82.919 µg/L) with an average of 9.50 µg/L, the lake has mesotrophic characteristics. Especially, measured very high chlorophyll-*a* concentrations at Eskice (st. 3) and Tahtaköprü streams (st. 8), indicated that the lake is changing to eutrophic conditions. Although there isn't any comprehensive study of the lake and its feeding streams, when compared the physicochemical variables and nutrients with earlier studies, values were found almost in similar levels [4, 25]. According to some physical and chemical parameters Buyukcekmece Dam Lake was classified as III and IV water quality classes by Baykal et al. [26]. It was reported that in earlier studies, intensive agricultural activities around the lake is the main reason of high nitrogen and phosphorus concentrations at the lake [27, 28].

**Table 3.** Some measured physicochemical parameters, nutrients, and chlorophyll- *a* concentrations.

| Months | | Temp. °C | pH | ORP (mV) | DO (mg/L) | $O_2$ Sat. (%) | Sal ‰ | Cond. (µS/cm) | Chl-*a* (µg/L) | $NO_2^-N$ (mg/L) | $NO_3^-N$ (mg/L) | $PO_4^{3-}$-P (mg/L) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **St.1** | 22.8 | 8.37 | -77 | 5.22 | 60.1 | 1 | 780 | 2.190 | 0.101 | 2.089 | 13.330 |
| | **St.2** | 21.5 | 8.43 | -79 | 6.69 | 70.5 | 4 | 1191 | 3.261 | 0.014 | 0.083 | 36.422 |
| | **St.3** | 20.8 | 7.55 | -29 | 2.01 | 21.7 | 1 | 701 | 1.523 | 0.015 | 0.033 | 9.434 |
| **May** | **St.4** | 21.2 | 8.06 | -63 | 4.08 | 45.4 | 3 | 1008 | 1.380 | 0.634 | 2.945 | 23.253 |
| **2017** | **St.5** | 23.3 | 8.25 | -66 | 4.67 | 53.4 | 4 | 1193 | 0.214 | 1.716 | 1.465 | 18.987 |
| | **St.6** | 24.2 | 8.15 | -64 | 4.53 | 54.1 | 5 | 1340 | 1.511 | 0.050 | 4.134 | 18.059 |
| | **St.7** | 21.8 | 8.47 | -82 | 4.90 | 58.4 | 1 | 646 | 6.712 | 0.036 | 1.260 | 1.737 |
| | **St.8** | 23.8 | 8.85 | -105 | 7.00 | 82.6 | 2 | 883 | 22.122 | 0.030 | 0.776 | 10.640 |
| | **St.9** | 21.6 | 8.47 | -81 | 4.75 | 54.1 | 1 | 634 | 3.653 | 0.051 | 2.906 | 1.366 |
| | **St.1** | 27.0 | 7.53 | -15 | 3.40 | 43.0 | 2 | 875 | 39.175 | 0.278 | 0.387 | 5.539 |
| | **St.2** | 26.4 | 7.32 | -39 | 6.43 | 81.7 | 5 | 1464 | 6.390 | 0.028 | 0.037 | 69.726 |
| | **St.3** | 27.4 | 7.86 | -53 | 6.26 | 79.7 | 1 | 650 | 82.919 | 0.492 | 0.000 | 1.069 |
| **August** | **St.4** | 27.2 | 7.90 | -18 | 5.45 | 68.1 | 1 | 623 | 36.890 | 0.619 | 0.000 | 1.403 |
| **2017** | **St.5** | 27.6 | 8.06 | -50 | 6.10 | 76.7 | 1 | 648 | 5.629 | 0.030 | 0.254 | 1.282 |
| | **St.6** | 25.6 | 7.53 | -35 | 4.41 | 54.6 | 6 | 1636 | 1.119 | 3.382 | 0.000 | 27.093 |
| | **St.7** | 26.6 | 7.90 | -57 | 5.89 | 73.5 | 5 | 1374 | 0.976 | 0.410 | 3.295 | 1.523 |
| | **St.8** | 27.9 | 8.09 | -61 | 5.56 | 70.7 | 1 | 659 | 40.210 | 0.023 | 0.248 | 2.933 |
| | **St.9** | 27.5 | 8.16 | -23 | 6.16 | 75.8 | 1 | 655 | 6.807 | 0.030 | 0.393 | 0.846 |
| | **St.1** | 10.3 | 7.90 | -67 | 7.35 | 65.0 | 3 | 987 | 0.678 | 0.341 | 0.603 | 10.046 |
| | **St.2** | 10.5 | 7.59 | -51 | 5.77 | 49.8 | 6 | 1576 | 0.417 | 0.288 | 0.903 | 24.570 |
| | **St.3** | 10.2 | 8.24 | -84 | 7.80 | 69.8 | 1 | 761 | 1.190 | 0.064 | 0.779 | 4.575 |
| | **St.4** | 10.9 | 8.11 | -80 | 6.81 | 61,5 | 3 | 996 | 1.833 | 0.320 | 1.384 | 5.743 |
| **November** | **St.5** | 11.4 | 8.02 | -75 | 7.33 | 67.3 | 3 | 981 | 1.369 | 0.035 | 0.111 | 1.496 |
| **2017** | **St.6** | 13.4 | 7.94 | -71 | 6.78 | 64.0 | 6 | 1601 | 0.202 | 1.224 | 1.299 | 24.524 |
| | **St.7** | 12.3 | 8.27 | -89 | 7.47 | 69.5 | 5 | 1396 | 1.142 | 0.934 | 1.548 | 10.084 |
| | **St.8** | 11.6 | 8.17 | -83 | 6.72 | 61.2 | 3 | 1105 | 56.501 | 0.188 | 2.589 | 24.459 |
| | **St.9** | 11.3 | 8.19 | -81 | 7.35 | 65.5 | 1 | 682 | 3.451 | 0.037 | 0.267 | 1.4956 |
| | **St.1** | 8.8 | 8.34 | -91 | 7.69 | 66.1 | 2 | 938 | 0.690 | 0.270 | 0.067 | 5.419 |
| | **St.2** | 8.2 | 8.54 | -96 | 8.17 | 70.0 | 1 | 715 | 1.761 | 0.117 | 0.127 | 2.191 |
| | **St.3** | 8.0 | 8.35 | -92 | 8.08 | 68.2 | 1 | 712 | 1.202 | 0.108 | 0.103 | 1.839 |
| **February** | **St.4** | 8.2 | 8.35 | -91 | 7.80 | 65.6 | 2 | 819 | 1.785 | 0.206 | 0.130 | 3.573 |
| **2018** | **St.5** | 8.1 | 7.85 | -65 | 4.50 | 37.7 | 1 | 751 | 3.011 | 0.154 | 0.183 | 6.569 |
| | **St.6** | 10.5 | 8.20 | -84 | 6.97 | 63.5 | 7 | 1817 | 0.226 | 0.862 | 0.147 | 16.344 |
| | **St.7** | 9.6 | 8.32 | -91 | 7.09 | 62.2 | 5 | 1481 | 0.405 | 0.541 | 0.138 | 10.417 |
| | **St.8** | 9.4 | 8.55 | -103 | 7.96 | 69.2 | 3 | 1030 | 1.809 | 0.324 | 0.207 | 11.030 |
| | **St.9** | 8.2 | 8.17 | -82 | 8.42 | 70.8 | 1 | 686 | 1.871 | 0.108 | 0.202 | 1.050 |

## 4. Conclusion

Eventhough in general physicochemical parameters indicated that the lake has mesotrophic characteristics, high orthoposphate and chlorophyll-*a* concentrations showed that the lake is close to eutrophic features. Also recorded species of Euglenozoa which are important organic pollution indicators and dominance of cyanobacterium *Anabaena spiroides* which indicates eutrophic conditions, showed that the lake has eutrophic characteristics. The water quality of the lake is affected negatively by the discharges from domestic, industrial wastewaters, and also inputs from agricultural areas. Especially, it is known that the pollution load carried by the streams was effective on the trophic level of the lake. When compared the streams in terms of carrying pollution loads to the lake, respectively Eskice, Karasu, Çekmece, Beylikçayı, İzzettin, Tahtaköprü, Ahlat and Çakmaklı streams affected the lake negatively. For this reason, designation of the usage areas and amounts of this creek's water again has an important role on its trophic status. It is required that Buyukcekmece Dam Lake and its creeks should be taken under protection for improving its water quality by relevant authorities. It is need to carrying out more detailed studies, both at the lake and its influent streams, on physicochemical variables, nutrient concentrations and seasonal changes of phytoplankton for monitoring the lake's water quality.

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