

Draft report on the Study of Lakes on Mumbai.

22nd March, 2009



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Introduction

It is well known that Mumbai city is comprised of seven islands till 1857. Gradually with invasion the islands were merged by the invaders and now the entire city is one big island. The island city has a rich heritage of natural resources like the forests, lakes mangroves, etc. The city in the past was self sufficient in terms of the basic amenities like housing, food, water, electricity it provided to its inhabitants. However with growing population and pollution the city is now adding to the pressure on the adjacent districts for its water and electricity requirements.

It is common knowledge that Mumbai has three lakes i.e. Tulsi, Powai and Vihar that used to provide water to Mumbai residents. Very few actually know that the city is blessed with many more in its BMC jurisdiction. These lakes are either polluted by human sewage or industrial effluents and have remained neglected with increasing urbanization. With depleting forests and water resources it is about time that the existing lakes are given a chance to serve the society again.

How do we define lakes?

There is considerable uncertainty about defining the difference between lakes and ponds. For example, limnologists have defined lakes as waterbodies which are simply a larger version of a pond or which have wave action on the shoreline, or where wind induced turbulence plays a major role in mixing the water column. None of these definitions completely excludes ponds and all are difficult to measure. For this reason there has been increasing use made of simple size-based definitions to separate ponds and lakes.

There is no specific definition for Lakes in India. The word "Lake" is used loosely to describe many types of water bodies – natural, manmade and ephemeral including wetlands. Many of them are euphemistically called Lakes more by convention and a desire to be grandiose rather than by application of an accepted definition. Vice versa, many lakes are categorized as wetlands while reporting under Ramsar Convention.

India abounds in water bodies, a preponderance of them manmade, typical of the tropics. The manmade (artificial) water bodies are generally called Reservoirs, Ponds and Tanks though it is not unusual for some of them to be referred to as lakes. Ponds and tanks are small in size compared to lakes and reservoirs.

Lakes can be divided into three categories (trophic states) based on a lake's nutrient and clarity levels:

- **Oligotrophic lakes** are generally clear, deep and free of weeds or large algae blooms. Though beautiful, they are low in nutrients and do not support large fish populations. However, oligotrophic lakes often develop a food chain capable of sustaining a very desirable fishery of large game fish.
- **Eutrophic lakes** are high in nutrients and support a large biomass (all the plants and animals living in a lake). They are usually either weedy or subject to frequent algae blooms, or both. Eutrophic lakes often support large fish populations, but are also susceptible to oxygen depletion. Small, shallow, eutrophic lakes are especially vulnerable to winterkill which can reduce the number and variety of fish. Rough fish are commonly found in eutrophic lakes.
- **Mesotrophic lakes** lie between the oligotrophic and eutrophic stages. Devoid of oxygen in late summer, their hypolimnions limit cold water fish and cause phosphorus cycling from sediments.

Purpose of the Study

In the present scenario where the rains are delayed and most of Maharashtra has received very little rains, Mumbai will have to reduce its dependence on the adjacent districts for its water requirements. Moreover there is very little to no data available on the existence of lakes of Mumbai. Several RTI's to the government bodies also revealed that there was a lacuna in terms of the availability of the data; as a result most of the water bodies are easily exploited. Hence the present study was undertaken to document the data on the existence and assess the physical condition of the lakes.

Methodology:

The baseline data was prepared with the help of Google Earth website. The areas appearing to be lakes were marked on the Google Earth Images. These were verified by the field staff through onsite visits. The survey was conducted during September and October, 2008 and March, 2009.

The present study considers only the fresh water lakes which were accessible. Saline water impoundments have not been considered in the present study. The areas where access has been denied but show presence of water body in Google images have been considered as lakes only after confirmation with the locals. These can be verified only after the permissions to visit the site are granted.

Data covering various visible aspects related to the lakes were collected during field visits. The sites which were identified as lakes were revisited in the month of March, 2009 to check for the seasonality and their water levels.

The lakes were categorized approximately depending on the sizes by visual estimation. i.e. less than One acre as small (S) between one to three acres as medium (M), between three to six acres as large (L) and above six acres as very large (VL)

The Municipal Corporation of Greater Mumbai (MCGM) was divided into three zones as given in the Map. Zone I – Colaba to Bandra and Kurla (West), Zone II – Kurla east till Mulund (Covering the central suburbs), Zone III- Khar till Dhaisar (Western Suburbs)



Zone I



Zone II



Zone III

The following questionnaire was used on the field to record the data.



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Study of Lakes of Mumbai

World Wide Fund for Nature –India,

Maharashtra State Office, 204 National Insurance Building, Dr. D.N. Road, Fort Mumbai – 400 001.

Phone : 22078105 / 22071970.

Date : _____ Time : _____

Google Information

Latitude : _____ Longitude : _____ Image no. : _____

Landmark : _____

Closest Road : _____

Nearest Railway : _____

Field Data

GPS Latitude : _____ GPS Longitude : _____ GPS nos: _____

Landmark : _____

Closest Road : _____

Nearest Railway : _____

Lake as per Google information : Exists / Does not exist / Never existed / not located on google

Name of the Lake : _____

Area of the lake : _____

Vegetation around the lake : Present / Absent.

Remarks about vegetation : Approx. No. of trees _____ Herbs _____ Shrubs _____,
Old trees / New plantation / Recent cutting / Old cut wood.

Vegetation **in the lake** : _____

Fishing activity : Present / Absent

Lake use : Drinking / Bathing / Washing Clothes / Washing of Vehicles / Nearby farming / Gardening / Collected in tankers / Boating / Surrounding used as Toilet / Not in use at all

Disposal activity : Nirmalaya / Rubble and construction material / Garbage / Sewage / Effluents released.

Encroachment : Local Residents / Builders / Government.

Around the lake : Temple / Mill area / High rise buildings / Old Housing Colonies / Hutments / Market / Garden / School / College / Office area.

Status of the lake : Clean / Looks clean but smells / Appears Polluted

Photograph Nos. : _____

Other observations and remarks; if available about the past of the lake. :

Data Collected by : _____

Based on the above questionnaire, Where ever applicable average was calculated by assigning a value of 1 for presence and 0 for absence of a particular aspect in the lake.

Observations:

129 sites were identified as potential lakes from Google Earth information and verified in September & October, 2008. 70 lakes were recorded from Mumbai including Western as well as central suburbs, whereas 17 sites were inaccessible. During the survey 11 lakes were recorded which were not observed in Google earth images. While surveying these lakes in March, we came across four additional lakes which were not documented during our first visit. Another major observation was that two of the lakes recorded during the monsoon were completely reclaimed by March.

The distribution of lakes in the different zones is as follows

Zone	Number of Lakes
Zone I	08
Zone II	11
Zone III	51

The size wise distribution of lakes in the different zones is as follows

	Zone I	Zone II	Zone III	Total
Small (S)	01	02	18	21
Medium (M)	06	04	23	33
Large (L)	01	03	08	12
Very Large (VL)	00	01	02	03

The very large lakes are Powai, Tulsi and Vihar are also included in the **National Lake Conservation Plan (NLCP)**.

The brief of the study based on the questionnaire is given below.

Given below is the Locality wise list of lakes:

Sr. No.	Locality	Total no. of lakes present		
		Total sites as per Google Earth Information	Sept-Oct, 08	March, 09
1.	Aksa	7	4	5 [#]
2.	Andheri	9	7	7
3.	Antop Hill	2	0	0
4.	Bandra	1	1	1
5.	Bhandup- Nahur	7	1	1
6.	Borivali	8	7	8 [#]
7.	Chandivli	3	2	2
8.	Charni Road	4	1	1
9.	Chembur	5	5	5
10.	Dadar	4	0	0
11.	Dahisar	3	1	1
12.	Dharavi	3	2	2
13.	Elphinstone	1	1	1
14.	Fort	1	0	0
15.	Gorai	2	3	3
16.	Goregaon	4	6	6
17.	Jogeshwari	4	2	2
18.	Juhu	2	2	1*
19.	Kandivli	4	3	3
20.	Kurla	3	1	1
21.	Madh	9	5	5
22.	Malad	8	6	6
23.	Manori	6	3	5 [#]
24.	Marol	3	3	3
25.	Mulund	1	0	0
26.	Parel- Lalbaug	4	3	3
27.	Powai	1	3	3
28.	Santa Cruz	1	1	1
29.	Sewri- Wadala	6	0	0
30.	Sion	2	1	1
31.	Trombay	3	3	3
32.	Vile Parle	3	1	1
33.	Walkeshwar	2	2	2
34.	Worli	3	2	2
	Total	129	83	86

* This was a foundation pit where construction has begun.

Some lakes were observed during the subsequent revisit in March, 2009.

The lakes found in Zone I depending on the size are as follows

Locality	Name of the Lake	size of lake
Walkeshwar	Banganga	L
Parel	MTNL complex lake	M
Worli	Tak	M
Anushakti Nagar	Near Central Avenue Rd	M
Sion	Sion Talao	M
Dharavi	Mahim Nature Park Lake	M
Bandra	Bandra Talao	M
Parel	New India United Mill No. 1	S

VL- Very Large; L- Large, M- Medium, S- Small.

The lakes found in Zone II depending on the size are as follows

Locality	Name of the Lake	size of lake
Trombay	Tata Colony	L
Dharavi	Behind Jasmine mill lake	L
Chembur	RCF Gate No. 2	L
Chembur	Charai Talao	M
Chembur	Ashish Talao	M
Chembur	Karnataka Sangh Lake, Ganesh Talao	M
Kurla	Sheetal Talao	M
Chandivli	Khandaan	S
Bhandup	Bhandupeshwar kund	S
Powai	Powai Lake	VL

VL- Very Large; L- Large, M- Medium, S- Small.

The lakes found in Zone III depending on the size are as follows

Locality	Name of the Lake	size of lake
Santa Cruz	Sahar Village	L
Marol	Near Jagannath Temple	L
Chandivli	Near Chandivali lake	L
Powai	Dagad Khaan	L
Andheri	Near Indian Oil Nagar	L
Andheri	Near Model Colony	L
Vile Parle	Erla Talao	L
Andheri	Near Tolani College	L
Andheri	Bhavan'a lake	M
Jogeshwari	Meghwadi Jogeshari Talao	M
Jogeshwari	Hara Talao	M

Goregaon	Arey Lake	M
Rathodi	Rathodi Lake	M
Malavani	Behind Malwani church	M
Kharodi	Ali Talao	M
Goregaon	Near Movie Star	M
Goregaon	Near Omega Orion Building	M
Madh	Madh Mandir Talao	M
Madh	Killeshwar Mahadev Temple Lake	M
Madh	Mamu Ka wala	M
Madh	Tokeri Talao (Vanala Talao)	M
Bhati	Bhati Talao	M
Malad	Ram Nagar lake	M
Malad	Opp. Dhiraj Ganga bldg, Chincholi Bunder Rd	M
Andheri	Lokhandwala rd	M
Goregaon	Near Gogtewadi	M
Manori	Manori Talao, Karjadevi Talao	M
Manori	Khardala Talao	M
Manori	Sumalai Talao	M
Gorai	Near Gorai Church	M
Gorai	Before Gorai Villege	M
Gorai	Ahead of Palm beach	S
Dahisar	Kandarpada Talao	S
Borivali	Eksar Gaondevi mandir lake	S
Borivali	Rani Jhansi Jogger's Track	S
Borivali	Veer Savarkar Talao	S
Borivali	Vajira Mandir Talao	S
Borivali	Eksar lake	S
Borivali	Gaondevi Talao	S
Kandivli	Bandarpakhadi talao	S
Kandivli	Starkrida Mandal Lake	S
Kandivli	Charkop talao / Dingeswar talao	S
Marol	Near marol fire brigade	S
Marol	Near marol fire brigade	S
Andheri	Behind The Leela	S
Borivali	Tulsi Lake	S
Goregaon	Vihar Lake	S
Aksa	Near Nausena baug	S
Manori	Further from Khardala talao, along kaccha road	S
Manori	Varan Talao	VL
Borivali	Near Sadar Vallabhbbhai Patel College	VL

VL- Very Large; L- Large, M- Medium, S- Small.

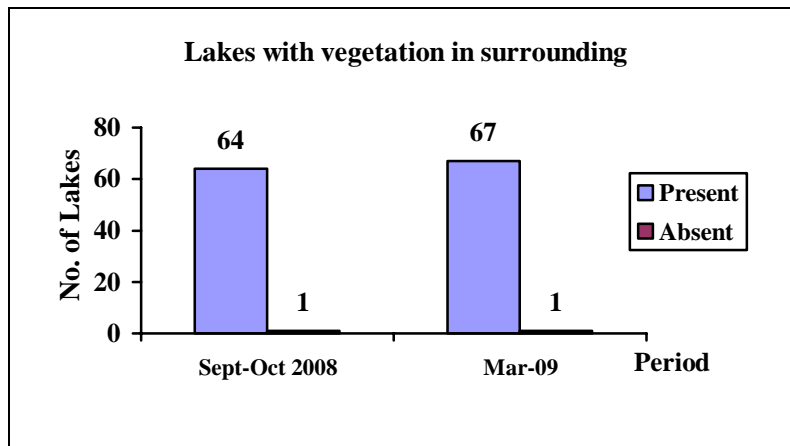
Out of 70 lakes surveyed, 64 lakes were found to be surrounded by vegetation in the month of September and October, 08 where as in March, 2009, 67 lakes were found surrounded with vegetation. This increase in number is because of the four new lakes that were found during second visit. 26 lakes did not have any vegetation within them but indicated mesotrophic conditions, while the others were at different levels of eutrophication. Based on the visual appeal only 25 % lakes appeared clean.

All the lakes were seen to be used for several purposes like Drinking, Religious rituals, washing clothes or vehicles, gardening or farming, collected in tankers, surrounding used as toilets or boating. The statistical data calculated on the basis of average revealed that the lakes were mostly used for bathing (0.217), washing clothes (0.304), farming and gardening (0.332) and as toilets (0.304). In addition the lakes were mostly used for dumping garbage with an average of 0.642, followed by disposal of nirmalya (Religious refuse) in an average of 0.418, and sewage released in average 0.328 lakes.

Fish are the major indicators of the health of the water bodies during the study 33% lakes showed signs of fish or fishing activity (i.e. 23 lakes). Of the 23 lakes one lake no longer exists. It was observed that the lakes were facing major encroachment problems due to the usage pattern as shown below (Fig). It revealed that the encroachments were done by local residents (53 %); which were than handed over to the builders (21%) and the government agencies (26%).

The comparative study in September-October 08 and March 09 revealed seven lakes as seasonal. Such lakes are highly important as they act as sponges during the monsoon and also help in increasing the ground water level. However such lakes are most neglected and easily encroached upon and need special attention

Details of the vegetation surrounding the Lakes:



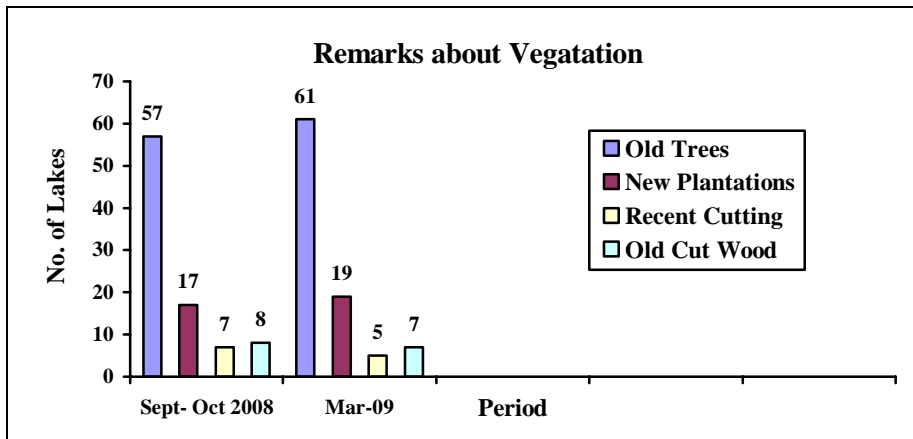
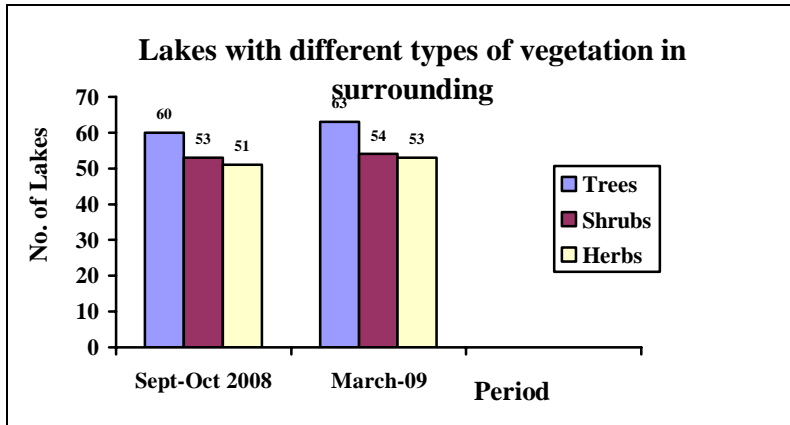


Table: Lakes which are devoid of vegetation in surrounding

Sr. No	Locality	Name of the Lake
1.	Bhandup	Bhandupeshwar kund

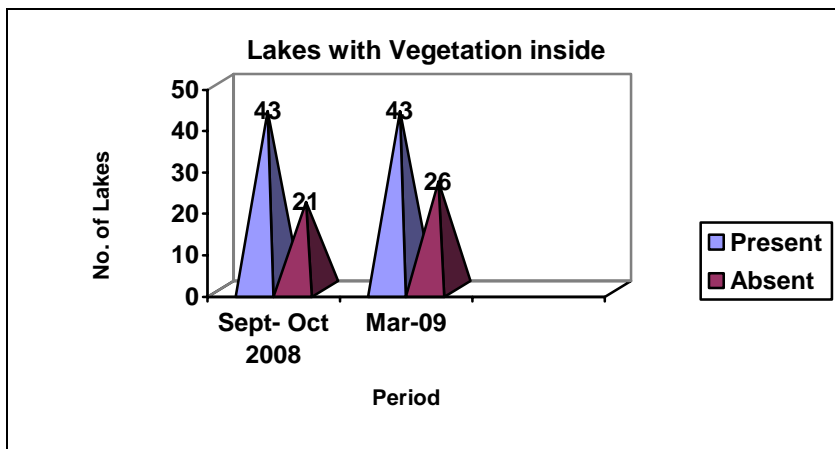


Table: Lakes which are devoid of vegetation within the lake

Locality	Name of the Lake
Walkeshwar	Banganga
Parel	MTNL complex lake
Sion	Sion Talao
Dharavi	Mahim Nature Park Lake
Chembur	Charai Talao
Chembur	Karnataka Sangh Lake, Ganesh Talao
Kurla	Sheetal Talao
Marol	Near Jagannath Mandir Temple
Chandivli	Khandaan
Jogeshwari	Meghwadi Jogeshari Talao
Jogeshwari	Hara Talao
Goregaon	Arey Lake
Madh	Madh Mandir Talao
Madh	Killeswar Mahadev Temple Lake
Malad	Opp. Dhiraj Ganga Building, Chincholibunder Rd.
Dahisar	Kandarpada Talao
Borivali	Near Rani Jhansi Jogger's Track
Borivali	Veer Savarkar Talao
Borivali	Jari Mari Talao / Gaondevi Talao
Kandivli	Bandarpakhadi talao
Kandivli	Starkrida Mandal Lake
Bhandup	Bhandupeshwar kund
Parel	New India United Mill No. 1
Borivali	Tulsi Lake
Goregaon	Vihar Lake
Manori	Varan Talao

Fishing Activity in Lakes:

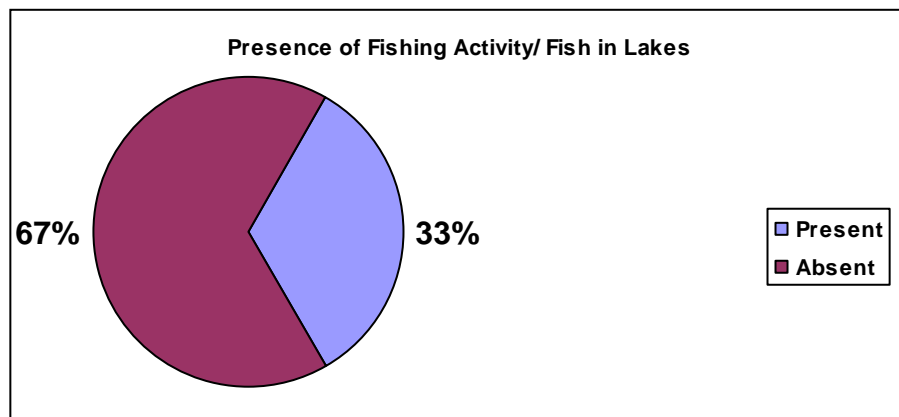


Table: Lakes with fishing activity or fish present

Sr. No	Locality	Name of the Lake
1.	Kurla	Sheetal Talao
2.	Andheri	Bhavan'a lake
3.	Jogeshwari	Hara Talao
4.	Andheri	Lokhandwala Lake
5.	Gorai	Near Gorai Church
6.	Kandivali	Charkop Talao
7.	Borivali	Gaondevi Talao
8.	Powai	Powai Lake
9.	Juhu*	Near Juhu Bus Depot
10.	Parel	MTNL complex lake
11.	Worli	Tak
12.	Trombay	Near Central Avenue Rd
13.	Trombay	Tata Colony
14.	Rathodi	Rathodi Lake
15.	Kharodi	Ali Talao
16.	Malad	Ram Nagar lake
17.	Borivali	Vajira Mandir Talao
18.	Kandivli	Bandarpakhadi talao
19.	Bhandup	Bhandupeshwar kund
20.	Powai	Powai Lake
21.	Borivali	Tulsi
22.	Goregaon	Vihar Lake
23.	Goregaon	Aarey Tank

* Lake no longer exists

Usage of Lake

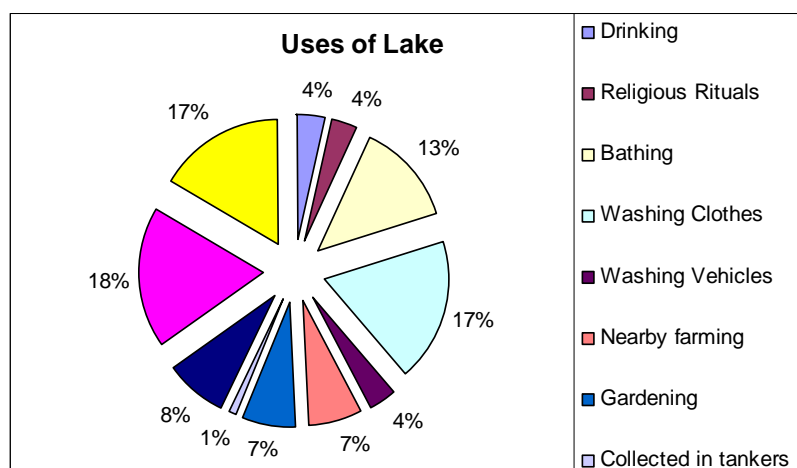


Table: Usage Pattern in Lakes

Sr. No.	Locality	Name of the Lake	1	2	3	4	5	6	7	8	9	10	11
1.	Walkeshwar	Banganga	-	+	+	-	-	-	-	-	-	-	-
2.	Parel	MTNL complex lake	-	-	-	-	-	-	+	-	-	-	-
3.	Worli	Tak	-	-	+	+	-	-	-	-	-	-	-
4.	Trombay	Near Central Avenue Rd	-	-	-	-	-	-	-	-	-	-	+
5.	Trombay	Tata Colony	-	-	-	-	-	-	-	-	-	-	+
6.	Dharavi	Behind Jasmine mill lake	-	-	+	+	-	-	-	-	-	+	-
7.	Sion	Sion Talao	-	-	+	+	-	-	-	-	-	+	-
8.	Dharavi	Mahim Nature Park Lake	+	-	-	-	-	-	+	-	-	-	-
9.	Chembur	RCF Gate No. 2	-	-	-	-	-	-	-	-	-	-	+
10.	Chembur	Charai Talao	-	-	-	-	-	-	-	-	+	-	-
11.	Chembur	Ashish Talao	-	-	-	-	-	-	+	-	+	+	-
12.	Bandra	Bandra Talao	-	-	-	-	-	-	-	-	-	-	+
13.	Chembur	Karnataka Sangh Lake, Ganesh Talao	-	-	-	-	-	-	+	-	-	-	-
14.	Kurla	Sheetal Talao	-	-	-	-	-	-	-	-	+	-	-
15.	Santa Cruz	Sahar Village	-	-	-	-	-	+	-	-	-	+	-
16.	Marol	Near Jagannath Temple	-	-	-	-	-	-	-	-	-	+	-
17.	Chandivli	Near Chandivali lake	-	-	-	-	-	-	-	-	-	+	-
18.	Chandivli	Khandaan	-	-	-	+	+	-	-	-	-	+	-
19.	Powai	Dagad Khaan	+	-	+	+	-	-	-	-	+	+	-
20.	Andheri	Near Indian Oil Nagar	-	-	-	-	-	-	-	-	-	+	-
21.	Andheri	Near Model Colony	-	-	-	-	-	-	-	-	-	+	-
22.	Vile Parle	Erla Talao	-	-	-	-	-	-	+	-	+	-	-
23.	Andheri	Near Tolani College	-	-	-	-	-	-	-	-	-	+	-
24.	Andheri	Bhavan'a lake	-	-	-	-	-	-	-	-	-	-	+
25.	Jogeshwari	Meghwadi Jogeshari Talao	-	-	-	-	-	-	-	-	-	-	+
26.	Jogeshwari	Hara Talao	-	-	+	-	-	-	-	-	-	-	-
27.	Goregaon	Arey Lake	-	-	-	-	-	-	-	-	+	-	-

28.	Rathodi	Rathodi Lake	-	-	+	+	+	-	-	-	-	+	-
29.	Malavani	Behind Malwani church	-	-	-	-	-	-	-	-	-	+	-
30.	Kharodi	Ali Talao	-	-	+	+	+	-	-	-	-	-	-
31.	Goregaon	Near Movie Star	-	-	-	-	-	-	-	+	-	-	-
32.	Goregaon	Near Omega Orion Building	-	-	-	-	-	-	-	-	-	-	+
33.	Madh	Madh Mandir Talao	-	+	+	+	-	-	-	-	-	-	-
34.	Madh	Killeswar Mahadev Temple Lake	-	-	-	-	-	-	-	-	-	-	+
35.	Madh	Mamu Ka wala	-	-	-	-	-	-	-	-	-	-	+
36.	Madh	Tokeri Talao (Vanala Talao)	-	-	+	+	-	-	-	-	-	+	-
37.	Bhati	Bhati Talao	-	-	+	+	-	-	-	-	-	-	+
38.	Malad	Ram Nagar lake	-	-	-	-	-	-	-	-	-	-	+
39.	Malad	Opp. Dhiraj Ganga bldg, Chincholi Bunder Rd	-	-	-	-	-	-	-	-	-	+	-
40.	Andheri	Lokhandwala rd	-	-	-	-	-	-	-	-	-	+	-
41.	Goregaon	Near Gogtewadi	-	-	-	-	-	-	-	-	-	+	-
42.	Manori	Manori Talao, Karjadevi Talao	-	-	-	+	+	-	+	-	-	-	-
43.	Manori	Khardala Talao	-	-	-	+	-	+	+	-	-	-	-
44.	Manori	Sumalai Talao	-	-	-	+	-	-	-	-	-	-	-
45.	Gorai	Near Gorai Church	-	-	-	+	-	+	-	-	-	-	-
46.	Gorai	Before Gorai Villegge	-	-	-	+	-	+	-	-	-	+	-
47.	Gorai	Ahead of Palm beach	-	-	-	+	-	+	-	-	-	-	-
48.	Dahisar	Kandarpada Talao	-	-	-	-	-	-	-	-	+	-	-
49.	Borivali	Eksar Gaondevi mandir lake	-	+	-	-	-	-	-	-	-	-	-
50.	Borivali	Rani Jhansi Jogger's Track	-	-	+	+	-	-	-	-	-	-	-
51.	Borivali	Veer Savarkar Talao	-	-	-	-	-	-	-	-	+	-	-
52.	Borivali	Vajira Mandir Talao	-	-	-	-	-	-	-	-	-	-	+
53.	Borivali	Eksar lake	-	-	-	-	-	-	-	-	-	-	+
54.	Borivali	Gaondevi Talao	-	-	-	-	-	-	-	-	-	-	+
55.	Kandivli	Bandarpakhadi talao	-	-	-	-	-	-	-	-	-	+	-
56.	Kandivli	Starkrida Mandal Lake	-	+	-	-	-	-	-	-	-	-	+
57.	Kandivli	Charkop talao / Dingeswar talao	-	-	+	+	-	-	-	-	-	-	-
58.	Bhandup	Bhandupeshwar kund	-	-	-	-	-	-	-	-	+	-	-
59.	Marol	Near marol fire brigade	-	-	-	-	-	-	-	-	-	-	+
60.	Marol	Near marol fire brigade	-	-	-	-	-	-	-	-	-	-	+
61.	Andheri	Behind The Leela	-	-	-	+	-	+	-	-	-	+	-
62.	Parel	New India United Mill No. 1	-	-	-	-	-	-	-	-	-	-	+
63.	Powai	Powai Lake	-	-	+	-	-	-	-	-	-	-	-
64.	Borivali	Tulsi Lake	+	-	-	-	-	-	-	-	-	-	-
65.	Goregaon	Vihar Lake	+	-	-	-	-	-	-	-	-	-	-
66.	Aksa	Near Nausena baug	-	-	-	-	-	-	-	-	-	-	+
67.	Manori	Further from Khardala talao, along kaccha road	-	-	-	+	-	+	+	-	-	-	-
68.	Manori	Varan Talao	-	-	+	+	-	+	-	-	-	-	-
69.	Borivali	Near Sadar Vallabhbai Patel College	-	-	-	-	-	-	-	-	-	+	-

1: Drinking; 2: Religious rituals; 3: Bathing; 4: Washing clothes; 5: Washing vehicles;
6: Nearby farming; 7: Gardening; 8: Collected in tankers; 9: Boating; 10: Surrounding
used as toilet; 11: Not in use at all

+ Present - Absent

Disposal Activity in the Lakes:

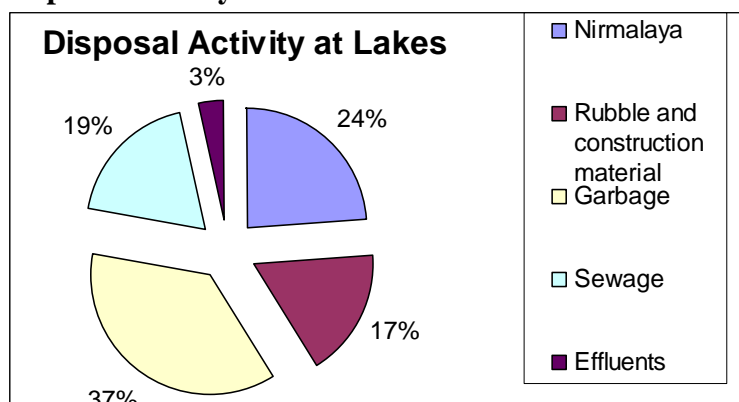


Table: Disposal Activity around Lake

Sr. No	Locality	Name of the Lake	1	2	3	4	5
1.	Walkeshwar	Banganga	+	-	-	-	-
2.	Parel	MTNL complex lake	-	-	-	-	-
3.	Worli	Tak	-	-	-	-	-
4.	Trombay	Near Central Avenue Rd	+	-	-	-	-
5.	Trombay	Tata Colony	-	-	-	-	-
6.	Dharavi	Behind Jasmine mill lake	-	-	+	-	-
7.	Sion	Sion Talao	+	-	+	-	-
8.	Dharavi	Mahim Nature Park Lake	-	-	-	-	-
9.	Chembur	RCF Gate No. 2	-	-	-	-	-
10.	Chembur	Charai Talao	+	-	+	-	-
11.	Chembur	Ashish Talao	+	-	+	-	-
12.	Bandra	Bandra Talao	-	-	+	+	-
13.	Chembur	Karnataka Sangh Lake, Ganesh Talao	-	-	-	-	-
14.	Kurla	Sheetal Talao	+	-	-	-	-
15.	Santa Cruz	Sahar Village	+	+	+	+	-
16.	Marol	Near Jagannath Temple	-	+	+	+	-
17.	Chandivli	Near Chandivali lake	-	+	+	+	+
18.	Chandivli	Khandaan	+	+	+	-	-
19.	Powai	Dagad Khaan	+	-	+	-	-
20.	Andheri	Near Indian Oil Nagar	-	+	+	+	-
21.	Andheri	Near Model Colony	-	+	+	+	-
22.	Vile Parle	Erla Talao	-	-	-	-	-
23.	Andheri	Near Tolani College	-	+	+	+	+
24.	Andheri	Bhavan'a lake	-	+	+	-	-
25.	Jogeshwari	Meghwadi Jogeshari Talao	+	-	-	-	-
26.	Jogeshwari	Hara Talao	+	-	+	-	-
27.	Goregaon	Arey Lake	+	-	+	+	-
28.	Rathodi	Rathodi Lake	-	-	+	-	-
29.	Malavani	Behind Malwani church	-	+	+	+	-
30.	Kharodi	Ali Talao	-	+	+	-	-

31.	Goregaon	Near Movie Star	-	+	+	+	-
32.	Goregaon	Near Omega Orion Building	-	+	+	+	+
33.	Madh	Madh Mandir Talao	-	-	+	-	-
34.	Madh	Killeshwar Mahadev Temple Lake	-	-	-	-	-
35.	Madh	Mamu Ka wala	-	+	+	+	-
36.	Madh	Tokeri Talao (Vanala Talao)	+	-	+	-	-
37.	Bhati	Bhati Talao	-	-	+	-	-
38.	Malad	Ram Nagar lake	+	-	+	-	-
39.	Malad	Opp. Dhiraj Ganga bldg, Chincholi Bunder Rd	+	+	+	-	-
40.	Andheri	Lokhandwala rd	+	-	+	-	-
41.	Goregaon	Near Gogtewadi	+	+	+	+	-
42.	Manori	Manori Talao, Karjadevi Talao	-	-	+	-	-
43.	Manori	Khardala Talao	-	-	+	+	-
44.	Manori	Sumalai Talao	-	-	-	+	-
45.	Gorai	Near Gorai Church	+	-	+	+	-
46.	Gorai	Before Gorai Villege	-	-	-	+	-
47.	Gorai	Ahead of Palm beach	-	-	-	-	-
48.	Dahisar	Kandarpada Talao	+	-	-	-	-
49.	Borivali	Eksar Gaondevi mandir lake	+	-	+	-	-
50.	Borivali	Rani Jhansi Jogger's Track	-	-	-	-	-
51.	Borivali	Veer Savarkar Talao	-	-	-	-	-
52.	Borivali	Vajira Mandir Talao	-	-	-	-	-
53.	Borivali	Eksar lake	+	-	+	+	-
54.	Borivali	Gaondevi Talao	+	+	-	-	-
55.	Kandivli	Bandarpakhadi talao	+	-	+	-	-
56.	Kandivli	Starkrida Mandal Lake	+	-	+	-	-
57.	Kandivli	Charkop talao / Dingeswar talao	+	-	+	-	-
58.	Bhandup	Bhandupeshwar kund	-	-	-	-	-
59.	Marol	Near marol fire brigade	+	+	+	+	-
60.	Marol	Near marol fire brigade	+	+	+	+	-
61.	Andheri	Behind The Leela	-	+	+	+	+
62.	Parel	New India United Mill No. +	-	-	-	-	-
63.	Powai	Powai Lake	+	-	+	+	-
64.	Borivali	Tulsi Lake	-	-	-	-	-
65.	Goregaon	Vihar Lake	-	-	-	-	-
66.	Aksa	Near Nausena baug	-	+	+	-	-
67.	Manori	Further from Khardala talao, along kaccha road	N D	N D	N D	N D	N D
68.	Manori	Varan Talao	N D	N D	N D	N D	N D
69.	Borivali	Near Sadar Vallabhbhai Patel College	-	-	+	-	-

1. Nirmalaya Effluents released 2. Rubble and construction material 3. Garbage 4. Sewage 5.

ND= No data available

Encroachments on Lakes (out of 27 encroached lakes):

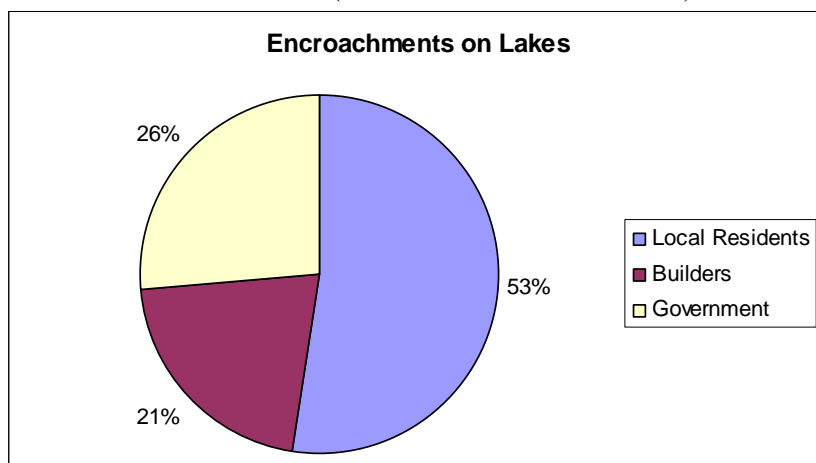


Table: Encroachment around Lakes .

Sr. No.	Locality	Name of the Lake	Local Residents	Builders	Government
1.	Walkeshwar	Banganga	+	-	-
2.	Parel	MTNL complex lake	-	-	-
3.	Worli	Tak	-	-	-
4.	Trombay	Near Central Avenue Rd	-	-	-
5.	Trombay	Tata Colony	-	-	-
6.	Dharavi	Behind Jasmine mill lake	+	-	-
7.	Sion	Sion Talao	-	-	-
8.	Dharavi	Mahim Nature Park Lake	-	-	-
9.	Chembur	RCF Gate No. 2	-	-	-
10.	Chembur	Charai Talao	-	-	-
11.	Chembur	Ashish Talao	-	-	-
12.	Bandra	Bandra Talao	-	-	-
13.	Chembur	Karnataka Sangh Lake, Ganesh Talao	-	-	-
14.	Kurla	Sheetal Talao	+	+	+
15.	Santa Cruz	Sahar Village	+	-	-
16.	Marol	Near Jagannath Temple	-	-	-
17.	Chandivli	Near Chandivali lake	+	+	-
18.	Chandivli	Khandaan	-	-	-
19.	Powai	Dagad Khaan	+	-	-
20.	Andheri	Near Indian Oil Nagar	-	-	-
21.	Andheri	Near Model Colony	-	+	-
22.	Vile Parle	Erla Talao	-	-	+
23.	Andheri	Near Tolani College	+	-	-
24.	Andheri	Bhavan'a lake	+	+	+
25.	Jogeshwari	Meghwadi Jogeshari Talao	-	-	+
26.	Jogeshwari	Hara Talao	-	-	+
27.	Goregaon	Arey Lake	-	-	-
28.	Rathodi	Rathodi Lake	-	-	-

29.	Malavani	Behind Malwani church	+	-	-
30.	Kharodi	Ali Talao	+	+	-
31.	Goregaon	Near Movie Star	-	+	-
32.	Goregaon	Near Omega Orion Building	+	+	-
33.	Madh	Madh Mandir Talao	+	-	-
34.	Madh	Killeshwar Mahadev Temple Lake	-	-	-
35.	Madh	Mamu Ka wala	+	-	-
36.	Madh	Tokeri Talao (Vanala Talao)	-	-	-
37.	Bhati	Bhati Talao	-	-	-
38.	Malad	Ram Nagar lake	-	-	+
39.	Malad	Opp. Dhiraj Ganga bldg, Chincholi Bunder Rd	-	-	-
40.	Andheri	Lokhandwala rd	-	-	-
41.	Goregaon	Near Gogtewadi	+	-	-
42.	Manori	Manori Talao, Karjadevi Talao	-	-	-
43.	Manori	Khardala Talao	-	-	-
44.	Manori	Sumalai Talao	-	-	-
45.	Gorai	Near Gorai Church	-	-	-
46.	Gorai	Before Gorai Villege	-	-	-
47.	Gorai	Ahead of Palm beach	-	-	-
48.	Dahisar	Kandarpada Talao	-	-	-
49.	Borivali	Eksar Gaondevi mandir lake	-	-	-
50.	Borivali	Rani Jhansi Jogger's Track	-	-	+
51.	Borivali	Veer Savarkar Talao	-	-	-
52.	Borivali	Vajira Mandir Talao	-	-	-
53.	Borivali	Eksar lake	+	-	-
54.	Borivali	Gaondevi Talao	-	-	-
55.	Kandivli	Bandarpakhadi talao	-	-	-
56.	Kandivli	Starkrida Mandal Lake	+	-	-
57.	Kandivli	Charkop talao / Dingeswar talao	+	+	+
58.	Bhandup	Bhandupeshwar kund	-	-	-
59.	Marol	Near marol fire brigade	+	-	+
60.	Marol	Near marol fire brigade	+	-	+
61.	Andheri	Behind The Leela	+	-	-
62.	Parel	New India United Mill No. 1	-	-	-
63.	Powai	Powai Lake	-	-	-
64.	Borivali	Tulsi Lake	-	-	-
65.	Goregaon	Vihar Lake	-	-	-
66.	Aksa	Near Nausena baug	-	-	-
67.	Manori	Further from Khardala talao, along kaccha road	-	-	-
68.	Manori	Varan Talao	-	-	-
69.	Borivali	Near Sadar Vallabhbbhai Patel College	-	-	-

+ Present - Absent

Land Use Pattern around the lake:

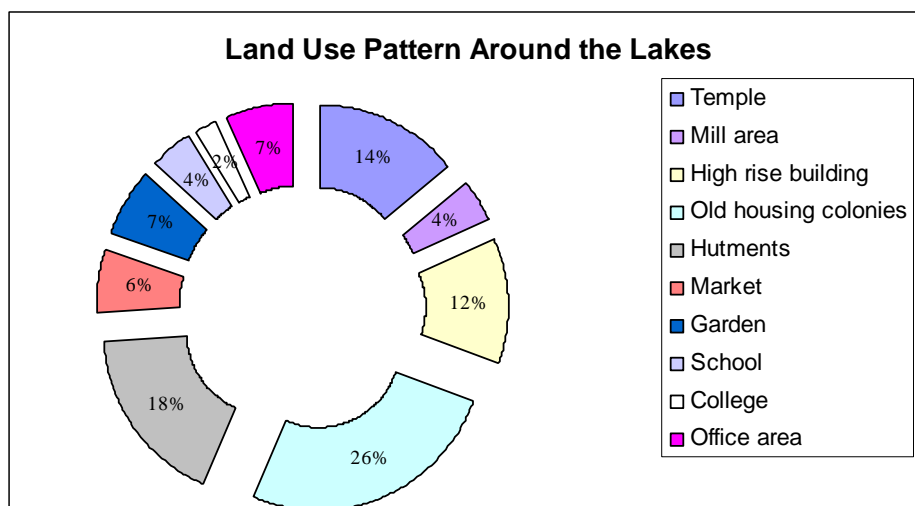


Table: Land Use Pattern around Lake

Sr.No.	Locality	Name of the Lake	1	2	3	4	5	6	7	8	9	10
1.	Walkeshwar	Banganga	+	-	+	+	+	+	-	-	-	+
2.	Parel	MTNL complex lake	-	+	-	-	-	-	-	-	-	+
3.	Worli	Tak	-	-	-	+	-	-	-	-	-	-
4.	Trombay	Near Central Avenue Rd	-	-	-	+	-	-	-	-	-	-
5.	Trombay	Tata Colony	-	-	-	-	-	-	-	-	-	-
6.	Dharavi	Behind Jasmine mill lake	-	+	-	-	+	-	-	-	-	-
7.	Sion	Sion Talao	+	-	+	+	+	-	-	-	-	-
8.	Dharavi	Mahim Nature Park Lake	-	-	-	-	-	-	+	-	-	+
9.	Chembur	RCF Gate No. 2	-	-	-	-	+	-	-	-	-	-
10.	Chembur	Charai Talao	-	-	-	+	-	-	-	+	-	-
11.	Chembur	Ashish Talao	-	-	-	-	-	-	+	-	-	-
12.	Bandra	Bandra Talao	-	-	+	+	-	+	-	-	-	+
13.	Chembur	Karnataka Sangh Lake, Ganesh Talao	-	-	-	-	-	-	-	-	-	-
14.	Kurla	Sheetal Talao	+	-	+	+	+	-	-	-	-	-
15.	Santa Cruz	Sahar Village	+	-	-	+	-	-	-	-	-	-
16.	Marol	Near Jagannath Temple	-	-	+	-	+	-	-	-	-	-
17.	Chandivli	Near Chandivali lake	-	+	-	-	+	-	-	-	-	-
18.	Chandivli	Khandaan	+	-	+	+	+	-	-	-	-	+
19.	Powai	Dagad Khaan	-	-	-	-	+	-	-	-	-	-
20.	Andheri	Near Indian Oil Nagar	-	-	+	+	-	-	-	-	-	-
21.	Andheri	Near Model Colony	-	-	+	+	-	-	-	+	-	-
22.	Vile Parle	Erla Talao	-	-	-	+	-	+	+	-	-	-
23.	Andheri	Near Tolani College	-	-	-	+	+	-	-	-	-	-
24.	Andheri	Bhavan'a lake	-	-	-	-	-	-	+	-	+	-
25.	Jogeshwari	Meghwadi Jogeshari Talao	+	-	+	+	-	-	+	-	-	+
26.	Jogeshwari	Hara Talao	-	-	+	-	-	-	-	+	-	-
27.	Goregaon	Arey Lake	-	-	-	-	-	-	+	-	-	-
28.	Rathodi	Rathodi Lake	-	-	-	+	+	-	-	-	-	-
29.	Malavani	Behind Malwani church	-	-	-	+	+	-	-	-	-	-
30.	Kharodi	Ali Talao	+	-	-	-	+	-	-	-	-	+
31.	Goregaon	Near Movie Star	-	-	+	+	-	-	-	-	-	-
32.	Goregaon	Near Omega Orion Building	-	+	-	+	+	+	-	-	-	+

33.	Madh	Madh Mandir Talao	+	-	-	+	+	+	-	-	-	-
34.	Madh	Killeswar Mahadev Temple Lake	+	-	-	-	-	-	-	-	-	-
35.	Madh	Mamu Ka wala	+	-	-	-	+	-	-	-	-	-
36.	Madh	Tokeri Talao (Vanala Talao)	-	-	-	+	-	+	-	-	-	-
37.	Bhati	Bhati Talao	-	-	-	+	-	-	-	-	-	-
38.	Malad	Ram Nagar lake	-	-	+	+	-	-	-	-	-	-
39.	Malad	Opp. Dhiraj Ganga bldg, Chincholi Bunder Rd	-	-	+	+	-	-	-	-	-	-
40.	Andheri	Lokhandwala rd	-	-	+	-	-	-	+	-	-	-
41.	Goregaon	Near Gogte wadi	-	+	-	+	+	-	-	-	-	-
42.	Manori	Manori Talao, Karjadevi Talao	+	-	-	+	-	-	-	-	-	-
43.	Manori	Khardala Talao	-	-	-	+	-	-	-	+	-	-
44.	Manori	Sumalai Talao	+	-	-	+	-	-	-	-	-	-
45.	Gorai	Near Gorai Church	+	-	-	+	-	-	-	-	-	-
46.	Gorai	Before Gorai Villege	-	-	-	+	-	-	-	-	-	-
47.	Gorai	Ahead of Palm beach	-	-	-	-	-	-	-	-	-	-
48.	Dahisar	Kandarpada Talao	+	-	-	+	+	+	-	-	-	-
49.	Borivali	Eksar Gaondevi mandir lake	+	-	-	-	-	-	-	-	-	-
50.	Borivali	Rani Jhansi Jogger's Track	-	-	-	+	-	-	-	-	-	-
51.	Borivali	Veer Savarkar Talao	-	-	-	-	-	-	+	-	-	-
52.	Borivali	Vajira Mandir Talao	+	-	+	-	-	-	-	-	-	-
53.	Borivali	Eksar lake	+	-	-	+	+	+	-	-	-	-
54.	Borivali	Gaondevi Talao	+	-	-	+	-	-	-	-	-	-
55.	Kandivli	Bandarpakhadi talao	+	-	-	-	+	-	-	-	-	-
56.	Kandivli	Starkrida Mandal Lake	-	-	-	+	-	-	-	-	-	-
57.	Kandivli	Charkop talao / Dingeswar talao	-	-	-	-	+	-	-	-	-	-
58.	Bhandup	Bhandupeshwar kund	-	-	-	-	-	-	+	-	-	-
59.	Marol	Near marol fire brigade	-	-	-	+	+	-	-	-	-	-
60.	Marol	Near marol fire brigade	-	-	+	+	+	-	-	-	-	-
61.	Andheri	Behind The Leela	+	-	+	-	+	-	-	-	-	-
62.	Parel	New India United Mill No. +	-	+	-	-	-	-	-	-	-	-
63.	Powai	Powai Lake	+	-	+	+	+	+	+	+	+	+
64.	Borivali	Tulsi Lake	-	-	-	-	-	-	-	-	-	-
65.	Goregaon	Vihar Lake	-	-	-	-	-	-	-	-	-	-
66.	Aksa	Near Nausena baug	-	-	-	-	-	-	-	-	-	+
67.	Manori	Further from Khardala talao, along kaccha road	-	-	-	-	-	-	-	+	-	-
68.	Manori	Varan Talao	-	-	-	+	-	-	-	-	-	-
69.	Borivali	Near Sadar Vallabhbai Patel College	-	-	-	-	+	-	-	-	+	-

1. Temple Hutments 2. Mill area 3. High rise building 4. Old housing colonies 5. Market 6. Garden 7. School 8. College 9. Office area 10. Office area

+ Present

- Absent

Visual Status of Lakes:

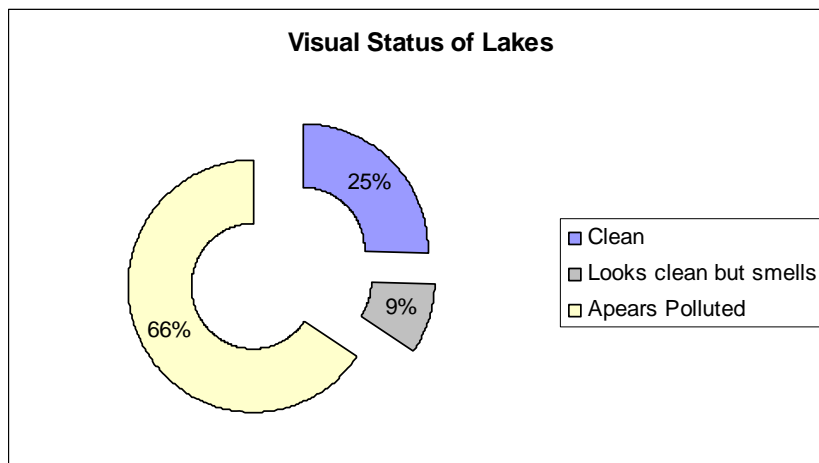


Table : Lakes which appear clean visually:

Locality	Name of the Lake
Parel	MTNL complex lake
Trombay	Central Avenue Road
Dharavi	Mahim Nature Park Lake
Chembur	Karnataka Sangh Lake, Ganesh Talao
Andheri	Bhavan'a lake
Madh	Killeshwar Mahadev Temple Lake
Manori	Sumalai Talao
Gorai	Before Gorai Villege
Gorai	Ahead of Palm Beach Resort
Borivali	Veer Savarkar Talao
Borivali	Vajira Mandir Talao
Borivali	Jari Mari Talao / Gaondevi Talao
Bhandup	Bhandupeshwar kund
Marol	Near Marol Fire Brigade Station
Parel	New India United Mill No. 1
Borivali	Tulsi Lake
Goregaon	Vihar Lake

Table: Lakes which appear clean visually but smell

Locality	Name of the Lake
Trombay	Near Tata Colony
Chandivli	Khandaan
Powai	Dagad Khaan
Rathodi	Rathodi Lake
Dahisar	Kandarpada Talao
Kandivli	Charkop talao / Dingeswar talao

Table: Lakes which appear polluted visually

Locality	Name of the Lake
Walkeshwar	Banganga
Worli	Tak
Dharavi	Behind Jasmine mill lake
Sion	Sion Talao
Chembur	Near RCF Gate No.2
Chembur	Charai Talao
Chembur	Ashish Talao
Bandra	Bandra Talao
Kurla	Sheetal Talao
Santa Cruz	Sahar Village
Marol	Near Jagannath Temple
Chandivli	Near Chandivli Lake
Andheri	Near Indian Oil Nagar
Andheri	Near Model Colony
Vile Parle	Erla Talao
Andheri	Near Tolani College
Jogeshwari	Meghwadi Jogeshari Talao
Jogeshwari	Hara Talao
Goregaon	Arey Lake
Malavani	Behind Malwani church
Kharodi	Ali Talao
Goregaon	Near Movie Star
Goregaon	Near Omega- Orion
Madh	Madh Mandir Talao
Madh	Mamu Ka wala
Madh	Tokeri Talao (Vanala Talao)
Bhati	Bhati Talao
Malad	Ram Nagar lake
Malad	Opp. Dhiraj Ganga Building, Chincholi Bunder Rd.
Andheri	Lokhandwala Lake
Goregaon	Near Gogte wadi
Manori	Manori Talao, Karjadevi Talao
Manori	Khardala Talao
Gorai	Near Gorai Church
Borivali	Eksar Gaondevi mandir lake
Borivali	Near Rani Jhansi Jogger's Park
Borivali	Eksar lake
Kandivli	Bandarpakhadi talao
Kandivli	Starkrida Mandal Lake
Marol	Near Marol Fire brigade Station
Andheri	Behind The Leela
Powai	Powai Lake
Aksa	Near Nausena Baug
Borivali	Near Sardar Vallabhbai Patel College

Table :Some Lakes where access was denied but presence of lake was affirmed by locals.

Locality	Name of the lake or Location
Malabar Hill	Near Babulnath Temple
Elphinstone	Bombay Dyeing
Worli	Century mill
Parel	Tata mill
Prabhadevi	India United mill 6
Trombay	3 lakes west of Central avenue rd, inaccessible as it exist within BARC campus
Chembur	2 RCF lakes
Juhu	Inside Juhu airport
Powai	NITIE lake
SEEPZ	Entry denied
Goregaon	Inside RPF , access denied, 2 lakes East to W. Express highway
Madh	Permission denied
Marve	Navy area INS Hamla, access denied high possibility that it has been reclaimed
Aksa	Defense area
Aksa	Defense area
Aksa	Defense area
Aksa	Defense area

Recommendations

From the basic study it is recommended that all the lakes be assessed for their chemical and physical properties as well as the toxicity and metal content. Moreover all the lakes should be conserved and protected from further degradation. It is also necessary to implement the laws that are exist to protect the lakes and use it more appropriately for the betterment of the society.

Conclusion :

During the study it was interesting to record total 70 lakes within MCGM. However it was also disturbing to know that the water bodies that were once used were now in a very bad state. This was mostly because the Mumbai citizens have easy access to water as a commodity that is supplied by the municipal corporation. If the water bodies are not neglected and conserved these can be used for several purposes, if not drinking. The lake in addition also helps in replenishing the ground water table, and also works as a sponge at times of heavy rains. Some of the seasonal lakes need special attention as they are most easily reclaimed. The municipal authorities will need to work towards cleaning up the existing lakes and encourage the adjacent dwellers to use and manage the ecosystems sustainably.

