Water Quality Report on

PALAKPAKIN LAKE

LAGUNA LAKE DEVELOPMENT AUTHORITY

Environmental Quality Management Division

WATER QUALITY REPORT ON PALAKPAKIN LAKE
1996 – 2005

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PALAKPAKIN LAKE

LAKE FEATURES

Palakpakin Lake is covered by three (3) barangays, namely Brgy. San Buenaventura, San Lorenzo and Dolores, San Pablo City. It has a surface area of 479,800 sq. m. (47.98 hectares) and an average depth of 7.7 meters.

The lake's inlet is connected with the outlet of lakes Calibato and Pandin. Palakpakin Lake is considered the shallow lake among the seven lakes of San Pablo.

As of 2008, the area occupied by aqua structures is 85,000 sq.m. (8.5 hectares) equivalent to 18 % of the total surface area of the lake.

WATER QUALITY MONITORING PROGRAM

The Laguna Lake Development Authority (LLDA), by virtue of RA 4850, as amended, has the primary responsibility to promote the development of the Laguna de Bay region, which includes San Pablo City, while providing for environmental management and control, preservation of the quality of life and ecological systems, and the prevention of undue ecological disturbance, deterioration and pollution.

The LLDA has been conducting regular water quality monitoring with the following objectives:

- To accurately assess the suitability of the lake for all its present and intended beneficial uses;
- To evaluate the impacts of development activities on the lake's water quality that will serve as important criteria for environmental planning and management; and
- To provide sound technical basis for water resources management policies and programs for the lake.

Routine monitoring programs conducted by LLDA cover the Laguna de Bay and its tributaries as well as the Seven Lakes of San Pablo City and Tadlac Lake in Los Banos.

METHODOLOGY

One water quality monitoring station was established for Palakpakin Lake. During the conduct of the sampling activity, water temperature and dissolved oxygen concentration are measured at the surface and at 2, 4, and 6 meters depth. A gallon of composite water from surface to 5-meter depth is also collected for chemical analysis. The chemical parameters analyzed at the laboratory include pH, total suspended solids (TSS), total dissolved solids (TDS), turbidity, chloride, nitrate, ammonia, inorganic phosphate, biochemical oxygen demand (BOD) and chemical oxygen demand (COD). Zooplankton and phytoplankton samples are collected by passing five pails of surface lakewater through a 35-micron mesh-sized plankton net. Zooplankton sample is preserved in a 10% formalin solution. On the other hand, phytoplankton sample is preserved with Lugol's solution. Chlorophyll sample is collected by grab method at the surface. Water transparency is likewise measured and all the physical observations including weather condition are noted and recorded.

At present, monitoring is conducted during the first (January, February, March) and last quarters (October, November and December), as well as in June and September.

EVALUATION OF RESULTS

Although monitoring of Palakpakin Lake was conducted since the 1980s, some problems were encountered, such as equipment breakdown, power interruptions and lack of chemicals such that analyses of some parameters were not completed.

This report presents the water quality monitoring data from 1996 to 2005 since this period represented a more complete set of data. Data for 2001 were incomplete due to the laboratory repair at that time, hence, they were not included in the statistical analysis.

Monthly data and annual averages are presented in Table 1. The variations of key parameters for the past ten years from 1996 to 2005 are depicted in the figures using a three-year moving trend analysis based on annual means. With this presentation, erratic trends are subdued and correlations between parameters are easier to establish.

Assessment of the water quality was based on the criteria for key parameters for Class C Waters as provided in the DENR Administrative Order No. 34.

Table 1. Water Quality Monitoring Data of Palakpakin Lake from 1996 to 2005

	pH	**COD**	**BOD**	**NH3**	**NO3**	**IPO4**	**TDS**	**TSS**	**Cl**
DATE	**units**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**
1996									
15-Jan-96	7.8	4	1.3	0.0640	0.4420	0.4794	259	2	22
07-Feb-96	7.9	36	1.3	0.0100	0.1570	0.4240	241	9	19
25-Mar-96	7.8	52	2.8	0.0790	0.0280	0.4000	218	2	11
17-Jun-96	7.6	56	3.4	0.3580	0.0020	0.3870	241	45	19
02-Sep-96	7.9	36	1.0	0.0520	0.1230	0.3510	209	6	11
20-Nov-96	7.4	32	2.6	0.4080	0.0070	0.4240	170	4	15
09-Dec-96	7.6	24	3.5	0.0440	0.0020	0.3840	210	42	15
Average:	7.7	34.3	2.3	0.1450	0.1087	0.4071	221.1	15.7	16.0
Std.Dev.	0.2	17.4	1.1	0.1646	0.1598	0.0407	29.2	19.2	4.2
1997									
13-Jan-97	7.6	72	15.2	0.0468	0.0857	0.4210	231	22	15
10-Feb-97	7.9	20	4.5	0.0124	0.0442	0.4384	230	13	15
05-Mar-97	8.0	132	2.1	0.3980	0.0164	0.3859	152	9	15
06-May-97	8.5	40	4.4	0.2125	0.0075	0.0570	202	6	15
07-Jul-97	6.8	62	1.8	0.1189	0.2290	0.0640	180	10	19
08-Oct-97	7.6	40	2.8	0.0487	0.0089	0.2583	200	2	11
05-Nov-97	7.8	40	2.9	0.0100	0.0084	0.2582	210	3	15
03-Dec-97	7.9	28	5.8	0.0466	0.0276	0.2359	210	2	11
Average:	7.8	54.3	4.9	0.1117	0.0535	0.2648	201.9	8.4	14.4
Std.Dev.	0.5	35.6	4.4	0.1335	0.0757	0.1481	26.0	6.8	2.4

Noncompliance to DAO 34 Water Quality Criteria Class C Waters

	pH	COD	BOD	NH3	NO3	IPO4	TDS	TSS	Cl
DATE	**units**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**
1998									
07-Jan-98	7.8	24	3	0.0484	0.0203	0.2033	185	8	11
04-Feb-98	7.8	24	3	0.0484	0.0203	0.2033	185	8	11
17-Mar-98	8.6	12	5	0.0148	0.0460	0.0358	215	9	19
20-May-98	8.6	20	4	0.0520	0.0220	0.1495	216	15	19
06-Jul-98	7.7	36	4	0.0160	0.0160	0.2390	210	3	19
14-Sep-98	7.4	12	4	0.0230	0.0060	0.2000	191	11	22
20-Oct-98	7.4	24	5	0.0680	0.0060	0.2550	224	9	19
23-Nov-98	7.2	<4	2	0.0968	0.0060	0.2549	366	5	11
03-Dec-98	7.2	36	3	0.0860	0.0140	0.2600	206	67	7
Average:	7.7	23.5	3.7	0.0504	0.0174	0.2001	222	15	15.3
Std.Dev.	0.5	9.2	1.0	0.0295	0.0125	0.0713	55.8	19.8	5.3
1999									
25-Jan-99	7.9	8	3	0.3200	0.0250	0.3800	225	1	11
24-Feb-99	7.9	4	4	0.0020	0.1040	0.3090	197	4	7
15-Mar-99	7.5	18	4	0.0095	0.0020	0.3730	212	1	19
10-May-99	7.3	20	3	0.0020	0.0375	0.3828	204	4	9
15-Jul-99	7.7	14	2	0.1894	0.0070	0.3950	210	8	11
20-Sep-99	7.5	28	8	0.0020	0.0334	0.3368	193	7	11
13-Oct-99	7.3	8	1	0.1503	0.0254	0.0369	204	4	11
10-Nov-99	7.5	12	4	0.0455	0.0678	0.3770	195	1	11
08-Dec-99	7.2	44	2	0.0020	0.1225	0.2734	196	6	7
Average:	7.5	17.3	3.4	0.0803	0.0472	0.3182	204.0	4.0	10.8
Std.Dev.	0.3	12.4	2.0	0.1146	0.0422	0.1129	10.3	2.6	3.5
2000									
20-Jan-00	7.1	102	5	0.0825	0.0269	0.8433	216	9	
09-Feb-00	7.5	14	3	0.0383	0.0964	0.5295	156	3	15
15-Mar-00	7.4	<4	6	0.0119	0.0020	0.4281	226	5	9
08-May-00	7.4	16	4	0.1425	0.0020	0.4148	234	3	11
11-Jul-00	7.4	12	0.8	0.1337	0.0598	0.3751	217	24	11
25-Sep-00	7.3	4	3	0.2188	0.0143	0.2648	191	1	7
19-Oct-00	*	134	*	*	*	*	206	20	11
09-Nov-00	8	34	5	0.1707	0.1578	0.5537	205	7	7
07-Dec-00	7.4	12	1	0.0830	0.1333	0.4123	203	14	4
Average:	7.4	41.0	3.5	0.1102	0.061563	0.4777	206	9.6	9.4
Std.Dev.	0.3	49.0	1.9	0.0691	0.061127	0.1726	22.7	8.1	3.4
2002									
14-Jan-02	7.8	2	3.0	0.0997	0.1803	0.3066	202	23.0	9.0
11-Feb-02	8.0	12	3.0	0.1228	0.0520	0.2318	204	42.0	9.0
2-Mar-02	8.3	2	2.0	0.0524	0.0794	0.2203	198	15.0	9.0
5-Jun-02	9.0	14	3.0	0.0334	0.0089	0.1116	186	10.0	13.0
16-Sep-02	7.6	12	4.0	0.1344	0.0542	0.2777	156	0.5	17.0
14-Oct-02	7.3	2	2.0	0.1998	0.1760	0.3592	209	2.0	15.0
18-Nov-02	7.7	10	2.0	0.0705	0.0751	0.3243	191	0.5	15.0
12-Dec-02	7.7	4	1.0	0.0983	0.1820	0.3511	233	4.0	15.0
Average:	7.9	7.3	2.5	0.1014	0.1010	0.2728	197	12.1	12.8
Std. Dev.	0.5	5.2	0.9	0.1	0.1	0.1	21.9	14.5	3.3

Noncompliance to DAO 34 Water Quality Criteria Class C Waters

	pH	COD	BOD	NH3	NO3	IPO4	TDS	TSS	Cl
DATE	**units**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**
2003									
20-Jan-03	7.9	8	2	0.1065	0.0282	0.3244	214	1	11
17-Feb-03	8.3	110	3	0.1332	0.1302	0.2668	211	20	9
17-Mar-03	8.0	27	4	0.2909	0.3122	0.2767	204	13	9
16-Jun-03	7.1	2	1	0.1643	0.001	0.2799	237	24	7
15-Sep-03	7.5	23	2	0.1486	0.1958	0.3077	199	0.5	15
20-Oct-03	7.6	2	2	0.1289	0.1365	0.3222	204	0.5	11
17-Nov-03	7.7	18		0.0540	0.0916	0.3157	203	1	22
15-Dec-03	7.6	2		0.1090	0.1364	0.2784	203	9	26
Average:	7.7	12.3	2.3	0.1419	0.1290	0.2965	209.4	8.6	13.8
Std. Dev.	0.36	13.05	1.03	0.07	0.10	0.02	12.15	9.51	6.82
2004									
19-Jan-04	7.8	23	1	0.0918	0.0437	0.2559	199	4	48
17-Feb-04	7.7	19	1	0.1205	0.1255	0.001	219	8	37
15-Mar-04	7.7	43	3	0.0444	0.0758	0.2196	183	13	33
21-Jun-04	7.4	34	2	0.1462	0.0275	0.332	195	5	15
20-Sep-04	7.4	4	2	0.1956	0.1527	0.3908	197	1	19
18-Oct-04	7.4	8	5	0.1149	0.03	0.3453	223	16	15
22-Nov-04	7.5	15	4	0.1701	0.18	0.3318	186	2	15
15-Dec-04	7.6	4	2	0.0791	0.2626	0.309	213	1	11
Average:	7.6	18.8	2.5	0.1203	0.1122	0.2732	201.9	6.3	24.1
Std. Dev.	0.16	14.16	1.41	0.05	0.08	0.12	14.88	5.65	13.43
2005									
17-Jan-05	7.4	8	3	0.1288	0.09	0.3474	186	2	4
21-Feb-05	7.4	38	2	0.0932	0.042	0.3065	203	88	7
14-Mar-05	8.0	2	3	0.061	0.0158	0.2698	187	10	15
20-Jun-05	7.3	2	3	0.2318	0.0396	0.3402	203	26	7
15-Sep-05	7.2	20	2	0.4799	0.2258	0.5043	209	19	11
25-Oct-05	7.3	34	3	0.1516	0.0414	0.384	204	5	11
21-Nov-o5	7.4	12	5	0.1981	0.1473	0.4523	209	4	15
15-Dec-05	7.5	8	4	0.1565	0.1592	0.3591	188	3	11
Average:	7.4	15.5	3.125	0.1876	0.0951	0.3705	198.6	19.6	10.1
Std. Dev.	0.24	13.93	0.99	0.13	0.07	0.08	9.93	28.92	3.91

Noncompliance to DAO 34 Water Quality Criteria
Class C Waters

pH

The pH of a sample of water is a measure of the concentration of hydrogen ions. The pH scale ranges from 0 to 14. A pH of 7 is considered to be neutral. Water with pH of less than 7 is acidic and a pH greater than 7 is basic. The pH of water determines the solubility and biological availability of chemical constituents such as nutrients and heavy metals.

The pH values for Palakpakin Lake were almost on a steady level, consistently within the set range of 6.5 to 8.5 for Class C Waters.

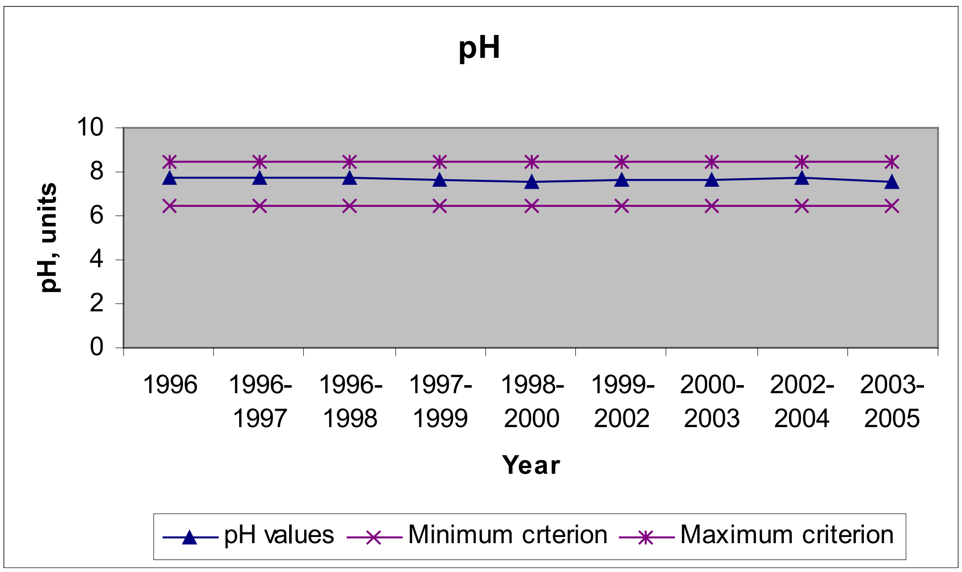

Figure 1. Three-year trend of pH values in Palakpakin Lake

Nitrate (NO3)

Nitrogen-containing compounds act as nutrients in water bodies. Nitrate reactions in fresh water can cause oxygen depletion. Thus, aquatic organisms depending on the supply of oxygen can die if there is too much nitrate. The major routes of entry of nitrogen into bodies of water are municipal wastewater, septic tanks, and animal wastes (including birds and fish). Bacteria in water also quickly convert nitrites (NO^{2-}) to nitrates (NO^{3-}).

The Class C water quality criterion for nitrate is set at 10 mg/L in lakes, reservoirs and similarly impounded water. It can be observed from the graph that the nitrate concentration slightly increases then decreases then increases again. But these changes in concentration have little effect since the level of nitrate is very low compared to the criterion.

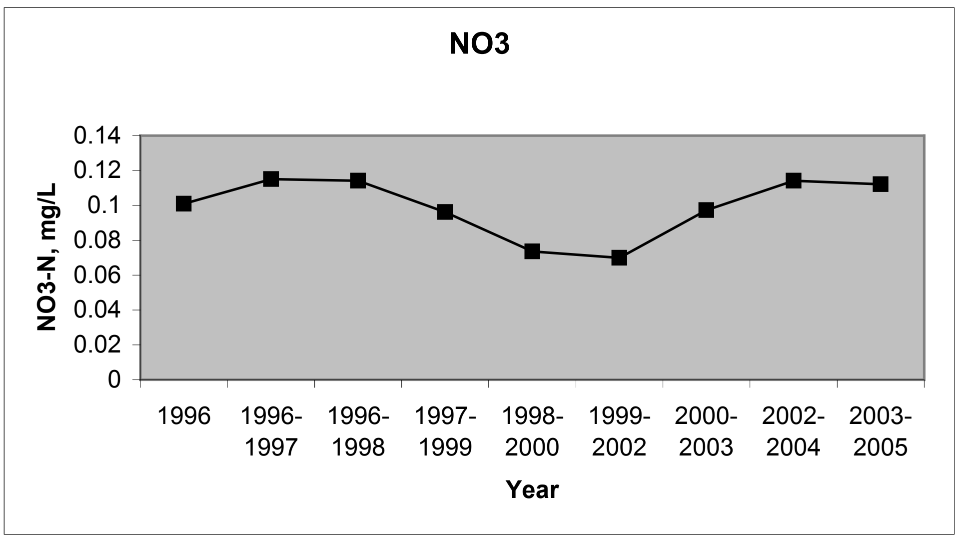

Figure 2. Three-year trend of nitrate levels in Palakpakin Lake

Ammonia (NH_3)

NH_3 is the principal form of toxic ammonia. It has been reported toxic to fresh water organisms at concentrations ranging from 0.53 to 22.8 mg/L. Toxic levels are both pH and temperature dependent. Toxicity increases as pH decreases and as temperature decreases. Plants are more tolerant of ammonia than animals, and invertebrates are more tolerant than fish. Hatching and growth rates of fishes may be affected.

Levels of ammonia for Palakpakin Lake started decreasing gradually from 1996 but increased again towards 2005. Although there is no Class C water quality criteria set for ammonia, levels should be kept as low as possible.

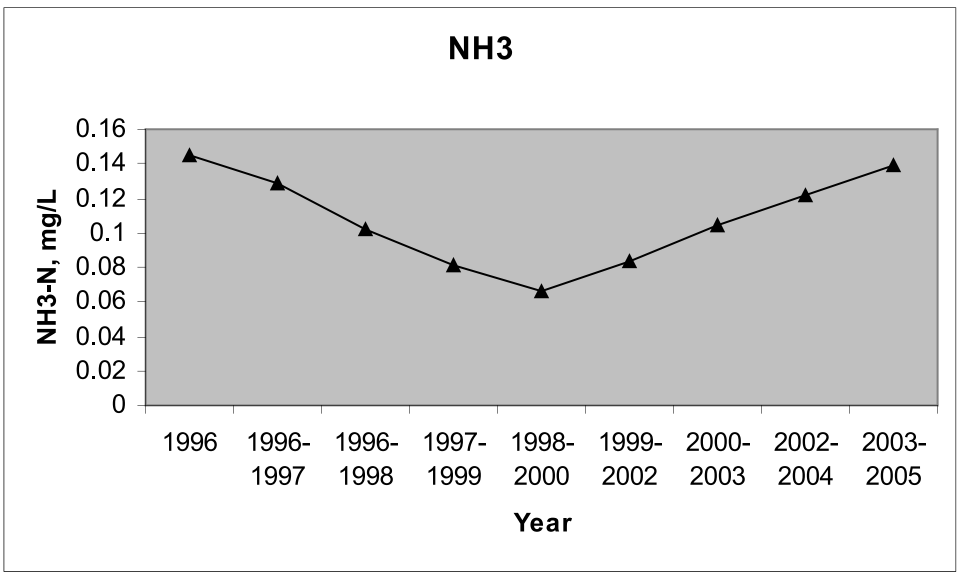

Figure 3. Three-year trend of ammonia levels in Palakpakin Lake

Inorganic Phosphate (IPO4)

Phosphorus in small quantities is essential for plant growth and metabolic reactions in animals and plants. It is the nutrient in shortest supply in most fresh waters, with even small amounts causing significant plant growth and having a large effect on the aquatic ecosystem. Phosphate-induced algal blooms may initially increase dissolved oxygen via photosynthesis, but after these blooms die bacteria aiding their decomposition consume more oxygen. Sources of phosphate include animal wastes, sewage, detergent, and fertilizer.

Phosphates do not pose a human or health risk except in very high concentrations. For Class C waters, the allowable phosphate concentration is set at 0.4 mg/L. When applied to lakes and reservoir, the phosphate concentration should not exceed an average of 0.05 mg/L nor a maximum of 0.1 mg/L.

Phosphate levels in Palakpakin Lake exceeded the set criteria. Human activities around the lake could have been a major contributor in high levels recorded.

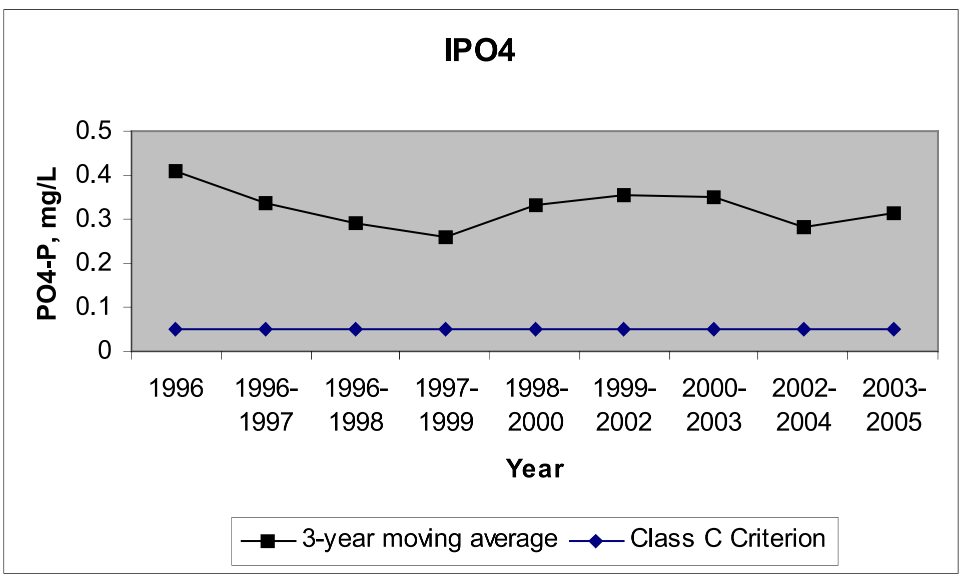

Figure 4. Three-year trend of phosphate levels in Palakpakin Lake

Solids (Total Dissolved Solids (TDS) and Total Suspended Solids (TSS))

Solids (especially suspended solids) affect water clarity. High levels of solids decrease the passage of light through water, thereby slowing photosynthesis of submersed aquatic plants. Water also heats up more rapidly and holds more heat as total dissolved solids increase. Sources of solids include: algae, decaying plant material, soil particles, fertilizers, and surface water runoff. Concentrations often increase sharply during rainfall. Regular monitoring of solids can help detect trends that might indicate increasing erosion within watersheds.

Palakpakin Lake water in terms of dissolved and suspended solids have been of high-quality for the ten-year period since there was a low and decreasing level. Although no Class C water criteria set for TSS and TDS, this low level should be maintained.

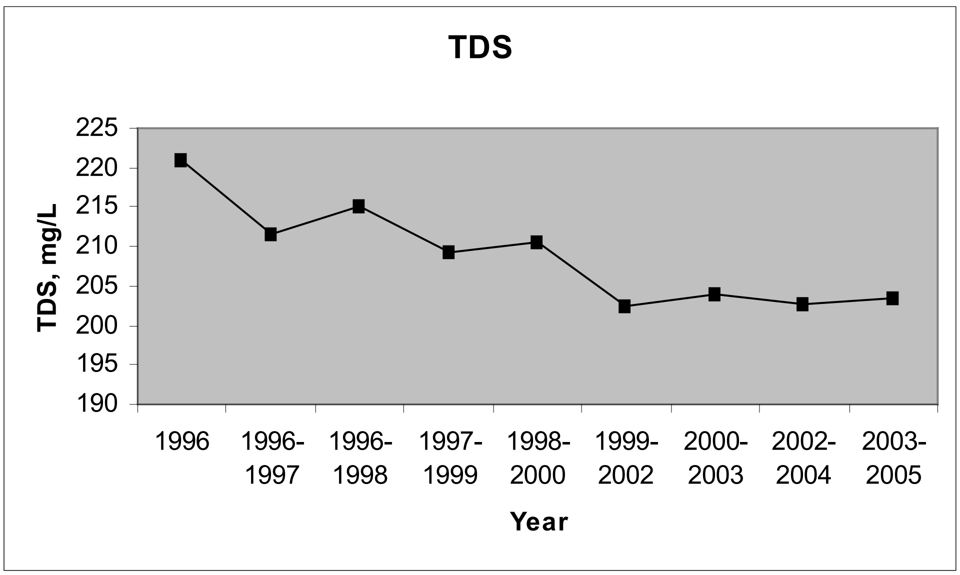

Figure 5. Three-year trend of TDS levels in Palakpakin Lake

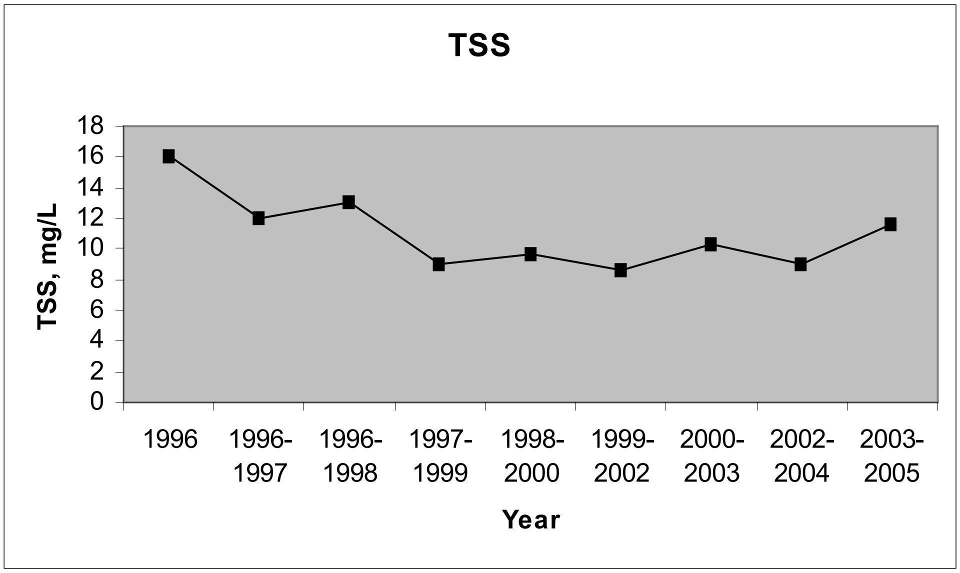

Figure 6. Three-year trend of TSS levels in Palakpakin Lake

Chloride

Chlorides can contaminate freshwater streams and lakes. Fish and aquatic communities cannot survive in high levels of chlorides. Several factors such as dissolved oxygen concentration, temperature, exposure time and the presence of other contaminants influence chloride toxicity. However, few studies have systematically evaluated the influence of chloride toxicity in aquatic environments.

A low concentration of chloride is expected from a freshwater lake such as Palakpakin. The ten-year period showed very low levels of chloride as evaluated against the Class C water criteria of 350 mg/L.

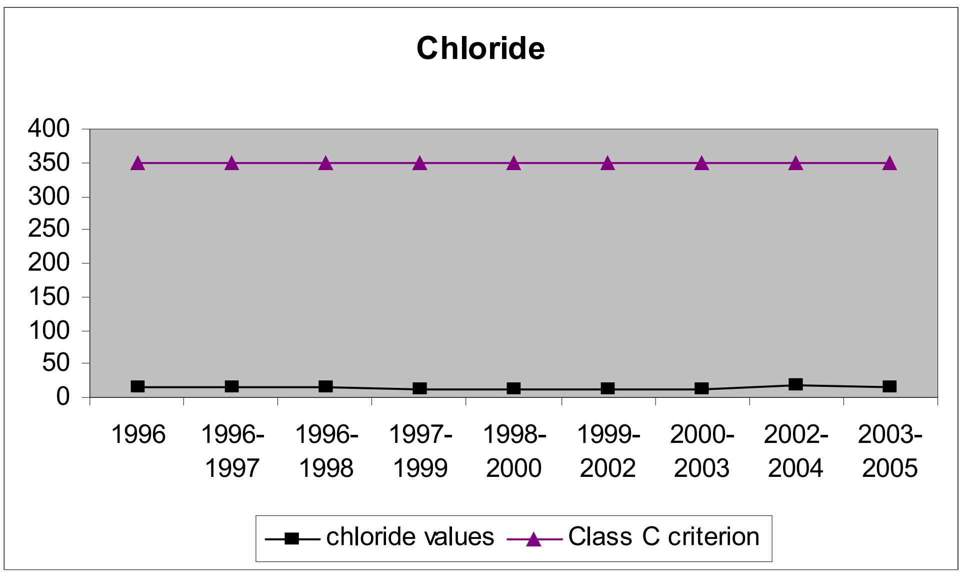

Figure 7. Three-year trend of chloride levels in Palakpakin Lake

Biochemical Oxygen Demand (BOD)

The measure of the amount of oxygen used by aerobic bacteria during decomposition is called biochemical oxygen demand. Usually, the higher the amount of organic material found in the water, the more oxygen is used for aerobic oxidation. This depletes the amount of dissolved oxygen available to other aquatic life.

The BOD levels for Palakpakin Lake is within the criteria set for Class C water which is 10 mg/L (maximum) or 7 mg/L (average). For the 10-year period, trends show slight variation in values recorded.

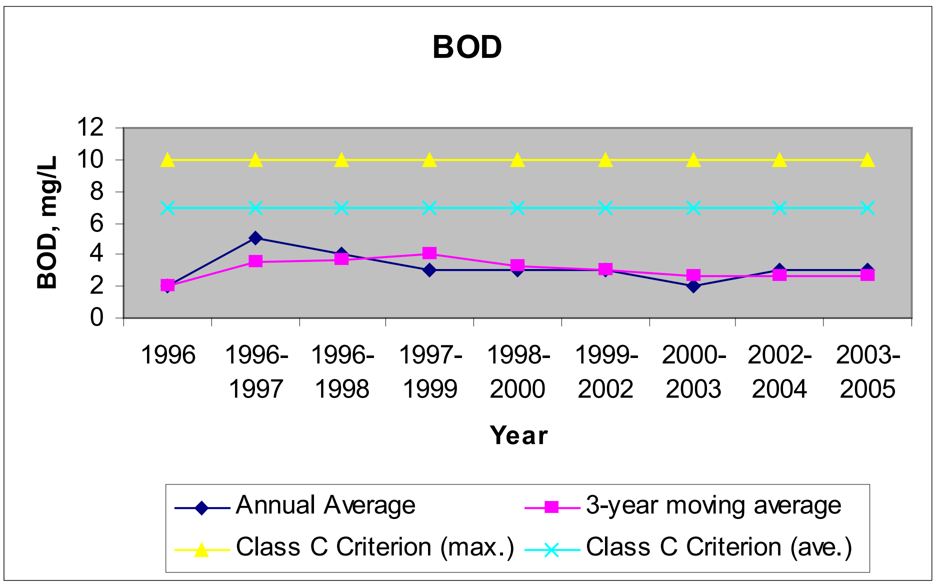

Figure 8. Three-year trend for BOD levels in Palakpakin Lake

Chemical Oxygen Demand (COD)

Chemical Oxygen demand represents the amount of oxygen consumed in the total oxidation of organic matter in the water. This includes the slowly and quickly decomposing organic matter. COD reduces the oxygen content in the water which can cause oxygen depletion and be harmful to all life forms.

Improved water quality is shown in the trend of COD for the 10-year period since decreasing levels are reached. No Class C water criterion is set for COD thus it is advised to maintain low levels of it.

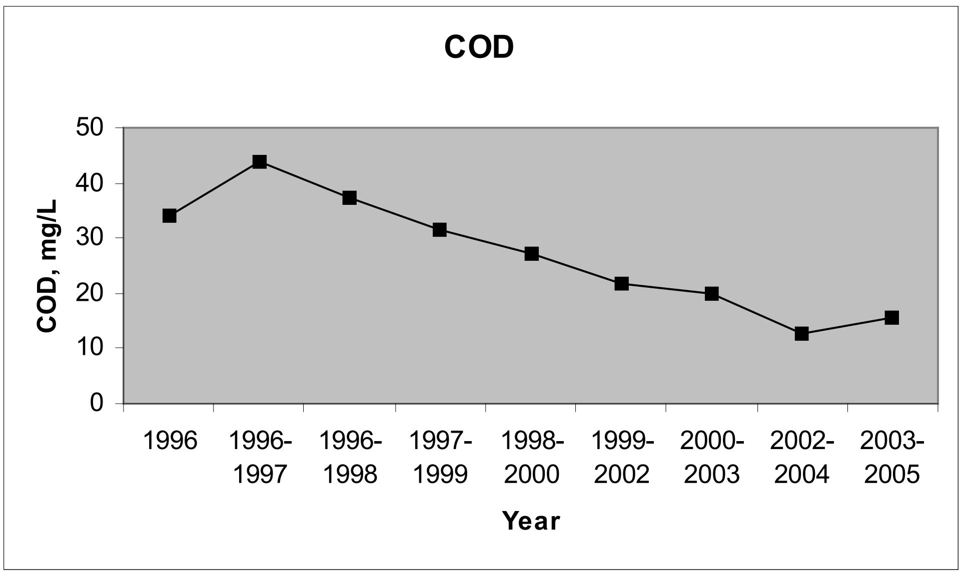

Figure 9. Three-year trend of COD levels in Palakpakin Lake

Dissolved Oxygen (DO)

Oxygen is one of the gases that is found dissolved in natural surface waters. It is moderately soluble in water and its value depends upon temperature, salinity, turbulence of water, and atmospheric pressure. The concentration of dissolved oxygen is also subject to diurnal and seasonal fluctuations that are due in part to variations in temperature, photosynthetic activity and river discharge.

Dissolved oxygen (DO) values at different depths were averaged on a monthly basis as shown in Table 2 and Figure 10.

Depth	D.O. (mg/L)								
	Jan	*Feb*	*Mar*	*May*	*Jul*	*Sep*	*Oct*	*Nov*	*Dec*
0	7.7	8.4	9.5	10.7	8.4	7.2	8.5	6.2	6.4
2	6.3	7.0	7.5	7.6	4.9	4.8	5.8	5.1	6.6
4	4.7	5.4	4.8	4.0	3.8	3.7	4.3	4.3	5.6
6	4.0	4.9	4.0	3.0	3.3	3.7	4.2	4.3	5.5

Compliance to DAO 34 Water Quality Criterion Class C Waters

Table 2. Monthly average of DO at different depths (1996-2005)

Though Palakpakin Lake is shallow, there are still variations in the DO levels as the depth increases. As seen from the graph below, high DO levels are recorded at the surface and the concentration decreases as the depth increases.

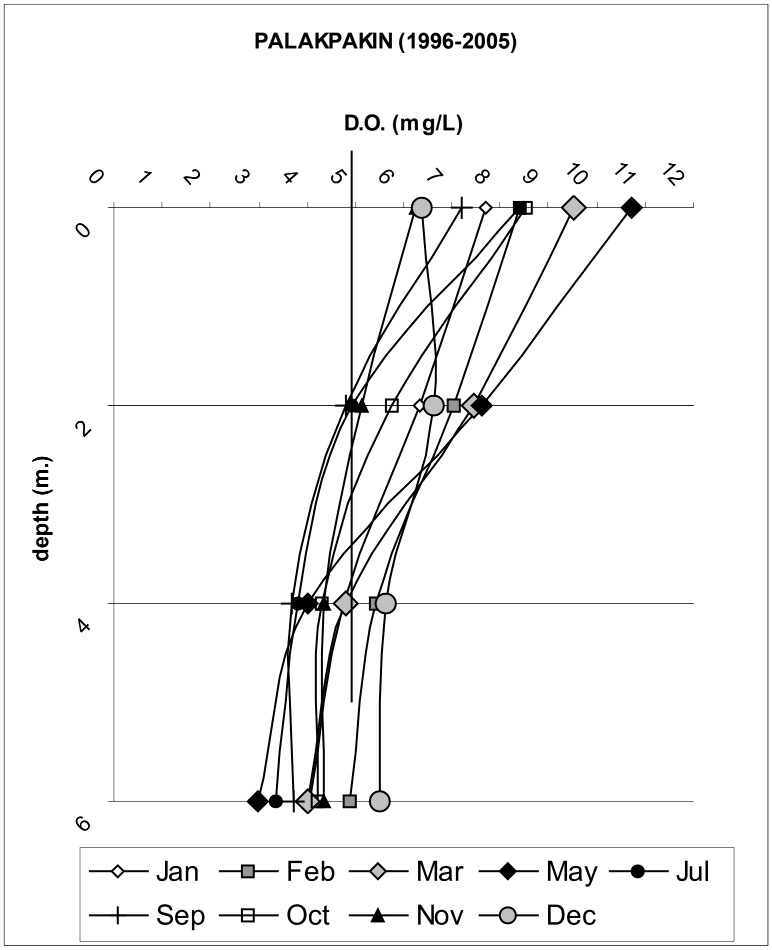

Figure 10. Monthly DO average at different depths

Phytoplankton

Bacillariophyta (diatoms) was the predominant group of phytoplankton present in the lake. About 12 genera of diatoms were identified and observed present all throughout the period (1996 – 2005). The second largest group was Chlorophyta (green algae) represented by *Crucigenia sp*., *Coelastrum sp*., *Closterium sp*., *Hormidium sp., Oocystis sp., Pediastrum sp., Scenedesmus sp., Staurastrum sp., Tetraedron sp.* and *Actinastrum sp.*. Bluegreen algae or Cyanophyta group comprise namely of *Anabaena sp., Microcystis sp., Oscillatoria sp.* and *Raphidiopsis sp*.. Two genera of Pyrrophyta (dinoflagellates) were also found present namely *Ceratium sp.* and *Glenodinium sp*. A total of 29 genera of algae were identified and presented in Table 1.

High algal counts was observed in 2005 with an annual average of 7375 cells/ml. Record showed that the dominant group all throughout was diatom. However, an increase in counts of bluegreen algae was observed in the month of November of 2005. During this period, transparency reading was 200 cm. inhibiting light penetration up to 2m depth. Calm weather coupled with temperature ranged of 27^{o}C – 28^{o}C from the surface to 6m depth could have triggered the growth/production of algae. *Microcystis sp.*, dominated the counts contributing about 90.8% (14157 cells/ml). At the same time, *Glenodinium sp*., a dinoflagellate with value of 6323 cells/ml contributed 18.5% of the total population.

Very low counts was recorded in 2001 with an average value of 1034 cells/ml. Diatoms such as *Melosira sp*. dominated the species during high and low counts.

Table 3. Phytoplankton Counts by Group, 1996 - 2005

Total Phytoplankton Counts Palakpakin Lake
1996 - 2005

	Bluegreen	Green	Diatom	Dinoflagellates	Total
1996	63	113	1049	38	1263
1997	26	131	1341	51	1549
1998	399	274	591	84	1349
1999	642	309	813	117	1881
2000	262	405	617	76	1360
2001	90	209	664	72	1034
2002	905	902	2865	55	4727
2003	164	195	986	96	1441
2004	88	151	1570	108	1917
2005	1948	444	4170	813	7375

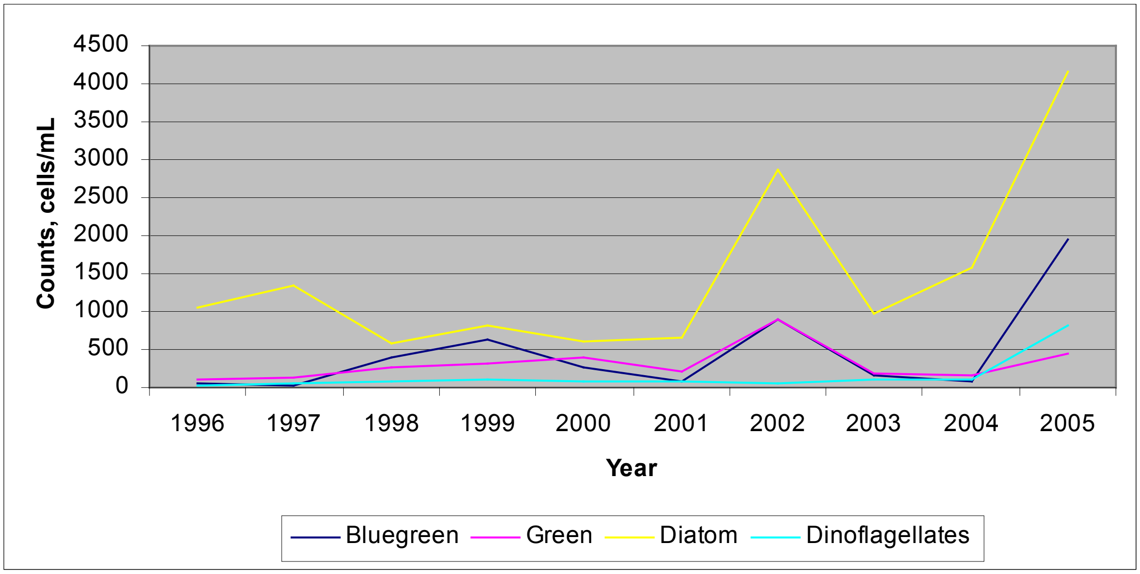

Figure 11. Phytoplankton Counts by Group

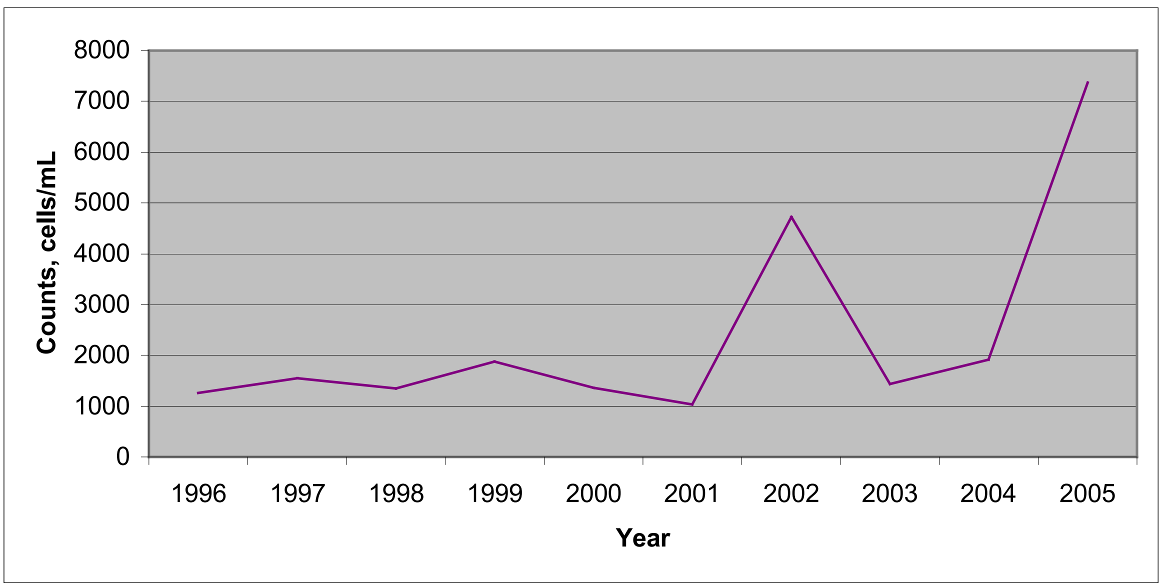

Figure 12. Total Phytoplankton Counts

Zooplankton

Zooplankton are microscopic animals that feed on other planktons, bacteria and algae. They are commonly found in the surface water where food resources such as algae are most abundant. Zooplankton is the first consumer in the food web of aquatic organisms.

The three groups of zooplankton found in the lake were rotifera, cladocera and copepoda. These major groups found were all present but low in number. There were about 7 genera of rotifera, 4 genera of cladocera and 3 genera of copepods. There were nauplii, copepodid and calanoid stages observed. Copepods dominate the counts all throughout the nine years period. The rotifera showed a slight increase in counts in 2000.

Below is the list of the identified zooplankton:

Rotifera

Brachionus caudatus
B. falcatus
B. calicyflorus
B. forficula
B. angularis
B. quadridentatus
Asplanchna sieboldi
Keratella sp.
Filinia longiseta
F. opoliensis
Trichocerca sp.
Lecane ungulata
Hexarthra fennica

Cladocera

Diaphanosoma excisum
Bosmina longirostris
Ceriodaphnia cornuta
Moina sp.

Copepoda

Mesocyclops sp.
Arctodiaptomus sp.
Thermocyclops crassus

Copepodid and calanoid stage
Nauplius stage

The following figure presents the percentage contribution of the different zooplankton groups from 1997 to 2005.

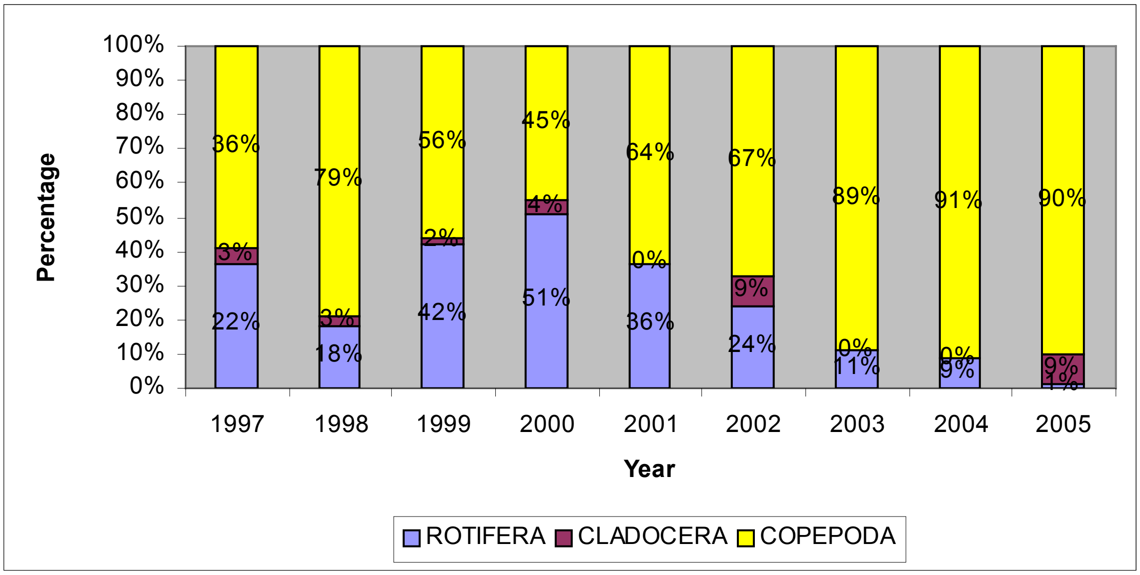

Figure 13. Percentage of Zooplankton by Group

Chlorophyll "a"

Chlorophyll –a is the pigment that allows plants including algae to convert sunlight into organic compounds in the process of photosynthesis. Abundance of Chlorophyll–a is also a good indicator of the amount of algae present in the water. Based on the ten (10) year data, the Chlorophyll–a concentration average was measured at 32.25 μg/L. The highest annual average was recorded in 2003 at 54.62 μg/L. The fluctuating Chlorophyll–a annual average was observed in Palakpakin Lake however, the amount of Chlorophyll–a present in the water column can still support the aquatic animals in the aforementioned lake.

The annual average of Chlorophyll –a in Lake Palakpakin are still with in the eutrophic range of 9.75 – 65.58 μg/L. (Ref. Eutrophication of Lakes in China, 1990)

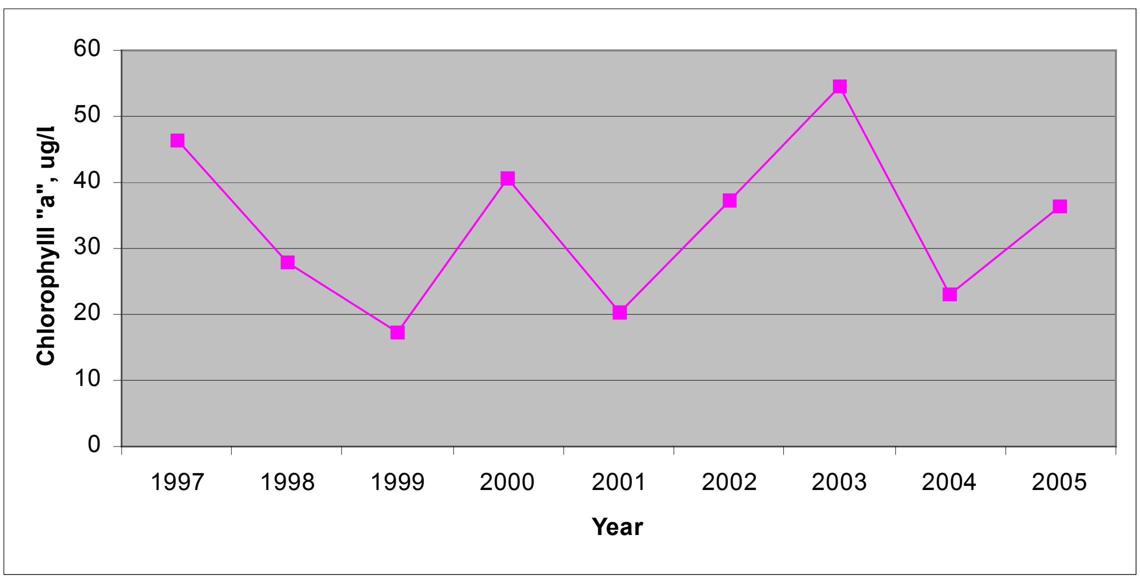

Figure 14. Annual average of Chlorophyll "a"

CONCLUSIONS AND RECOMMENDATIONS

Palakpakin Lake faces the same threat as the other lakes in the system.

BOD exceeded once during the study period. On the average, the BOD is within the limit set for Class C Waters. The DO meets the set criterion up to 2 meters depth.

Increased concentration of nutrients like ammonia and inorganic phosphate affects the generally good water quality of the lake. Phosphate levels are way above the criterion of 0.05 mg/L.

Human activities and improper use of resources may have triggered this. Communities living around the lake should be properly informed of the possible threats these may pose and continuous efforts of preserving the lake should be implemented.