

Phytoplankton and periphytic analysis as indicators of water quality in Lake Durowskie at Wagrowiec, Poland

17th July, 2010

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1. Introduction and Aims

Fresh water ecosystem has being threatened by eutrophication, indicating poor water quality status due to the continuous nutrient input primarily nitrogen and phosphorous from agriculture, industry and urban wastes. The use of phytoplankton for water quality assessment (especially eutrophication) has a long history. Although it is difficult to indicate trophic level due to the range of habitat genera or species can tolerate, it is possible to asses water quality on the basis of dominant species or dominant communities (Busch, 1992). Phytoplankton are sensitive indicators, as their structure and metabolism changes quickly in response to environmental changes (Wasielewska, 2006). Moreover, these organisms can respond to low levels of pollutants such as pesticides or industrialwastes (Munamati, 2007).

Different methods of water quality assessment have been developed; some of them use phytoplankton abundance (typically as chlorophyll *a*), whereas others examine the structure of the phytoplankton community (dominant and indicator species).The water quality assessment systems based on the taxonomic composition typically lists trophic indicator species. In the EU Water Framework Directive (WFD) (2000/60/EC, EU, 2000), phytoplankton is one of the four biological quality elements (but five biological groups: phytoplankton, macrophytes and phytobenthos, macroinvertebrates and fish) required for the ecological status assessment of surface waters: According to the WFD, the phytoplankton based assessment should include: species composition, species abundance or biomass, and the frequency and intensity of phytoplankton blooms (Pasztaience et al.,2009).

The aim of this paper is to compare the current ecological status of Lake Durowskie in 2010 with the year 2008 when restoration program was started and with 2009. Based on the phytoplankton community distribution and abundance across different localities of the lake we tried to :

- assess the trophic level of the lake on the basis of phytoplankton biomass and periphytic diatom species;
- compare phytoplankton and periphytic composition and distribution in seven representative sites of the lake;
- see if there is spatial or temporal difference in phytoplankton distribution across the lake;
- estimate water quality according WFD based on periphytic diatom`s index;
- answer if restoration project which started in 2008 is effective or not.

2. Materials and Methods

2.1 Area description: Lake Durowskie is located in the city Wagrowiec, in Poland.

Morphometry of the lake Durowskie:

Parameters

surface	143.7 ha
volume	11,322,900 m ³
max depth	14.6 m
mean depth	7.9 m
main tributary	Struga Gołaniecka
surface of the whole catchment area	236.1 km ²
surface of the direct catchment area	1,581.3 ha
share of agricultural area	58.26%
share of forests	33.52%
urban area	8.25%

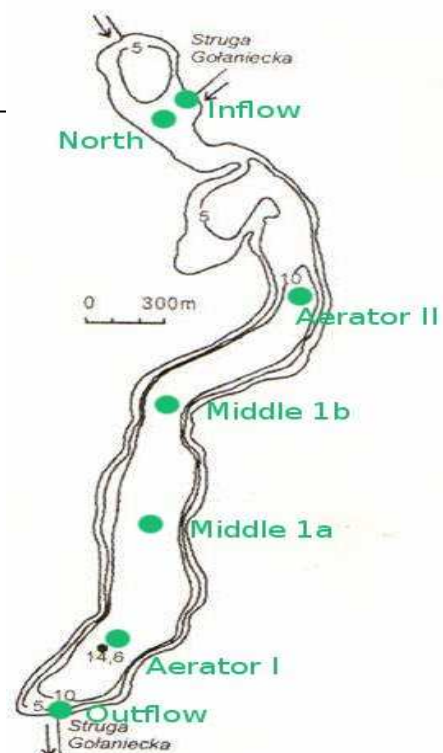


Fig 1. Sampling area across durowskie lake

2.2 Methods

For phytoplankton analysis water samples were collected from seven stations namely aerator1, aerator2, middle 1a, middle 1b, inflow and outflow and north (fig, 1) in the pelagic zone, 1m below the water surface, for 6 days, from July 5 to July 10, 2010 . The samples were then preserved immediately with Lugol`s solution allowed to be settled for at least 24 hours. We have also collected periphytic communities for diatom analysis.

In the laboratory, phytoplanktonic and periphytic diatom species were identified to their respective species. We quantified in 100 cells counting chamber of 0.0125mm^3 each. And then the biomass of each species was calculated. After that statistical analysis (1) mixed trophic index of phytoplankton, (2) Diatom index at the periphytic sites was simulated to give us an idea of trophic state of Lake Durowskie. Moreover, we have calculated the Jacard index at the aerator 1 site to asses simillarity of phytoplankton communities in the years 2008 to 2010.

3. Results and Discussion

3.1 Phytoplankton communities

In our laboratory analysis we have found totally 80 species of phytoplankton among which chlorophytes are dominating group (fig. 2). The result clearly shows that Lake Durowskie is highly dominated both in cell numbers and biomass by eutrophic indicator algae species such as diatom species, *Fragilaria ulna*, *Fragilaria ulna* var. *angustissima* and *Peridiniopsis cuningtonii* or *Peridiniopsis berolinense* from Dinoflagelates.

The inflow and north part of the lake scored highest number of cyanobacteria and dinophyta. Also in terms of biomass, the northern and inflow region scored the highest number which is mainly due to two side effect from the lake (shallow part) and the river side. Biomass comparison from 2009 and 2010 shows that the number of cyanoprocaryota and dinophyta has greatly decreased (fig. 3) at the aerator 1, 2 and middle 1A sites.

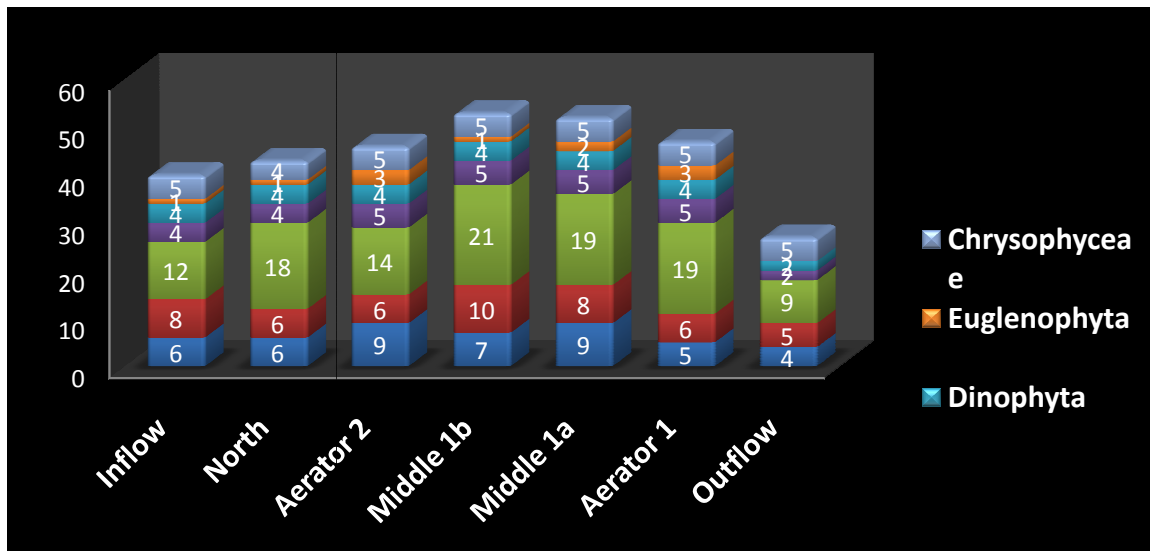


Fig 2. Number of algae species in all sites.

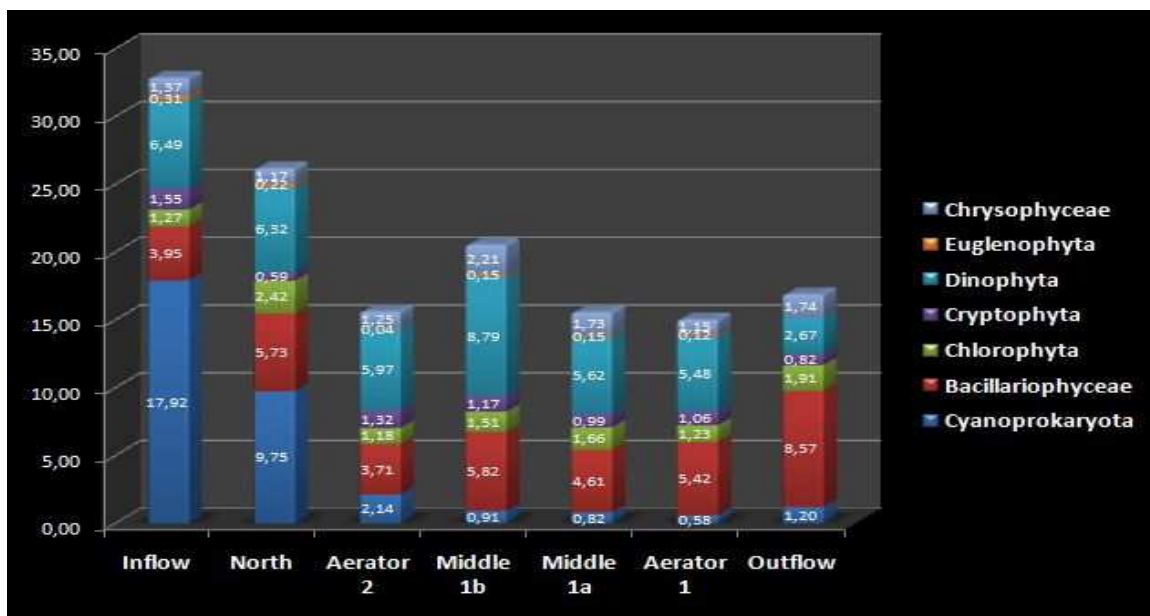


Fig.3 Average algae biomass in all studied sites.

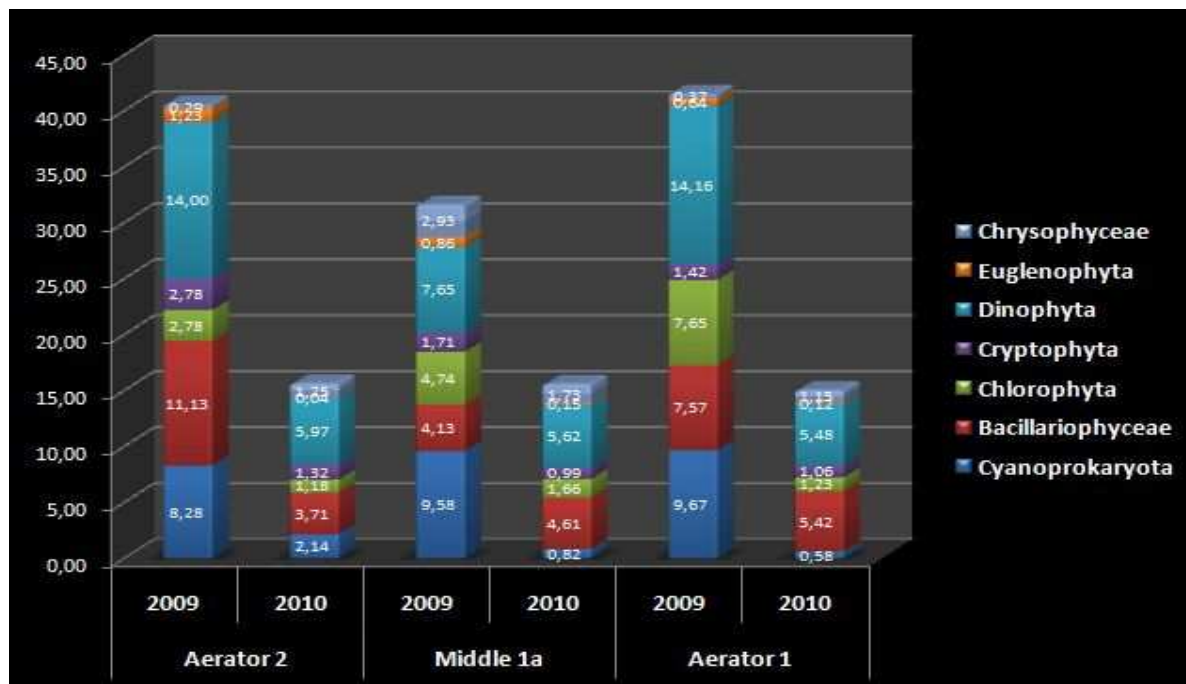


Fig 4. Comparison of biomass of different species in year 2009 and 2010.

The mixed index of Nygaard is based on the number of species from all sorts taxonomical groups of algae and it is given by:

mixed index of Nygaard = Cyanobacteria + Chlorococcales + centric diatoms + euglenoids / desmids.

the scale: eutrophy > 3.0 > mesotrophy > 1.0 > oligotrophy > 0.2 > dystrophy

Table 1. Trophy state according to Zdanowski (1991)

Trophy	biomass [mg/l]	chlorophyll-a [$\mu\text{g/l}$]
ultraoligotrophy	to 0.2	to 0.5
oligotrophy	0.2 – 0.5	< 1.0
mesotrophy	1.0 – 3.0	2.5 – 8.0
Eutrophy	2.5 – 10	8.0 – 25
hypertrophy	> 10	> 25

The simulation of mixed phytoplankton index (Nygaard) indicate a lower number in 2010 than 2008 and 2009. Also the Jacard index used for comparing the similarity and diversity of sample sets has decreased in 2010. Both of this statistical analysis prove that the water quality has improved than previous years. Moreover, Shannon Weaver index (biodiversity index) and species eveness were calculated (annex 15).

Table 2.Mixed phytoplankton index

Station	2008	2009	2010	Trophy
Aerator1	9.67	16	8.3	Eutrophy
Aerotor 2	~	26	11.5	Eutrophy
Middle 1a	~	9	12.5	Eutrophy
Middle 1b	~	~	8.3	Eutrophy
inflow	~	~	1.8	Eutrophy
Outflow	~	~	6.5	Eutrophy
North	~	~	11.5	Eutrophy

Table 3. Jacard index

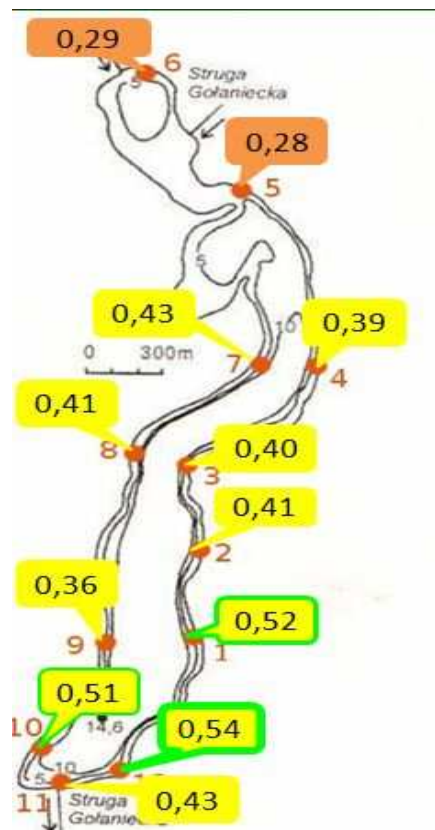
Year	2009	2010
2008	0.84	0.513
2009	~	0.48

During lab identification of the algae species we have identified copepods (zooplankton) which can put pressure on green algae and decrease their numbers, but still the number of spiny (*Trublaria planktonica*) and thick cell wall (*Phacotus lenticularis*) remains high because the zooplankton are not able to eat them (fig. 5).



Fig.5 *Phacotus lenticularis*- and *Trublaria planktonica* (long spikes)
(thick cell wall)

3.2 Periphytic species Phyto**benthos** is listed as one of the biological quality elements of the biota. For the assessment of ecological status, the taxonomic composition and abundance of the species were investigated and compared to the specific reference conditions for different types of lakes. For the research project presented in this report, benthic (periphytic) diatoms were investigated along the Durowskie lakeside. Twelve different sites presented characteristic species composition and abundance. On final analysis, 78 taxa were deemed to be useful indicators for the assessment of the ecological status of different sampling site, the abundance of these species has to be taken into consideration. A formula was developed to calculate a Diatom Index of ecological status using the sum of the abundances of particular species per trophic and sensitivity category (Picińska-Fałtynowicz, 2006). Using this calculated index, each sampling site was assigned to one of the five ecological quality classes according the Water Framework Directive (fig. 6).



Clasification of the ecological state for lakes:

>0,83 –very good

0,55 –good

0,30 –moderate

0,15 –poor

<0,15 –bad

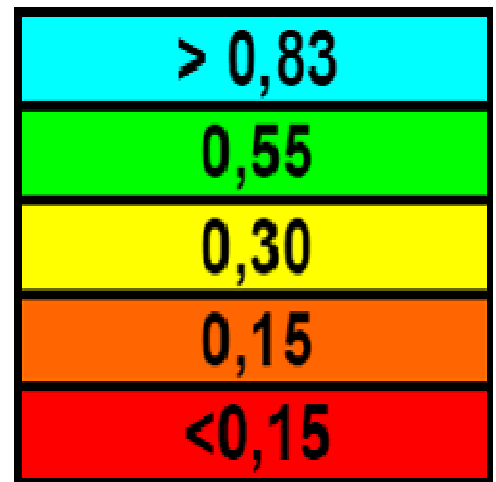


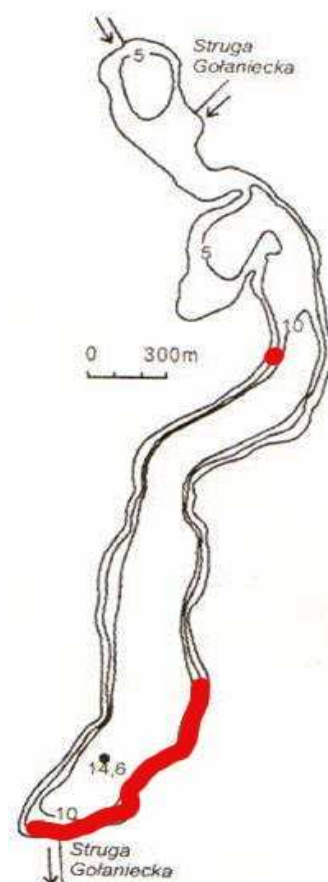
Fig. 6. Diatom Index

3.3 Fresh water red algae – epilithic

Hildenbrandia rivularis, red alga form bright red patches on stones in shaded stream and lakes (mostly in calcerous waters). It is very abundant in alkaline running waters with high conductivity, often at rather deep water and needs shadow (Eloranta and Kwandrans, 2007). *Hildenbrandia rivularis* tolerates some nutrient enrichment but is sensitive to organic pollution. Its presence still indicates good conditions what is a good sign of changes occurring in the waters quality of Lake Durowskie. This is in accordance with other findings. Based on a broad literature survey, Schmedtje et al. (1998) describe the occurrence of *Hildenbrandia rivularis* in the range of oligo-mesotrophic to eutrophic conditions, with the center in mesotrophic conditions. In Rott et al. (1999), *Hildenbrandia rivularis* is classified as an indicator for meso- to eutrophic conditions. According to to Rott et al. (1997) and Gutowski et al.

(2004), the alga can tolerate moderate loads of organic pollution. On the other hand, De'Uomo (1991) reports *Hildenbrandia rivularis* at natural sites unaffected by or only slightly subjected to pollution and identifies it as reliable indicator for excellent water quality. This red alga species was not noted to this times in Lake Durowskie. The sudden appearance of its in large amounts in the littoral zone on the south-west side of Lake Durowskie (fig .7) can provide changes in the water quality in relation to the restoration of this water ecosystem. The next position of *Hildenbrandia rivularis* was observed on the west lakeside and perhaps it proved an improve of the water quality in the deepest basin of the lake. The north part of the lake is shallow (maximally 5 m) and this red algae species was not observed there. De'Uomo (1991) reports *Hildenbrandia rivularis* at natural sites unaffected by or only slightly subjected to pollution and identifies it as reliable indicator for excellent water quality. This red alga species was not noted to this times in Lake Durowskie. The its sudden appearance in arge amounts in the littoral zone on the south-west side of Lake Durowskie (fig. 7) can provide changes in the quality waters in relation to the restoration of this water ecosystem. The next position of *Hildenbrandia rivularis* was observed on the west lakeside and perhaps its proves changes of the water quality in the deepest basin of the lake. The north part of the lake is shallow (maximally 5 m) and this red algae species was not observed there.

Fig. 7 Lake Durowskie -site where red algae flourishes



Conclusion:

Based on biological water quality assessment using phytoplankton we can see that Lake Durowskie, although still eutrophic there are some improvements seen in the year 2010. This can be proven by the decrease in number of cyanobacteria, but increase in green algae, dinoflagellates and diatoms biomass as well as increase in number of taxa in general. Moreover, statistical simulation shows a decrease in Mixed Trophic Index and from Jacard index we can see that the percentage of similarity in different sites of the lake has decreased as compared to previous years. Diatom index indicate a moderate water quality in south part and poor quality in the north which is in direct contact to inflow of polluted water from the river Struga Gołaniecka. Red alga *Hildebrandia rivularis* which is seen in shady calcareous region of south west of the lake is a good indication of water quality improvement in this part of the lake. Therefore, it seems that the restoration program is showing some gradual improvement, specially if the source of pollution from the river Struga Gołaniecka is decreased or put under control.

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Annex 1. Species composition and quantity (ind./ml) of phytoplankton species found in Lake Durowskie during 5.07.2010.

	Aerator	Aerator	Middle	Middle
	1	2	1a	1b
<i>Cyanoprokaryota</i>				
Aphanizomenon flos-aquae (L.) Ralfs		40		80
Jaaginema pseudogeminatum (Schmid) Anagn. et Kom.				80
Limnothrix redekei (Van Goor) Meffert		200	40	
Microcystis flos-aquae (Wittrock) Kirchner	240		40	
Phormidium granulatum Gardn. Anagn.			40	
<i>Planktothrix agardhii</i> (D.C. ex Gom.) Anagn. et Kom.				560
Pseudanabaena limnetica (Lemm.) Kom.				200
Total	240	240	120	920
<i>Bacillariophyceae</i>				
Amphora ovalis Kützing			40	40
Cyclotella ocellata Pant.				40
Cyclotella radiosa (Grun.) Lemm.		600		200

<i>Cymbella minuta</i> Hilse ex Rabenhorst				40
<i>Fragilaria ulna</i> (Nitzsch) Lange-Bertalot	1400	680	1120	1680
<i>Fragilaria ulna</i> var. <i>angustissima</i> Sippen				760
<i>Navicula radiosa</i> Kützing				40
Total	1400	1280	1160	2800
<i>Chlorophyta</i>				
<i>Coelastrum microporum</i> Naegel.				40
<i>Cosmarium regnellii</i> Wille				80
<i>Desmodesmus communis</i> (Hegew.) Hegew.			40	
<i>Elkatothrix gelatinosa</i> Wille				80
<i>Golenkinia radiata</i> Chodat				120
<i>Monoraphidium contortum</i> (Thur.) Kom.-Legn.				120
<i>Pteromonas cordiformis</i> (Carter) Lemm.				40
<i>Tetraedron minimum</i> (A. Br.) Hansgirg	80		40	200
<i>Tetraedron triangulare</i> (Chod.) Kom.	120			
<i>Pteromonas angulosa</i> (Carter) Lemm.	280			
Total	480	0	80	680
<i>Cryptophyta</i>				

Cryptomonas erosa Ehrenberg	40	440		400
Cryptomonas marssonii Skuja				120
<i>Cryptomonas rostrata</i> Troitzskaja emend I. Kiselev				80
Rhodomonas minuta Skuja		160		320
Total	40	600	0	920
<i>Dinophyta</i>				
Peridinopsis berolinense (Lemm.) Bourrelly	80	200		80
Peridiniopsis cuningtonii Lemm.	720	40	40	1480
<i>Peridinium cinctum</i> (O.F. Müller) Ehrenberg				80
Peridinopsis elpatiewskyi (Ostenf.) Bourrelly		120	80	240
Total	800	360	120	1880
<i>Euglenophyta</i>				
Trachelomonas hispida (Perty) Stein	160		40	40
Euglena pisciformis Klebs				40
Colacium vesiculosum Ehr.		160		
Total	160	160	40	80
<i>Chrysophyceae</i>				
Erkenia subaequiciliata Skuja	1600	1120	320	14840

Dinobryon sociale Ehrenberg				2600
Dinobryon divergens Imhof			680	440
Dinobryon bavaricum Imhoff				360
Total	1600	1120	1000	18240

Annex 2. Species composition and quantity (ind./ml) of phytoplankton species found in Lake Durowskie during 6.07.2010.

	Aerator	Aerator	Middle	Middle
	1	2	1a	1b
<i>Cyanoprokaryota</i>				
Aphanizomenon flos-aquae (L.) Ralfs		40		
Limnithrix redekei (Van Goor) Meffert	240	40	240	440
<i>Planktolyngbya limnetica</i> (Lemm.) Kom. – Legn. Et Cronenberg			160	
<i>Planktothrix agardhii</i> (D.C. ex Gom.) Anagn. et Kom.	360	40	440	360
Pseudanabaena limnetica (Lemm.) Kom.	280	160		

Spirulina laxissima (W. West)		40	80	
Total	880	320	920	800
<i>Bacillariophyceae</i>				
Amphora ovalis Kützing	120			
Cocconeis placentula Ehr.			40	
Cyclotella ocellata Pant.			280	80
Cyclotella radiosa (Grun.) Lemm.	600	360	240	520
<i>Fragilaria ulna</i> (Nitzsch) Lange-Bertalot	2200	400	1560	2120
<i>Fragilaria ulna</i> var. angustissima Sippen	1840	560	960	1080
Naviula sp.		40		
Total	4760	1360	3080	3800
<i>Chlorophyta</i>				
Chlamydomonas passiva Skuja			40	120
Closterium acutum var. variabile (Lemm.) Krieg.				40
Cosmarium abbreviatum Raciborski			40	
Cosmarium phaseolus Brebisson in Ralfs				40
Cosmarium regnellii Wille	280		200	240
Desmodesmus communis (Hegew.) Hegew.	120	400		

<i>Desmodesmus subspicatus</i> (Chod.) Hegew. et Schmidt			40	
<i>Dictyosphaerium pulchellum</i> Wood			40	120
<i>Elkatothrix gelatinosa</i> Wille		40	160	80
<i>Golenkinia radiata</i> Chodat	360	560	240	440
<i>Monoraphidium contortum</i> (Thur.) Kom.-Legn.	120		40	40
<i>Oocystis lacustris</i> Chodat	160			40
<i>Pandorina morum</i> (O.F. Müller) Bory			40	
<i>Phacotus lenticularis</i> (Ehr.) Stein	280		760	600
<i>Tetraedron minimum</i> (A. Br.) Hansgirg	120		80	160
<i>Tetraedron triangulare</i> (Chod.) Kom.	160	80		80
<i>Tetrastrum staurogeanieforme</i> (Schroed.) Lemm.	40			
<i>Pteromonas angulosa</i> (Carter) Lemm.	40			
<i>Treubaria schmidlei</i> (Schroeder) Fott et Kovacik	40		40	
Total	1720	1080	1720	2000
<i>Cryptophyta</i>				
<i>Chroomonas acuta</i> Uterm.				
<i>Cryptomonas erosa</i> Ehrenberg	120	1040	440	760
<i>Cryptomonas marssonii</i> Skuja	40	320	80	

<i>Cryptomonas rostrata</i> Troitzskaja emend I. Kiselev	320	120	80	120
Rhodomonas minuta Skuja	360	200	280	320
Total	840	1680	880	1200
<i>Dinophyta</i>				
Peridinopsis berolinense (Lemm.) Bourrelly	200	160	40	120
Peridiniopsis cuningtonii Lemm.	360	200	200	880
<i>Peridinium cinctum</i> (O.F. Müller) Ehrenberg			80	80
Peridinopsis elpatiewskyi (Ostenf.) Bourrelly	280	160	40	80
Total	840	520	360	1160
<i>Euglenophyta</i>				
Trachelomonas hispida (Perty) Stein	160	40		40
Euglena pisciformis Klebs	40			
Total	200	40	0	40
<i>Chrysophyceae</i>				
Erkenia subaequiciliata Skuja	12640	15680	34240	21760
Dinobryon sociale Ehrenberg			760	760
Dinobryon divergens Imhof	2360	920	280	360
Dinobryon bavaricum Imhoff			360	1440

Dinobryon crenulatum W. et G.S. West		200		
Total	15000	16800	35640	24320

Annex 3. Species composition and quantity (ind./ml) of phytoplankton species found in Lake Durowskie during 7.07.2010.

	Aerator 1	Aerator 2	Middle 1a	Middle 1b
<i>Cyanoprokaryota</i>				
Aphanizomenon flos-aquae (L.) Ralfs	40			
Aphanocapsa incerta (Lemm.) Cronberg et Komarek		1920		
Limnothrix redekei (Van Goor) Meffert		400	120	240
Planktothrix agardhii (D.C. ex Gom.) Anagn. et Kom.	40	880	60	120
Pseudanabaena limnetica (Lemm.) Kom.		80		120
Spirulina laxissima (W. West)		80		
Total	80	3360	180	480

<i>Bacillariophyceae</i>				
Cocconeis placentula Ehr.			60	
Cyclotella ocellata Pant.	80	160		
Cyclotella radiosa (Grun.) Lemm.	160	400		
<i>Fragilaria ulna</i> (Nitzsch) Lange-Bertalot	1080	1280	480	1560
<i>Fragilaria ulna</i> var. angustissima Sippen	1000	1040	480	1000
Gomphonema olivaceum (Horn.) Breb.				40
Navicula cincta (Ehr.) Ralfs	40			
Total	2360	2880	1020	2600
<i>Chlorophyta</i>				
Chlamydomonas passiva Skuja		160		80
Cosmarium regnellii Wille	960	160		120
Desmodesmus communis (Hegew.) Hegew.		400	60	
Elkatothrix gelatinosa Wille	40	80		200
Golenkinia radiata Chodat	520	320		
Oocystis lacustris Chodat		80		
Phacotus lenticularis (Ehr.) Stein	560	1040	1170	360
Tetraedron minimum (A. Br.) Hansgirg		160	60	80

Tetraedron triangulare (Chod.) Kom.		120		80
Pteromonas angulosa (Carter) Lemm.			60	
Total	2080	2520	1350	920
<i>Cryptophyta</i>				
Cryptomonas erosa Ehrenberg	280	560	180	200
Cryptomonas marssonii Skuja			120	
Cryptomonas ovata Ehrenberg				80
<i>Cryptomonas rostrata</i> Troitzskaja emend I. Kiselev	80	80		
Rhodomonas minuta Skuja		320	120	
Total	360	960	420	280
<i>Dinophyta</i>				
Peridinopsis berolinense (Lemm.) Bourrelly	40	80	120	
Peridiniopsis cuningtonii Lemm.	40	880	360	240
Peridinopsis elpatiewskyi (Ostenf.) Bourrelly		80		40
Total	80	1040	480	280
<i>Euglenophyta</i>				
Trachelomonas hispida (Perty) Stein				40
Total	0	0	0	40

<i>Chrysophyceae</i>				
Erkenia subaequiciliata Skuja	560	8320	6720	1600
Dinobryon sociale Ehrenberg			60	
Dinobryon divergens Imhof	1360	160	960	1280
Dinobryon crenulatum W. et G.S. West			60	
Total	1920	8480	7800	2880

Annex 4. Species composition and quantity (ind./ml) of phytoplankton species found in Lake Durowskie during 8.07.2010.

	Aerator	Aerator	Middle	Middle		
	1	2	1a	1b	Inflow	North
<i>Cyanoprokaryota</i>						
Aphanizomenon flos-aquae (L.) Ralfs	80	240	400	80	520	1440
Limnothrix redekei (Van Goor) Meffert	80	440	240	1320	3320	3490
Phormidium granulatum Gardn. Anagn.		200			280	80
<i>Planktolyngbya limnetica</i> (Lemm.) Kom. – Legn. Et Cronenberg					1640	560

<i>Planktothrix agardhii</i> (D.C. ex Gom.) Anagn. et Kom.	88	400	80	880	11960	4440
<i>Pseudanabaena limnetica</i> (Lemm.) Kom.		200			800	680
<i>Cyanogranis feruginea</i> (Wawrik) Hind.		560				
Total	248	2040	720	2280	18520	10690
<i>Bacillariophyceae</i>						
<i>Amphora ovalis</i> Kützing			240		80	
<i>Cocconeis placentula</i> Ehr.				40		80
<i>Cyclotella meneghiniana</i> Kütz.					40	
<i>Cyclotella ocellata</i> Pant.				40		120
<i>Cyclotella operculata</i> (Ag.) Kützing					120	
<i>Cyclotella radiosa</i> (Grun.) Lemm.	80	40	1200	80	240	200
<i>Cymbella minuta</i> Hilse ex Rabenhorst				40	40	
<i>Fragilaria ulna</i> (Nitzsch) Lange-Bertalot	240	680	1920	1240	1320	1480
<i>Fragilaria ulna</i> var. <i>angustissima</i> Sippen	840	880	1440	760	400	1040
<i>Gomphonema olivaceum</i> (Horn.) Breb.						120
<i>Navicula radiosa</i> Kützing					40	
Total	1160	1600	4800	2200	2280	3040
<i>Chlorophyta</i>						

Monoraphidium komarkovae Nygaard					80	
Chlamydomonas globosa Snow					80	
Chlamydomonas passiva Skuja	200	40	480			280
Closterium acutum var. variabile (Lemm.) Krieg.	80	240				40
Closterium gracile Brebisson ex Ralfs						
Coelasrum astroideum De Notaris		40				40
Cosmarium phaseolus Brebisson in Ralfs	40					
Cosmarium regnellii Wille	640	796		360	40	240
Desmodesmus communis (Hegew.) Hegew.	40		80		80	120
<i>Desmodesmus subspicatus</i> (Chod.) Hegew. et Schmidt				160		
Desmodesmus opoliensis (Richter) Hegew.				40		
Dictyosphaerium pulchellum Wood			200		40	80
Elkatothrix gelatinosa Wille		360		40	360	240
Golenkinia radiata Chodat	920			720	120	360
Monoraphidium contortum (Thur.) Kom.-Legn.				80	240	200
Oocystis lacustris Chodat	40		400	80	40	40
Pediastrum tetras (Ehr.) Ralfs						40
Phacotus lenticularis (Ehr.) Stein	40			1000		760

Scenedesmus bicaudatus Dedusenko	40					40
Scenedesmus ecornis (Ehr.) Chod.						40
Tetraedron minimum (A. Br.) Hansgirg	320	160	160	400	200	160
Tetraedron triangulare (Chod.) Kom.	40				80	120
Tetrastrum staurogeanieforme (Schroed.) Lemm.						40
Pteromonas angulosa (Carter) Lemm.		320	1920	40	40	40
Total	2400	1956	3240	2920	1400	2880
<i>Cryptophyta</i>						
Cryptomonas erosa Ehrenberg		120	640	640	640	80
Cryptomonas marssonii Skuja	120		80	40	120	120
Cryptomonas ovata Ehrenberg	80			200		
<i>Cryptomonas rostrata</i> Troitzskaja emend I. Kiselev		80	80	40	80	40
Rhodomonas minuta Skuja	160	320	80	320	280	320
Total	360	520	880	1240	1120	560
<i>Dinophyta</i>						
Peridiniopsis berolinense (Lemm.) Bourrelly	80	40	480	160	40	80
Peridiniopsis cuningtonii Lemm.	200			1000	360	400
<i>Peridinium cinctum</i> (O.F. Müller) Ehrenberg				40	40	80

Peridinopsis elpatiewskyi (Ostenf.) Bourrelly	160	240	1040	80	240	40
Total	440	280	1520	1280	680	600
<i>Euglenophyta</i>						
Trachelomonas hispida (Perty) Stein			160	120		
Trachelomonas volocina Ehrenberg		240				
Euglena pisciformis Klebs			80	80	80	40
Total	0	240	240	200	80	40
<i>Chrysophyceae</i>						
Erkenia subaequiciliata Skuja	360	6760	30160	17640	9840	15760
Dinobryon sociale Ehrenberg	1480	1480		2600	680	240
Dinobryon divergens Imhof	80	760	1200	240	160	120
Dinobryon bavaricum Imhoff	320	840		480	840	440
Dinobryon crenulatum W. et G.S. West	80				160	
Total	2320	9840	31360	20960	11680	16560

Annex 5. Species composition and quantity (ind./ml) of phytoplankton species found in Lake Durowskie during 9.07.2010.

	Aerator 1	Aerator 2	Middle 1a	Middle 1b
<i>Cyanoprokaryota</i>				
<i>Aphanizomenon flos-aquae</i> (L.) Ralfs	240	80		
<i>Aphanizomenon isatschenkoi</i> (Usacc.) Pros. - Lavrenko			40	
<i>Limnothrix redekei</i> (Van Goor) Meffert	200	800	440	840
<i>Planktolyngbya limnetica</i> (Lemm.) Kom. – Legn. Et Cronenberg		280	160	80
<i>Planktothrix agardhii</i> (D.C. ex Gom.) Anagn. et Kom.	200	680	840	360
<i>Pseudanabaena limnetica</i> (Lemm.) Kom.		280	120	80
Total	640	2120	1600	1360
<i>Bacillariophyceae</i>				
<i>Achnanthes minutissima</i> Kützing				
<i>Achnanthes exigua</i> Grun.		40	40	
<i>Amphora pediculus</i> (Kütz.) Grun.			40	40
<i>Cyclotella ocellata</i> Pant.	160	200	200	80

Cyclotella radiosa (Grun.) Lemm.	200	240	160	280
<i>Fragilaria ulna</i> (Nitzsch) Lange-Bertalot	1520	1560	1280	200
<i>Fragilaria ulna</i> var. <i>angustissima</i> Sippen	800	1680	720	1720
Total	2680	3720	2440	2320
<i>Chlorophyta</i>				
<i>Chlamydomonas passiva</i> Skuja		80		
<i>Coelastrum microporum</i> Naegel.	40			
<i>Cosmarium regnellii</i> Wille	200	280	640	560
<i>Desmodesmus communis</i> (Hegew.) Hegew.		40	40	40
<i>Elkatothrix gelatinosa</i> Wille	200	240	120	200
<i>Golenkinia radiata</i> Chodat	240	680	560	440
<i>Monoraphidium contortum</i> (Thur.) Kom.-Legn.		40	80	40
<i>Monoraphidium griffithii</i> (Berk.) Kom.-Legn.			40	
<i>Monoraphidium irregulare</i> (G.M. Sm.) Kom.-Legn.		40		
<i>Oocystis lacustris</i> Chodat		160		80
<i>Phacotus lenticularis</i> (Ehr.) Stein	320	520	440	1480
<i>Sphaerocystis planctonica</i> (Korsikov) Bourrelly				40
<i>Tetraedron minimum</i> (A. Br.) Hansgirg	120	80	80	111

Tetraedron triangulare (Chod.) Kom.	40		40	
<i>Treubaria schmidlei</i> (Schroeder) Fott et Kovacik			40	
Total	1160	2160	2080	2991
<i>Cryptophyta</i>				
Cryptomonas erosa Ehrenberg	280	120	240	160
Cryptomonas marssonii Skuja	40	40	40	40
Cryptomonas ovata Ehrenberg	40	80	80	40
<i>Cryptomonas rostrata</i> Troitzskaja emend I. Kiselev	40	240	120	40
Rhodomonas minuta Skuja	520	880	600	800
Total	920	1360	1080	1080
<i>Dinophyta</i>				
Peridinopsis berolinense (Lemm.) Bourrelly		160	40	40
Peridiniopsis cuningtonii Lemm.	320	760	360	320
<i>Peridinium cinctum</i> (O.F. Müller) Ehrenberg	80	80	40	
Peridinopsis elpatiewskyi (Ostenf.) Bourrelly	280	160	40	40
Total	680	1160	480	400
<i>Euglenophyta</i>				
Trachelomonas volocina Ehrenberg	120			

Euglena pisciformis Klebs	40			
Total	160	0	0	0
<i>Chrysophyceae</i>				
Erkenia subaequiciliata Skuja	25680	15840	16480	18320
Dinobryon sociale Ehrenberg	600	1200	1400	520
Dinobryon divergens Imhof	120	400	120	320
Dinobryon bavaricum Imhoff	400	1920	640	1520
Dinobryon crenulatum W. et G.S. West	40	40		120
Total	26840	19400	18640	20800

Annex 6. Species composition and quantity (ind./ml) of phytoplankton species found in Lake Durowskie during 10.07.2010.

	Aerator	Middle	Middle	
	1	1a	1b	Outflow
<i>Cyanoprokaryota</i>				

Aphanizomenon flos-aquae (L.) Ralfs		200	400	180
Aphanizomenon isatschenkoi (Usacc.) Pros. - Lavrenko		160	360	120
Limnithrix redekei (Van Goor) Meffert	760	680	200	680
<i>Planktolyngbya limnetica</i> (Lemm.) Kom. – Legn. Et Cronenberg			280	
<i>Planktothrix agardhii</i> (D.C. ex Gom.) Anagn. et Kom.	800	640	200	440
Pseudanabaena limnetica (Lemm.) Kom.		120	120	
Total	1560	1800	1560	1420
<i>Bacillariophyceae</i>				
Achnanthes minutissima Kützing				40
Cyclotella ocellata Pant.	120	120	120	240
Cyclotella radiosa (Grun.) Lemm.	200	160	360	600
<i>Fragilaria ulna</i> (Nitzsch) Lange-Bertalot	2520	2440	2480	1600
<i>Fragilaria ulna</i> var. angustissima Sippen	1760	4560	1640	2000
Total	4600	7280	4600	4480
<i>Chlorophyta</i>				
Coelasrum astroideum De Notaris	120	80	80	
Coelastrum microporum Naegel.	40			
Cosmarium phaseolus Brebisson in Ralfs	40			40

Cosmarium regnellii Wille	280	360	440	920
<i>Crucigenia tetrapedia</i> (Kirchner) W. et G.S. West	80			
Desmodesmus communis (Hegew.) Hegew.	40	80	40	40
Desmodesmus naegellii (Meyen) Hegew.				80
Elkatothrix gelatinosa Wille	200	280	280	120
Golenkinia radiata Chodat	600	760	840	1280
Kirchneriella contorta var. elegans (Schmidle) Bohlin				40
Phacotus lenticularis (Ehr.) Stein	680	760	600	280
Tetraedron minimum (A. Br.) Hansgirg	160	120	200	80
Tetraedron triangulare (Chod.) Kom.		40	80	
Tetrastrum staurogeanieforme (Schroed.) Lemm.		40	40	
Total	2240	2520	2600	2880
<i>Cryptophyta</i>				
Cryptomonas erosa Ehrenberg	400	360	520	240
Cryptomonas marssonii Skuja	40	40	80	
Cryptomonas ovata Ehrenberg		120	200	
<i>Cryptomonas rostrata</i> Troitzskaja emend I. Kiselev	200	120	80	
Rhodomonas minuta Skuja	800	840	680	720

Total	1440	1480	1560	960
<i>Dinophyta</i>				
Peridinopsis berolinense (Lemm.) Bourrelly	40	40	40	
Peridiniopsis cuningtonii Lemm.	440	480	480	200
<i>Peridinium cinctum</i> (O.F. Müller) Ehrenberg	40	40	40	40
Peridinopsis elpatiewskyi (Ostenf.) Bourrelly	80	120	80	
Total	600	680	640	240
<i>Euglenophyta</i>				
Trachelomonas volocina Ehrenberg		40		
Euglena pisciformis Klebs		80	40	
Total	0	120	40	0
<i>Chrysophyceae</i>				
Erkenia subaequiciliata Skuja	23760	23480	22400	15640
Dinobryon sociale Ehrenberg	1280	1520	1160	400
Dinobryon divergens Imhof	640	480	600	440
Dinobryon bavaricum Imhoff	1960	2080	1640	1280
Dinobryon crenulatum W. et G.S. West	360	480	640	480
Total	28000	28040	26440	18240

Annex 7. Biomass (mg/l) of particular phytoplankton species found in Lake Durowskie during 5.07.2010

	Aerator 1	Aerator 2	Middle 1a	Middle 1b
<i>Cyanoprokaryota</i>				
Aphanizomenon flos-aquae (L.) Ralfs	0.471	0.079		0.157
Limnothrix redekei (Van Goor) Meffert		0.063	0.013	0.025
Microcystis flos-aquae (Wittrock) Kirchner			0.079	
Phormidium granulatum Gardn. Anagn.			0.02	
<i>Planktothrix agardhii</i> (D.C. ex Gom.) Anagn. et Kom.				0.703
Pseudanabaena limnetica (Lemm.) Kom.				0.035
Total	0.471	0.142	0.112	0.92
<i>Bacillariophyceae</i>				

Amphora ovalis Kützing			0.2	0.201
Cyclotella ocellata Pant.				0.035
Cyclotella radiosa (Grun.) Lemm.		0.75		0.25
<i>Cymbella minuta</i> Hilse ex Rabenhorst				0.074
<i>Fragilaria ulna</i> (Nitzsch) Lange-Bertalot	1.904	0.925	1.523	2.285
<i>Fragilaria ulna</i> var. <i>angustissima</i> Sippen				2.067
<i>Navicula cincta</i> (Ehr.) Ralfs				0.214
<i>Navicula radiosa</i> Kützing				0.099
Total	1.904	1.675	1.723	5.225
<i>Chlorophyta</i>				
<i>Coelastrum astroideum</i> De Notaris				0.188
<i>Cosmarium phaseolus</i> Brebisson in Ralfs				0.064
<i>Crucigenia tetrapedia</i> (Kirchner) W. et G.S. West			0.036	0.037
<i>Didymocystis planctonica</i> Korsikov				0.088
<i>Elkatothrix gelatinosa</i> Wille				0.047
<i>Monoraphidium circinale</i> (Nyg.) Nygaard				0.021
<i>Tetraedron caudatum</i> (Corda) Hansgirg	0.008		0.004	0.022
<i>Tetraedron minimum</i> (A. Br.) Hansgirg	0.014			

<i>Tetrastrum glabrum</i> (Roll) Ahlstr. et Tiff		0.036		
<i>Tetrastrum staurogeanieforme</i> (Schroed.) Lemm.	0.228			0.032
Total	0.25	0.036	0.04	0.499
<i>Cryptophyta</i>				
<i>Chroomonas acuta</i> Uterm.	0.064	0.713		0.648
<i>Cryptomonas erosa</i> Ehrenberg				0.152
<i>Cryptomonas ovata</i> Ehrenberg				0.168
<i>Cryptomonas rostrata</i> Troitzskaja emend I. Kiselev				0.041
Total	0.064	0.713	0	1.009
<i>Dinophyta</i>				
<i>Gymnodinium aeruginosum</i> Stein	7.056	0.392	0.392	14.504
<i>Peridiniopsis cuningtonii</i> Lemm.				1.34
<i>Peridinium willei</i> Huitfeld-Kaas		0.96	0.64	1.92
Total	7.056	1.352	1.032	17.764
<i>Euglenophyta</i>				
<i>Trachelomonas volocina</i> Ehrenberg	0.167		0.042	0.042
<i>Euglena clavata</i> Skuja		0.168		0.157
Total	0.167	0.168	0.042	0.157

<i>Chrysophyceae</i>				
Erkenia subaequiciliata Skuja	0.089	0.063	0.018	0.831
Dinobryon sociale Ehrenberg				0.988
Chrysococcus rufescens Klebs				0.201
Dinobryon bavaricum Imhoff				0.187
Dinobryon crenulatum W. et G.S. West		0.113		0.187
Total	0.089	0.176	0.018	2.394

Annex 8. Biomass (mg/l) of particular phytoplankton species found in Lake Durowskie during 6.07.2010				
	Aerator	Aerator	Middle	Middle
	1	2	1a	1b
<i>Cyanoprokaryota</i>				
Aphanizomenon flos-aquae (L.) Ralfs		0.079	0.236	
Limnothrix redekei (Van Goor) Meffert	0.074	0.013	0.075	0.138

<i>Planktolyngbya limnetica</i> (Lemm.) Kom. – Legn. Et Cronenberg			0.027	
<i>Planktothrix agardhii</i> (D.C. ex Gom.) Anagn. et Kom.	0.452	0.5	0.553	0.452
<i>Pseudanabaena limnetica</i> (Lemm.) Kom.	0.05	0.028		
<i>Spirulina laxissima</i> West		0.008	0.025	
Total	0.576	0.628	0.916	0.59
<i>Bacillariophyceae</i>				
<i>Amphora ovalis</i> Kützing	0.603			
<i>Cocconeis placentula</i> Ehr.			0.224	
<i>Cyclotella ocellata</i> Pant.			0.245	0.07
<i>Cyclotella radiosa</i> (Grun.) Lemm.	0.75	0.45	0.3	0.65
<i>Fragilaria ulna</i> (Nitzsch) Lange-Bertalot	2.992	0.544	2.122	2.883
<i>Fragilaria ulna</i> var. <i>angustissima</i> Sippen	5.005	1.523	2.611	2.937
<i>Navicula</i> sp.		0.03		
Total	9.35	2.547	5.502	6.54
<i>Chlorophyta</i>				
<i>Chlamydomonas passiva</i> Skuja			0.022	0.065
<i>Closterium acutum</i> var. <i>variabile</i> (Lemm.) Krieg.				0.041
<i>Cosmarium abbreviatum</i> Raciborski			0.027	

Cosmarium phaseolus Brebisson in Ralfs				0.302
Cosmarium regnellii Wille	0.223		0.048	0.191
Desmodesmus communis (Hegew.) Hegew.	0.107	0.356		
<i>Desmodesmus subspicatus</i> (Chod.) Hegew. et Schmidt			0.021	
Dictyosphaerium pulchellum Wood			0.193	0.579
Elkatothrix gelatinosa Wille		0.44	0.176	0.088
Golenkinia radiata Chodat	0.374	0.203	0.086	0.158
Monoraphidium contortum (Thur.) Kom.-Legn.	0.021		0.007	0.007
Oocystis lacustris Chodat	0.409			0.102
<i>Pandorina morum</i> (O.F. Müller) Bory			0.101	
Phacotus lenticularis Chodat.	0.273		0.578	0.586
Tetraedron minimum (A. Br.) Hansgirg	0.013		0.009	0.018
Tetraedron triangulare (Chod.) Kom.	0.019	0.01		0.009
Tetrastrum staurogeanieforme (Schroed.) Lemm.	0.006			
Pteromonas angulosa (Carter) Lemm.	0.032			
<i>Treubarria schmidlei</i> (Schroeder) Fott et Kovacik	0.068		0.042	
Total	1.545	1.009	1.31	2.146
<i>Cryptophyta</i>				

Cryptomonas erosa Ehrenberg	1.166	1.685	0.713	1.231
Cryptomonas marssonii Skuja	0.051	0.406	0.102	
<i>Cryptomonas rostrata</i> Troitzskaja emend I. Kiselev	0.672	0.252	0.168	0.252
Rhodomonas minuta Skuja	0.254	0.141	0.198	0.225
Total	2.143	2.484	1.181	1.708
<i>Dinophyta</i>				
Peridinopsis berolinense (Lemm.) Bourrelly	1.84	1.472	0.392	1.104
Peridiniopsis cuningtonii Lemm.	3.528	0.08	1.6	8.624
<i>Peridinium cinctum</i> (O.F. Müller) Ehrenberg			1.34	1.34
Peridinopsis elpatiewskyi (Ostenf.) Bourrelly	2.24	1.28	0.32	0.64
Total	7.608	2.832	3.652	11.708
<i>Euglenophyta</i>				
Trachelomonas hispida (Perty) Stein	0.168	0.042		0.042
Euglena pisciformis Klebs	0.157			
Total	0.325	0.042	0	0.042
<i>Chrysophyceae</i>				
Erkenia subaequiciliata Skuja	0.708	0.878	1.917	1.219
Dinobryon sociale Ehrenberg			0.281	0.289

Dinobryon divergens Imhof	1.076	0.419	0.28	0.164
Dinobryon bavaricum Imhoff			0.158	0.749
Dinobryon crenulatum W. et G.S. West		0.071		
Total	1.784	1.368	2.636	2.421

Annex 9. Biomass (mg/l) of particular phytoplankton species found in Lake Durowskie during 7.07.2010

	Aerator	Aerator	Middle	Middle
	1	2	1a	1b
<i>Cyanoprokaryota</i>				
<i>Aphanizomenon flos-aquae</i> (L.) Ralfs	0.079			
<i>Aphanocapsa incerta</i> (Lemm.) Cronberg et Komarek		0.403		
<i>Limnothrix redekei</i> (Van Goor) Meffert		0.126	0.038	0.075
<i>Planktothrix agardhii</i> (D.C. ex Gom.) Anagn. et Kom.	0.05	1.105	0.075	0.151
<i>Pseudanabaena limnetica</i> (Lemm.) Kom.		0.014		0.021

Spirulina laxissima West		0.039		
Total	0.129	1.687	0.113	0.247
<i>Bacillariophyceae</i>				
Cocconeis placentula Ehr.			0.398	
Cyclotella ocellata Pant.	0.07	0.061		
Cyclotella radiosa (Grun.) Lemm.	0.2	0.5		
<i>Fragilaria ulna</i> (Nitzsch) Lange-Bertalot	1.468	1.791	0.652	1.212
<i>Fragilaria ulna</i> var. angustissima Sippen	2.72	1.414	1.306	1.36
Gomphonema olivaceum (Horn.) Breb.				0.025
Navicula cincta (Ehr.) Ralfs	0.031			
Total	4.489	3.766	2.356	2.597
<i>Chlorophyta</i>				
Chlamydomonas passiva Skuja		0.086		0.043
Cosmarium regnellii Wille	0.85	0.127		0.096
Desmodesmus communis (Hegew.) Hegew.		0.356	0.053	
Elkatothrix gelatinosa Wille	0.044	0.089		0.221
Golenkinia radiata Chodat	0.187	0.115		
Oocystis lacustris Chodat		0.204		

Phacotus lenticularis Chodat.	0.546	0.015	1.112	0.351
Tetraedron minimum (A. Br.) Hansgirg		0.018	0.007	0.009
Tetraedron triangulare (Chod.) Kom.		0.01		0.01
Pteromonas angulosa (Carter) Lemm.			0.048	
Total	1.627	1.02	1.22	0.73
<i>Cryptophyta</i>				
Cryptomonas erosa Ehrenberg	0.45	0.908	0.291	0.324
Cryptomonas marssonii Skuja			0.152	
Cryptomonas ovata Ehrenberg				0.16
<i>Cryptomonas rostrata</i> Troitzskaja emend I. Kiselev	0.7	0.168		
Rhodomonas minuta Skuja		0.226	0.085	
Total	1.15	1.302	0.528	0.484
<i>Dinophyta</i>				
Peridinopsis berolinense (Lemm.) Bourrelly	0.37	0.736	1.104	
Peridiniopsis cuningtonii Lemm.	0.392	8.624	3.528	0.029
Peridinopsis elpatiewskyi (Ostenf.) Bourrelly		0.64		0.32
Total	0.762	10	4.632	0.349
<i>Euglenophyta</i>				

Trachelomonas hispida (Perty) Stein				0.042
Total				0.042
<i>Chrysophyceae</i>				
Erkenia subaequiciliata Skuja	0.03	0.466	0.376	0.089
Dinobryon sociale Ehrenberg			0.023	
Dinobryon divergens Imhof	0.62	0.401	0.437	0.584
Dinobryon crenulatum W. et G.S. West			0.021	
Total	0.65	0.867	0.857	0.673

Annex 10. Biomass (mg/l) of particular phytoplankton species found in Lake Durowskie during 8.07.2010						
	Aerator	Aerator	Middle	Middle	Inflow	North
	1	2	1a	1b		
<i>Cyanoprokaryota</i>						
Aphanizomenon flos-aquae (L.) Ralfs	0.157	0.047	0.785	0.157	1.02	2.826
Limnithrix redekei (Van Goor) Meffert	0.025	0.138	0.075	0.414	1.043	1.092

Phormidium granulatum Gardn. Anagn.		6.098			0.137	0.039
<i>Planktolyngbya limnetica</i> (Lemm.) Kom. – Legn. Et Cronenberg					0.29	0.099
<i>Planktothrix agardhii</i> (D.C. ex Gom.) Anagn. et Kom.	0.111	0.502	0.1	1.105	15.021	5.576
Pseudanabaena limnetica (Lemm.) Kom.		0.035			0.41	0.12
Cyanogranis feruginea (Wawrik) Hind.		0.073				
Total	0.293	6.893	0.96	1.676	17.921	9.752
<i>Bacillariophyceae</i>						
Amphora ovalis Kützing					0.402	
Cocconeis placentula Ehr.				0.266		0.531
Cyclotella meneghiniana Kütz.					0.09	
Cyclotella ocellata Pant.				0.041		0.03
Cyclotella operculata (Ag.) Kützing					0.105	
Cyclotella radiosa (Grun.) Lemm.	0.1	0.05	1.5	0.1	0.3	0.25
<i>Cymbella minuta</i> Hilse ex Rabenhorst				0.074	0.074	
<i>Fragilaria ulna</i> (Nitzsch) Lange-Bertalot	0.326	0.925	2.611	1.686	1.795	2.012
<i>Fragilaria ulna</i> var. angustissima Sippen	2.285	2.394	1.958	2.067	1.088	2.828
Gomphonema olivaceum (Horn.) Breb.						0.075
Navicula radiosa Kützing					0.099	

Total	2.711	3.369	6.069	4.234	3.953	5.726
<i>Chlorophyta</i>						
Monoraphidium komarkovae Nygaard					0.308	
Chlamydomonas globosa Snow					0.021	
Chlamydomonas passiva Skuja	0.108	0.022	0.259			0.151
Closterium acutum var. variabile (Lemm.) Krieg.	0.036	0.506				0.084
Coelasrum astroideum De Notaris		0.109				0.109
Cosmarium phaseolus Brebisson in Ralfs	0.199					
Cosmarium regnellii Wille	0.104	0.414		0.287	0.032	0.038
Desmodesmus communis (Hegew.) Hegew.	0.01		0.071		0.071	0.109
<i>Desmodesmus subspicatus</i> (Chod.) Hegew. et Schmidt				0.09		
Desmodesmus opoliensis (Richter) Hegew.				0.039		
Dictyosphaerium pulchellum Wood			0.876		0.192	0.385
Didymocystis planctonica Korsikov		0.398				
Elkatothrix gelatinosa Wille		0.398		0.044	0.397	0.265
Golenkinia radiata Chodat	0.331			0.26	0.043	0.129
Monoraphidium contortum (Thur.) Kom.-Legn.				0.014	0.042	0.035
Oocystis lacustris Chodat	0.102		1.022	0.204	0.102	0.102

Pediastrum tetras (Ehr.) Ralfs						0.154
Phacotus lenticularis Chodat.	0.039			0.32		0.741
Pteromonas cordiformis Lemm.					0.031	
Scenedesmus bicaudatus Dedusenko	0.029					0.029
Scenedesmus ecornis (Ehr.) Chod.						0.017
Sphaerocystis planctonica (Korsikov) Bourrelly	0.091					
Tetraedron minimum (A. Br.) Hansgirg	0.036	0.018	0.018	0.044	0.022	0.017
Tetraedron triangulare (Chod.) Kom.	0.005				0.009	0.014
Tetrastrum staurogeanieforme (Schroed.) Lemm.						0.006
Pteromonas angulosa (Carter) Lemm.		0.255	1.528	0.032		0.031
Total	1.09	2.12	3.774	1.334	1.27	2.416
<i>Cryptophyta</i>						
Chroomonas acuta Uterm.						
Cryptomonas erosa Ehrenberg		0.194	1.037	0.037	1.036	0.13
Cryptomonas marssonii Skuja	0.152		0.102	0.051	0.152	0.153
Cryptomonas ovata Ehrenberg	0.016			0.398		
<i>Cryptomonas rostrata</i> Troitzskaja emend I. Kiselev		0.168	0.168	0.084	0.168	0.084
Rhodomonas minuta Skuja	0.113	0.226	0.056	0.226	0.197	0.225

Total	0.281	0.588	1.363	0.796	1.553	0.592
<i>Dinophyta</i>						
Peridinopsis berolinense (Lemm.) Bourrelly	0.736	0.368	4.416	1.472	0.368	0.736
Peridiniopsis cuningtonii Lemm.	1.96			9.8	3.528	3.92
<i>Peridinium cinctum</i> (O.F. Müller) Ehrenberg				0.012	0.67	1.34
Peridinopsis elpatiewskyi (Ostenf.) Bourrelly	1.28	1.92	8.32	0.64	1.92	0.32
Total	3.976	2.288	12.736	11.924	6.486	6.316
<i>Euglenophyta</i>						
Trachelomonas hispida (Perty) Stein			0.168	0.126		
Trachelomonas volocina Ehrenberg						0.062
Euglena pisciformis Klebs			0.314	0.314	0.314	0.157
Total			0.482	0.44	0.314	0.219
<i>Chrysophyceae</i>						
Erkenia subaequiciliata Skuja	0.02	0.379	1.689	0.988	0.551	0.882
Dinobryon sociale Ehrenberg	0.562	0.548		0.962	0.258	0.092
Dinobryon divergens Imhof	0.037	0.347	0.547	0.109	0.072	0.054
Dinobryon bavaricum Imhoff	0.166	0.437		0.154	0.436	0.14
Dinobryon crenulatum W. et G.S. West	0.029				0.057	

Total	0.814	1.711	2.236	2.213	1.374	1.168
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Annex 11. Biomass (mg/l) of particular phytoplankton species found in Lake Durowskie during 9.07.2010

	Aerator 1	Aerator 2	Middle 1a	Middle 1b
<i>Cyanoprokaryota</i>				
Aphanizomenon flos-aquae (L.) Ralfs	0.471	0.157		
Aphanizomenon isatschenkoi (Usacc.) Pros. - Lavrenko			0.075	
Limnithrix redekei (Van Goor) Meffert	0.063	0.251	0.138	0.264
<i>Planktolyngbya limnetica</i> (Lemm.) Kom. – Legn. Et Cronenberg		0.05	0.028	0.014
<i>Planktothrix agardhii</i> (D.C. ex Gom.) Anagn. et Kom.	0.251	0.854	1.055	0.452
Pseudanabaena limnetica (Lemm.) Kom.		0.049	0.021	0.014
Total	0.785	1.361	1.317	0.744
<i>Bacillariophyceae</i>				

Achnanthes minutissima Kützing			0.014	
Achnanthes exigua Grun.		0.014	0.013	
Amphora pediculus (Kütz.) Grun.			0.068	0.089
Cyclotella ocellata Pant.	0.14	0.175	0.158	0.07
Cyclotella radiosa (Grun.) Lemm.	0.25	0.3	0.2	0.35
<i>Fragilaria ulna</i> (Nitzsch) Lange-Bertalot	2.067	2.122	1.74	2.72
<i>Fragilaria ulna</i> var. angustissima Sippen	2.176	4.569	1.958	4.678
Total	4.633	7.18	4.151	7.907
<i>Chlorophyta</i>				
Chlamydomonas passiva Skuja		0.043		
Coelastrum microporum Naegel.	0.177			
Cosmarium regnellii Wille	0.159	0.206	0.509	0.446
Desmodesmus communis (Hegew.) Hegew.		0.036	0.036	0.036
Elkatothrix gelatinosa Wille	0.035	0.265	0.133	0.221
Golenkinia radiata Chodat	0.086	0.245	0.202	0.158
Monoraphidium contortum (Thur.) Kom.-Legn.		0.007	0.014	0.007
Monoraphidium griffithii (Berk.) Kom.-Legn.			0.103	
Monoraphidium irregulare (G.M. Sm.) Kom.-Legn.		0.007		

Oocystis lacustris Chodat		0.408		0.204
Phacotus lenticularis Chodat.	0.312	0.507	0.429	1.125
Sphaerocystis planctonica (Korsikov) Bourrelly				0.142
Tetraedron minimum (A. Br.) Hansgirg	0.013	0.009	0.009	0.004
Tetraedron triangulare (Chod.) Kom.	0.005		0.005	
<i>Treubaria schmidlei</i> (Schroeder) Fott et Kovacik			0.086	
Total	0.787	1.733	1.526	2.343
<i>Cryptophyta</i>				
Chroomonas acuta Uterm.				
Cryptomonas erosa Ehrenberg	0.454	0.194	0.389	0.259
Cryptomonas marssonii Skuja	0.051	0.051	0.051	0.051
Cryptomonas ovata Ehrenberg	0.079	0.159	0.159	0.08
<i>Cryptomonas rostrata</i> Troitzskaja emend I. Kiselev	0.084	0.504	0.252	0.084
Rhodomonas minuta Skuja	0.367	0.621	0.424	0.565
Total	1.035	1.529	1.275	1.039
<i>Dinophyta</i>				
Peridiniopsis berolinense (Lemm.) Bourrelly		1.472	0.368	0.368
Peridiniopsis cuningtonii Lemm.	3.136	7.448	3.528	3.136

<i>Peridinium cinctum</i> (O.F. Müller) Ehrenberg	1.34	1.34	0.706	
Peridinopsis elpatiewskyi (Ostenf.) Bourrelly	2.24	1.28	0.32	0.32
Total	6.716	11.54	4.922	3.824
<i>Euglenophyta</i>				
Trachelomonas volocina Ehrenberg	0.067			
Euglena pisciformis Klebs	0.157			
Total	0.224			
<i>Chrysophyceae</i>				
Erkenia subaequiciliata Skuja	1.438	0.887	0.923	1.026
Dinobryon sociale Ehrenberg	0.222	0.444	0.518	0.197
Dinobryon divergens Imhof	0.054	0.182	0.055	0.146
Dinobryon bavaricum Imhoff	0.128	0.614	0.204	0.79
Dinobryon crenulatum W. et G.S. West	0.014	0.014		0.043
Total	1.856	2.141	1.7	2.202

Annex 12. Biomass (mg/l) of particular phytoplankton species found in Lake Durowskie during 10.07.2010

	Aerator 1	Middle 1a	Middle 1b	Outflow
<i>Cyanoprokaryota</i>				
Aphanizomenon flos-aquae (L.) Ralfs		0.394	0.794	0.393
Aphanizomenon isatschenkoi (Usacc.) Pros. - Lavrenko		0.05	0.113	0.038
Limnothrix redekei (Van Goor) Meffert	0.239	0.214	0.063	0.214
<i>Planktolyngbya limnetica</i> (Lemm.) Kom. – Legn. Et Cronenberg			0.049	
<i>Planktothrix agardhii</i> (D.C. ex Gom.) Anagn. et Kom.	1.005	0.804	0.251	0.553
Pseudanabaena limnetica (Lemm.) Kom.		0.038	0.038	
Total	1.244	1.5	1.308	1.198
<i>Bacillariophyceae</i>				
Achnanthes minutissima Kützing				0.013
Cyclotella ocellata Pant.	0.946	0.105	0.105	0.187
Cyclotella radiosa (Grun.) Lemm.	0.25	0.2	0.45	0.75
<i>Fragilaria ulna</i> (Nitzsch) Lange-Bertalot	3.427	3.318	3.372	2.176

Fragilaria ulna var. angustissima Sippen	4.787	4.243	4.461	5.44
Total	9.41	7.866	8.388	8.566
<i>Chlorophyta</i>				
Coelastrum astroideum De Notaris	0.544	0.365	0.368	
Coelastrum microporum Naegel.	0.181			
Cosmarium phaseolus Brebisson in Ralfs	0.119			0.18
Cosmarium regnellii Wille	0.223	0.286	0.35	0.732
<i>Crucigenia tetrapedia</i> (Kirchner) W. et G.S. West	0.003			
Desmodesmus communis (Hegew.) Hegew.	0.03	0.06	0.03	0.036
Desmodesmus naegellii (Meyen) Hegew.				0.082
Elkatothrix gelatinosa Wille	0.221	0.309	0.309	0.133
Golenkinia radiata Chodat	0.216	0.274	0.302	0.461
Kirchneriella contorta var. elegans (Schmidle) Bohlin				0.004
Phacotus lenticularis Chodat.	0.517	0.742	0.586	0.273
Tetraedron caudatum (Corda) Hansgirg		0.005	0.009	
Tetraedron minimum (A. Br.) Hansgirg	0.018	0.013	0.022	0.009
Tetrastrum staurogeanieforme (Schroed.) Lemm.		0.006	0.005	
Total	2.072	2.06	1.981	1.91

<i>Cryptophyta</i>				
Cryptomonas erosa Ehrenberg	0.648	0.583	0.842	0.308
Cryptomonas marssonii Skuja	0.051	0.145	0.101	
Cryptomonas ovata Ehrenberg		0.239	0.399	
<i>Cryptomonas rostrata</i> Troitzskaja emend I. Kiselev	0.42	0.051	0.168	
Rhodomonas minuta Skuja	0.565	0.593	0.48	0.508
Total	1.684	1.611	1.99	0.816
<i>Dinophyta</i>				
Peridinopsis berolinense (Lemm.) Bourrelly	0.368	0.368	0.368	
Peridiniopsis cuningtonii Lemm.	4.312	4.704	4.704	1.96
<i>Peridinium cinctum</i> (O.F. Müller) Ehrenberg	0.706	0.698	0.706	0.707
Peridinopsis elpatiewskyi (Ostenf.) Bourrelly	0.64	0.96	0.64	
Total	6.026	6.73	6.418	2.667
<i>Euglenophyta</i>				
Trachelomonas volocina Ehrenberg		0.062		
Euglena pisciformis Klebs		0.314	0.157	
Total		0.376	0.157	
<i>Chrysophyceae</i>				

Erkenia subaequiciliata Skuja	0.133	1.314	1.254	0.876
Dinobryon sociale Ehrenberg	0.474	0.562	0.429	0.148
Dinobryon divergens Imhof	0.292	0.219	0.599	0.201
Dinobryon bavaricum Imhoff	0.672	0.665	0.853	0.409
Dinobryon crenulatum W. et G.S. West	0.128	0.171	0.227	0.107
Total	1.699	2.931	3.362	1.741

Annex 13. Phytoplankton quantity (ind./ml) in the epilimnion layer (1m) of Lake Durowskie in July 2010.							
	Aerator				Middle	Aerator	Middle
	1	Outflow	Inflow	North	1a	2	1b
<i>Cyanoprokaryota</i>							
Aphanizomenon flos-aquae (L.) Ralfs	+	+	+	+	+	+	+
Aphanizomenon aphanizomenoides (Forti) Hort. & Kom.							

Aphanizomenon gracile Lemmerman							
Aphanizomenon isatschenkoi (Usacc.) Pros. - Lavrenko		+			+		+
<i>Aphanocapsa incerta</i> (Lemm.) Cronberg et Komarek						+	
Chroococcus limneticus Lemm.							
Jaaginema pseudogeminatum (Schmid) Anagn. et Kom.							+
Limnothrix redekei (Van Goor) Meffert	+	+	+	+	+	+	+
Microcystis aeruginosa Kützing							
Microcystis flos-aquae (Wittrock) Kirchner	+				+		
Phormidium granulatum Gardn. Anagn.			+	+	+	+	
<i>Planktolyngbya limnetica</i> (Lemm.) Kom. – Legn. Et Cronenberg			+	+	+	+	+
<i>Planktothrix agardhii</i> (D.C. ex Gom.) Anagn. et Kom.	+	+	+	+	+	+	+
Pseudanabaena limnetica (Lemm.) Kom.	+		+	+	+	+	+
Spirulina laxissima (W. West)					+	+	
Cyanogranis feruginea (Wawrik) Hind.						+	
<i>Bacillariophyceae</i>							
Achnanthes minutissima Kützing		+					
Achnanthes exigua Grun.					+	+	
Amphora ovalis Kützing	+		+		+		+

<i>Amphora pediculus</i> (Kütz.) Grun.					+		+
<i>Cocconeis euglypta</i> (Ehr.) Clevei							
<i>Cocconeis placentula</i> Ehr.				+	+		+
<i>Cyclotella meneghiniana</i> Kütz.			+				
<i>Cyclotella ocellata</i> Pant.	+	+		+	+	+	+
<i>Cyclotella operculata</i> (Ag.) Kützing			+				
<i>Cyclotella radiosa</i> (Grun.) Lemm.	+	+	+	+	+	+	+
<i>Cymbella minuta</i> Hilse ex Rabenhorst			+				+
<i>Fragilaria crotonensis</i> Kitton							
<i>Fragilaria pinnata</i> Ehr.							
<i>Fragilaria ulna</i> (Nitzsch) Lange-Bertalot	+	+	+	+	+	+	+
<i>Fragilaria ulna</i> var. <i>angustissima</i> Sippen	+	+	+	+	+	+	+
<i>Gomphonema olivaceum</i> (Horn.) Breb.				+			+
<i>Melosira varians</i> Ag.							
<i>Navicula cincta</i> (Ehr.) Ralfs	+						
<i>Navicula mensiculus</i> Schumann							
<i>Navicula radiosa</i> Kützing			+				+
<i>Naviula</i> sp.						+	

Chlorophyta

Monoraphidium komarkovae Nygaard			+				
Chlamydomonas globosa Snow			+				
Chlamydomonas passiva Skuja	+			+	+	+	+
Closterium acutum var. variabile (Lemm.) Krieg.	+			+		+	+
Closterium gracile Brebisson ex Ralfs							
Coelasrum astroideum De Notaris	+			+	+	+	+
Coelastrum microporum Naegel.	+						+
Coelastrum reticulatum (Dang.) Senn							
Cosmarium abbreviatum Raciborski					+		
Cosmarium phaseolus Brebisson in Ralfs	+	+					+
Cosmarium regnellii Wille	+	+	+	+	+	+	+
Crucigenia quadrata Morren							
<i>Crucigenia tetrapedia</i> (Kirchner) W. et G.S. West	+						
Desmodesmus communis (Hegew.) Hegew.	+	+	+	+	+	+	+
<i>Desmodesmus subspicatus</i> (Chod.) Hegew. et Schmidt					+		+
Desmodesmus naegellii (Meyen) Hegew.		+					
Desmodesmus opoliensis (Rchter) Hegew.							+

Dictyosphaerium pulchellum Wood			+	+	+		+
Didymocystis planctonica Korsikov							
Elkatothrix gelatinosa Wille	+	+	+	+	+	+	+
Golenkinia radiata Chodat	+	+	+	+	+	+	+
Kirchneriella contorta var. elegans (Schmidle) Bohlin		+					
Koliella longiseta (Vischer) Hindak							
Monoraphidium arcuatum (Kors.) Hindak							
Monoraphidium circinale (Nyg.) Nygaard							
Monoraphidium contortum (Thur.) Kom.-Legn.	+		+	+	+	+	+
Monoraphidium griffithii (Berk.) Kom.-Legn.					+		
Monoraphidium irregulare (G.M. Sm.) Kom.-Legn.						+	
<i>Monoraphidium mirabile</i> (W. et G.S. West) Pankow							
Monoraphidium obtusum (Kors.)Kom. - Legn.							
Oocystis lacustris Chodat	+		+	+	+	+	+
<i>Pandorina morum</i> (O.F. Müller) Bory					+		
Pediastrum tetras (Ehr.) Ralfs				+			
Phacotus lenticularis (Ehr.) Stein	+	+		+	+	+	+
Phacotus lendneri Chodat.							

<i>Pteromonas cordiformis</i> Lemm.							
<i>Pteromonas cordiformis</i> (Carter) Lemm.							+
<i>Scenedesmus acuminatus</i> (Lager.) Chodat							
<i>Scenedesmus bicaudatus</i> Dedusenko	+			+			
<i>Scenedesmus ecornis</i> (Ehr.) Chod.				+			
<i>Sphaerocystis planctonica</i> (Korsikov) Bourrelly							+
<i>Tetraedron caudatum</i> (Corda) Hansgirg							
<i>Tetraedron minimum</i> (A. Br.) Hansgirg	+	+	+	+	+	+	+
<i>Tetraedron triangulare</i> (Chod.) Kom.	+		+	+	+	+	+
<i>Tetrastrum glabrum</i> (Roll) Ahlstr. et Tiff							
<i>Tetrastrum staurogeanieforme</i> (Schroed.) Lemm.	+			+	+		+
<i>Pteromonas angulosa</i> (Carter) Lemm.	+		+	+	+	+	+
<i>Treubaria schmidlei</i> (Schroeder) Fott et Kovacik	+				+		
<i>Cryptophyta</i>							
<i>Chroomonas acuta</i> Uterm.							
<i>Cryptomonas erosa</i> Ehrenberg	+	+	+	+	+	+	+
<i>Cryptomonas marssonii</i> Skuja	+		+	+	+	+	+
<i>Cryptomonas ovata</i> Ehrenberg	+				+	+	+

<i>Cryptomonas rostrata</i> Troitzskaja emend I. Kiselev	+		+	+	+	+	+
<i>Rhodomonas minuta</i> Skuja	+	+	+	+	+	+	+
<i>Dinophyta</i>							
<i>Peridiniopsis berolinense</i> (Lemm.) Bourrelly	+		+	+	+	+	+
<i>Ceratium hirundinella</i> (F. B. Müller) Bergh							
<i>Gymnodinium albulum</i> Lindemann							
<i>Gymnodinium aeruginosum</i> Stein							
<i>Peridiniopsis cuningtonii</i> Lemm.	+	+	+	+	+	+	+
<i>Peridinium cinctum</i> (O.F. Müller) Ehrenberg	+	+	+	+	+	+	+
<i>Peridiniopsis elpatiewskyi</i> (Ostenf.) Bourrelly	+		+	+	+	+	+
<i>Euglenophyta</i>							
<i>Trachelomonas hispida</i> (Perty) Stein	+					+	
<i>Trachelomonas volocina</i> Ehrenberg	+				+	+	
<i>Euglena pisciformis</i> Klebs	+		+	+	+		+
<i>Phacus mirabilis</i> Pochmann							
<i>Colacium vesiculosum</i> Ehr.						+	
<i>Chrysophyceae</i>							
<i>Erkenia subaequiciliata</i> Skuja	+	+	+	+	+	+	+

Dinobryon sociale Ehrenberg	+	+	+	+	+	+	+
Dinobryon divergens Imhof	+	+	+	+	+	+	+
Dinobryon bavaricum Imhoff	+	+	+	+	+	+	+
Dinobryon crenulatum W. et G.S. West	+	+	+		+	+	+

Annex 14. List of diatom species found in periphyton communities in Lake Durowskie during July 2010.

<u>DIATOM SPECIES</u>	<u>PREFERENCES</u>	
	<u>Trophy</u>	<u>Oxygen</u>
<u><i>Achnanthes exigua</i></u>	cosmopolitic	100%
<u><i>Achnanthes lanceolata</i></u>	eutrophy	50%
<u><i>Achnanthes lanceolata v. elliptica</i></u>	eutrophy	-
<u><i>Achnanthes minutissima</i></u>	cosmopolitic	100%
<u><i>Achnanthes minutissima var. lanceolata</i></u>	eutrophy	-
<u><i>Amphora ovalis</i></u>	eutrophy	75%
<u><i>Amphora pediculus</i></u>	eutrophy	75%
<u><i>Aulacoseira granulata</i></u>	eutrophy	50%
<u><i>Aulacoseira muzzanensis</i></u>	eutrophy	-
<u><i>Caloneis amphisbaena</i></u>	eutrophy	50%
<u><i>Caloneis bacillum</i></u>	eutrophy	75%
<u><i>Caloneis silicula</i></u>	eutrophy	75%
<u><i>Caloneis silicula v. truncata</i></u>	eutrophy	75%
<u><i>Cocconeis euglypta</i></u>	eutrophy	50%
<u><i>Cocconeis placentula</i></u>	eutrophy	50%
<u><i>Cocconeis placentula v. lineata</i></u>	eutrophy	50%

<i>Cyclotella meneghiniana</i>	<u>eutrophy</u>	10%
<i>Cyclotella ocellata</i>	<u>eutrophy</u>	100%
<i>Cyclotella operculata</i>	<u>eutrophy</u>	-
<i>Cyclotella radiosa</i>	<u>eutrophy</u>	75%
<i>Cyclotella steligera</i>	<u>eutrophy</u>	75%
<i>Cymatopleura solea</i>	<u>eutrophy</u>	50%
<i>Cymbella affinis</i>	<u>eutrophy</u>	100%
<i>Cymbella amphicephala</i>	<u>mesotrophy</u>	100%
<i>Cymbella microcephala</i>	<u>eutrophy</u>	100%
<i>Cymbella minuta</i>	<u>cosmopolitic</u>	-
<i>Cymbella turgida</i>	<u>mesotrophy</u>	-
<i>Diatoma vulgare</i>	<u>eutrophy</u>	75%
<i>Epithemia argus</i>	<u>mesotrophy</u>	-
<i>Eunotia exigua</i>	<u>cosmopolitic</u>	75%
<i>Eunotia praerupta</i>	<u>mesotrophy</u>	100%
<i>Fragilaria capucina v. vaucherie</i>	<u>eutrophy</u>	50%
<i>Fragilaria crotonensis</i>	<u>mesotrophy</u>	75%
<i>Fragilaria pinnata</i>	<u>cosmopolitic</u>	100%
<i>Fragilaria ulna</i>	<u>cosmopolitic</u>	50%
<i>Fragilaria ulna var. angustissima</i>	<u>cosmopolitic</u>	75%
<i>Fragilaria ulna var. biceps</i>	<u>eutrophy</u>	75%

<u>Gomphonema acuminatum</u>	<u>eutrophy</u>	<u>75%</u>
<u>Gomphonema affine</u>	<u>mesotrophy</u>	<u>75%</u>
<u>Gomphonema capitatum</u>	<u>mesotrophy</u>	<u>75%</u>
<u>Gomphonema olivaceum</u>	<u>eutrophy</u>	<u>75%</u>
<u>Gomphonema parvulum</u>	<u>eutrophy</u>	<u>30%</u>
<u>Gomphonema truncatum</u>	<u>eutrophy</u>	<u>75%</u>
<u>Gyrosigma attenuatum</u>	<u>eutrophy</u>	<u>50%</u>
<u>Meridion circulare</u>	<u>cosmopolitic</u>	<u>75%</u>
<u>Navicula anglica</u>	<u>eutrophy</u>	<u>50%</u>
<u>Navicula cincta</u>	<u>eutrophy</u>	<u>50%</u>
<u>Navicula cryptocephala</u>	<u>cosmopolitic</u>	<u>50%</u>
<u>Navicula cuspidata</u>	<u>eutrophy</u>	<u>50%</u>
<u>Navicula exigua</u>	<u>eutrophy</u>	<u>100%</u>
<u>Navicula gastrum</u>	<u>eutrophy</u>	<u>75%</u>
<u>Navicula gregaria</u>	<u>eutrophy</u>	<u>30%</u>
<u>Navicula capitata var. hungarica</u>	<u>eutrophy</u>	<u>50%</u>
<u>Navicula placentula f. rostrata</u>	<u>eutrophy</u>	<u>75%</u>
<u>Navicula pupula</u>	<u>eutrophy</u>	<u>50%</u>
<u>Navicula radiosa</u>	<u>eutrophy</u>	<u>75%</u>
<u>Navicula reinhardtii</u>	<u>eutrophy</u>	<u>75%</u>
<u>Navicula rhynchocephala</u>	<u>eutrophy</u>	-

<u>Navicula scuteloidea</u>	<u>eutrophy</u>	<u>75%</u>
<u>Navicula tripunctata</u>	<u>eutrophy</u>	<u>75%</u>
<u>Navicula veneta</u>	<u>eutrophy</u>	<u>30%</u>
<u>Navicula viridula</u>	<u>eutrophy</u>	<u>75%</u>
<u>Nitzschia amphibia var. amphibia</u>	<u>eutrophy</u>	<u>50%</u>
<u>Nitzschia incospicua</u>	<u>eutrophy</u>	<u>50%</u>
<u>Nitzschia palacea</u>	<u>eutrophy</u>	<u>50%</u>
<u>Nitzschia palea</u>	<u>hypertrophy</u>	<u>30%</u>
<u>Nitzschia recta</u>	<u>cosmopolitic</u>	<u>75%</u>
<u>Nitzschia sigmoidea</u>	<u>eutrophy</u>	<u>50%</u>
<u>Pinnularia maior</u>	<u>eutrophy</u>	<u>75%</u>
<u>Pinnularia microstauron</u>	<u>cosmopolitic</u>	<u>50%</u>
<u>Pinnularia viridis</u>	<u>cosmopolitic</u>	<u>50%</u>
<u>Rhopalodia gibba</u>	<u>eutrophy</u>	<u>50%</u>
<u>Stauroneis phoenicentron</u>	<u>eutrophy</u>	<u>50%</u>
<u>Stephanodiscus hantzschii</u>	<u>hyertrophy</u>	<u>30%</u>
<u>Stephanodiscus minutulus</u>	<u>hypertrophy</u>	<u>50%</u>
<u>Surirella ovalis</u>	<u>eutrophy</u>	<u>30%</u>
<u>Surirella robusta var splendida</u>	<u>eutrophy</u>	<u>75%</u>
<u>Tabellaria fenestrata</u>	<u>mesotrophy</u>	<u>100%</u>

Annex 15. Values of the evenness index and diversity index of phytoplankton algae for Lake Durowskie in July 2010.

	Shannon-Weaver						
	Aerator 1	Aerator 2	Middle 1a	Middle 1b	Inflow	Outflow	North
05.07.2010	1,6	2,85	2,96	2,96			
06.07.2010	3,68	3,41	3,97	3,49			
07.07.2010	3,2	3,05	3,05	3,18			
08.07.2010	3,45	3,39	3,37	3,29	3,3		3,89
09.07.2010	3,64	3,63	3,89	3,58			
10.07.2010	3,73		3,89	3,9		3,54	
21.06.2008	3,9						
20.07.2008	3,58						
	Aerator 1	Aerator 2	Middle 1a	Middle 1b	Inflow	Outflow	North
Average	3,3475	3,266	3,521667	3,4	3,3	3,54	3,89

	Evenness						
	Aerator 1	Aerator 2	Middle 1a	Middle 1b	Inflow	Outflow	North
05.07.2010	0,46	0,77	0,83	0,57			
06.07.2010	0,76	0,73	0,78	0,71			
07.07.2010	0,77	0,65	0,72	0,75			
08.07.2010	0,71	0,72	0,76	0,64	0,61		0,6
09.07.2010	0,75	0,71	0,76	0,72			
10.07.2010	0,77		0,76	0,77		0,68	
21.06.2008	0,68						
20.07.2008	0,63						
	Aerator 1	Aerator 2	Middle 1a	Middle 1b	Inflow	Outflow	North
Average	0,69125	0,716	0,768333	0,693333	0,61	0,68	0,6

Annex 16. Dominant Species of phytoplankton in lake Durowskie [%].

(Num- Number; Bio- Biomass)

Dominant species	Aerator 1		Aerator 2		Middle 1a		Middle 1b		Inflow		Outflow		North	
	Num	Bio	Num	Bio	Num	Bio	Num	Bio	Num	Bio	Num	Bio	Num	Bio
05.07.10														
<i>Cyclotella radiosa</i> (Grun.) Lemm.			16%											
<i>Dinobryon divergens</i> Imhof					27%									
<i>Dinobryon sociale</i> Ehrenberg							10%							
<i>Erkenia subaequiciliata</i> Skuja	34%		30%		13%		58%							
<i>Fragilaria ulna</i> (Nitzsch) Lange-Bertalot	30%	18%	18%	15%	44%	51%	7%	8%						
<i>Fragilaria ulna</i> var. <i>angustissima</i> Sippen								7%						
<i>Peridiniopsis berolinense</i> (Lemm.) Bourrelly		7%		30%										
<i>Peridiniopsis cuningtonii</i> Lemm.	15%	66%					13%		50%					
<i>Peridiniopsis elpatiewskyi</i> (Ostenf.) Bourrelly				16%			22%							
06.07.10														
<i>Cryptomonas erosa</i> Ehrenberg			5%	15%										
<i>Dinobryon divergens</i> Imhof	10%		4%				4%							

Erkenia subaequiciliata Skuja	52%		72%		80%	13%	65%							
<i>Fragilaria ulna</i> (Nitzsch) Lange-Bertalot	9%	13%			4%	14%	6%	11%						
<i>Fragilaria ulna</i> var. <i>angustissima</i> Sippen		21%		14%	2%	17%		12%						
<i>Peridiniopsis berolinense</i> (Lemm.) Bourrelly				13%										
<i>Peridiniopsis cuningtonii</i> Lemm.		15%						34%						
07.07.10														
<i>Aphanocapsa incerta</i> (Lemm.) Cronberg et Komarek			10%											
<i>Cosmarium regnellii</i> Wille		10%												
<i>Dinobryon divergens</i> Imhof	20%				9%		17%	11%						
Erkenia subaequiciliata Skuja			43%		60%		21%							
<i>Fragilaria ulna</i> (Nitzsch) Lange-Bertalot	16%	17%	7%	10%			21%	24%						
<i>Fragilaria ulna</i> var. <i>angustissima</i> Sippen	15%	31%		8%		13%		27%						
<i>Peridiniopsis cuningtonii</i> Lemm.				46%		36%								
<i>Phacotus lenticularis</i> Chodat.						11%								
<i>Phacotus lenticularis</i> (Ehr.) Stein					10%									
08.07.10														
<i>Dinobryon sociale</i> Ehrenberg			9%				8%							
Erkenia subaequiciliata Skuja	21%		41%		71%		57%		28%				46%	

10.07.10

Dinobryon bavaricum Imhoff	3%						4%							
Erkenia subaequiciliata Skuja	62%				56%		60%				55%			
<i>Fragilaria ulna</i> (Nitzsch) Lange-Bertalot	7%	15%			6%	14%	7%	14%			6%	13%		
Fragilaria ulna var. angustissima Sippen		22%			11%	18%	4%	19%			7%	32%		
Peridiniopsis cuningtonii Lemm.		19%				20%		20%				12%		