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SUMMER SCHOOL

Ecological state of the lake during restoration measures

- Algae Group-

Natalia Bartoszek (UAM)
Clemens Kühn (CAU)
Joanna Niedźwiedzińska (UAM)
Liviu Pârâu (UAIC)
Guilherme Stecher Pinto (CAU)

Supervisor: Dr. Beata Messyasz (UAM)

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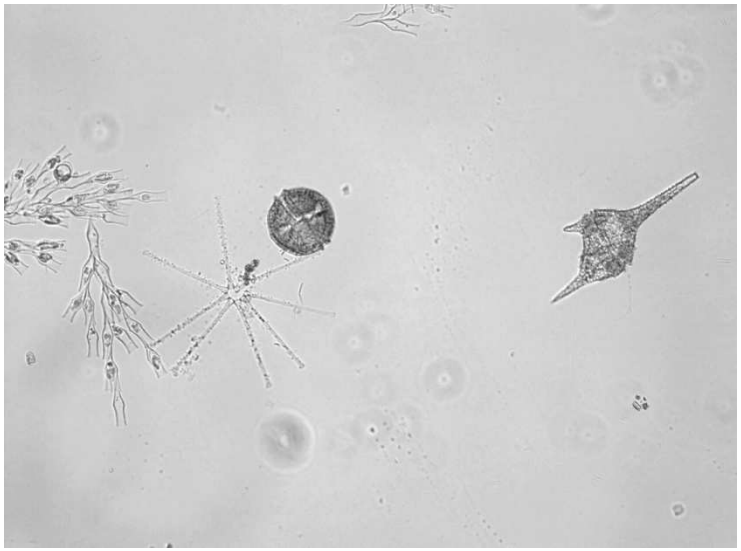
Introduction

- Algae form the basis of the food web in freshwater ecosystems
- adapt fast to environmental changes
- sensitive indicators of pollution and eutrophication

- algae distribution was investigated with following aims:



- ➢ assess water quality
- ➢ monitor development of lake restoration
- ➢ derive hints for further management

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Materials and Methods

- Investigated area – Lake Durowskie, located near Wągrowiec.
- 6 days of field work – 7 sampling sites for phytoplankton

  8 sampling sites for periphyton
- Microscope analysis for obtaining the species index – biomass calculation – Jaccard and Shanon - Weaver index

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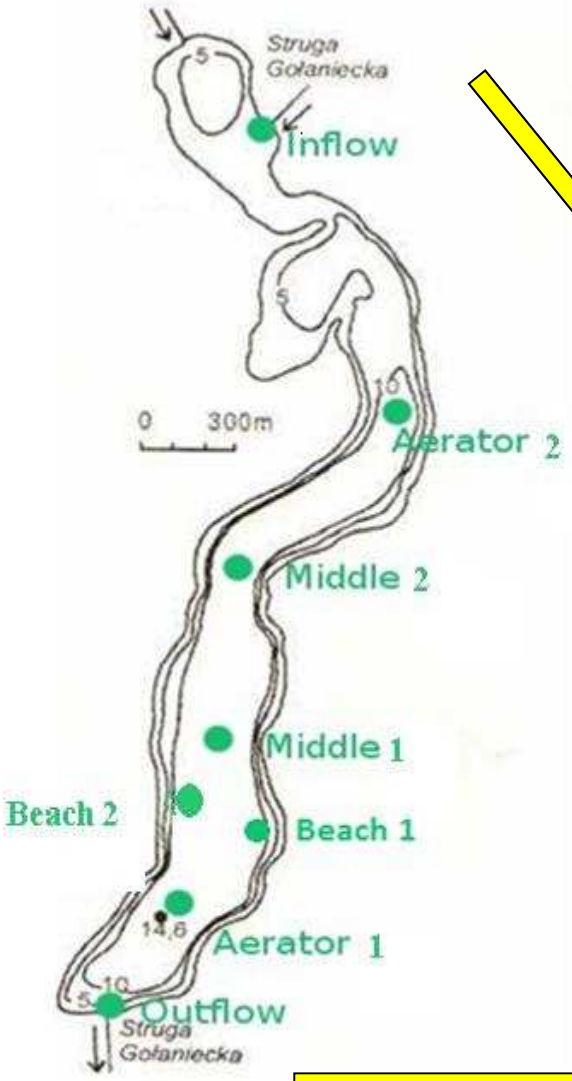

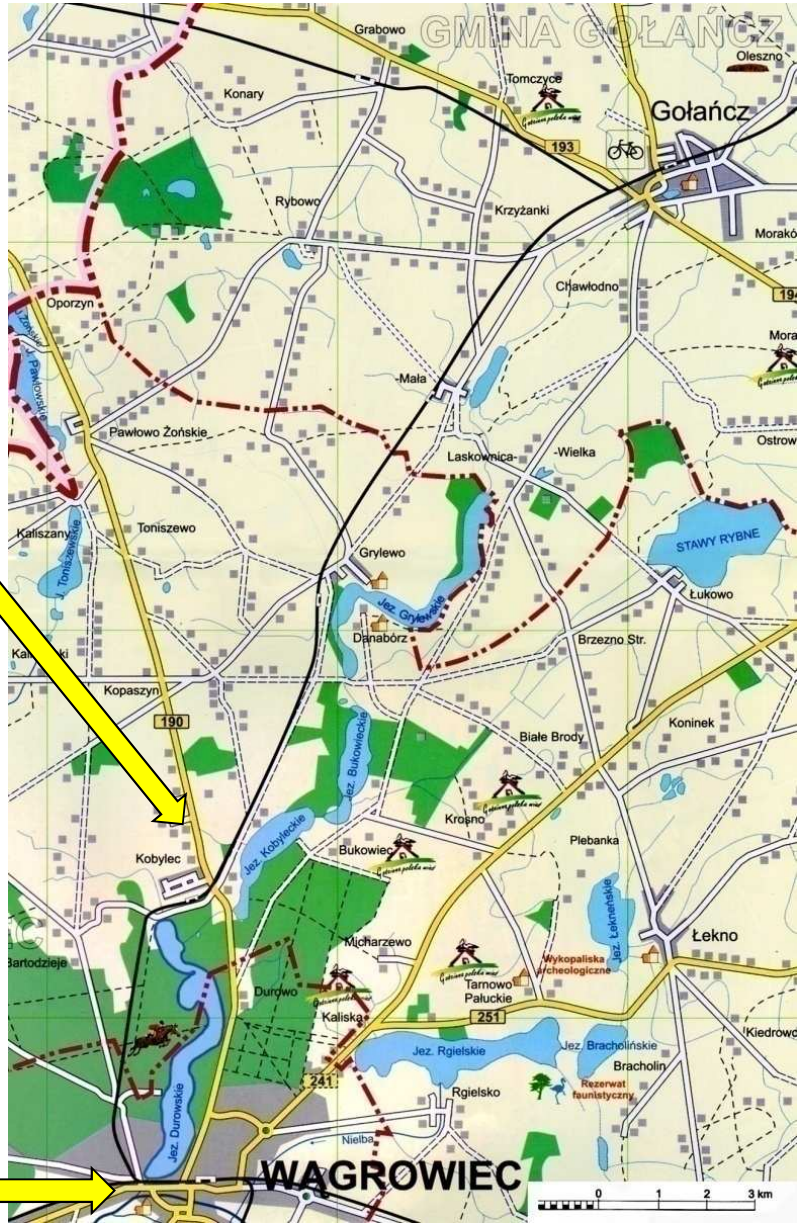

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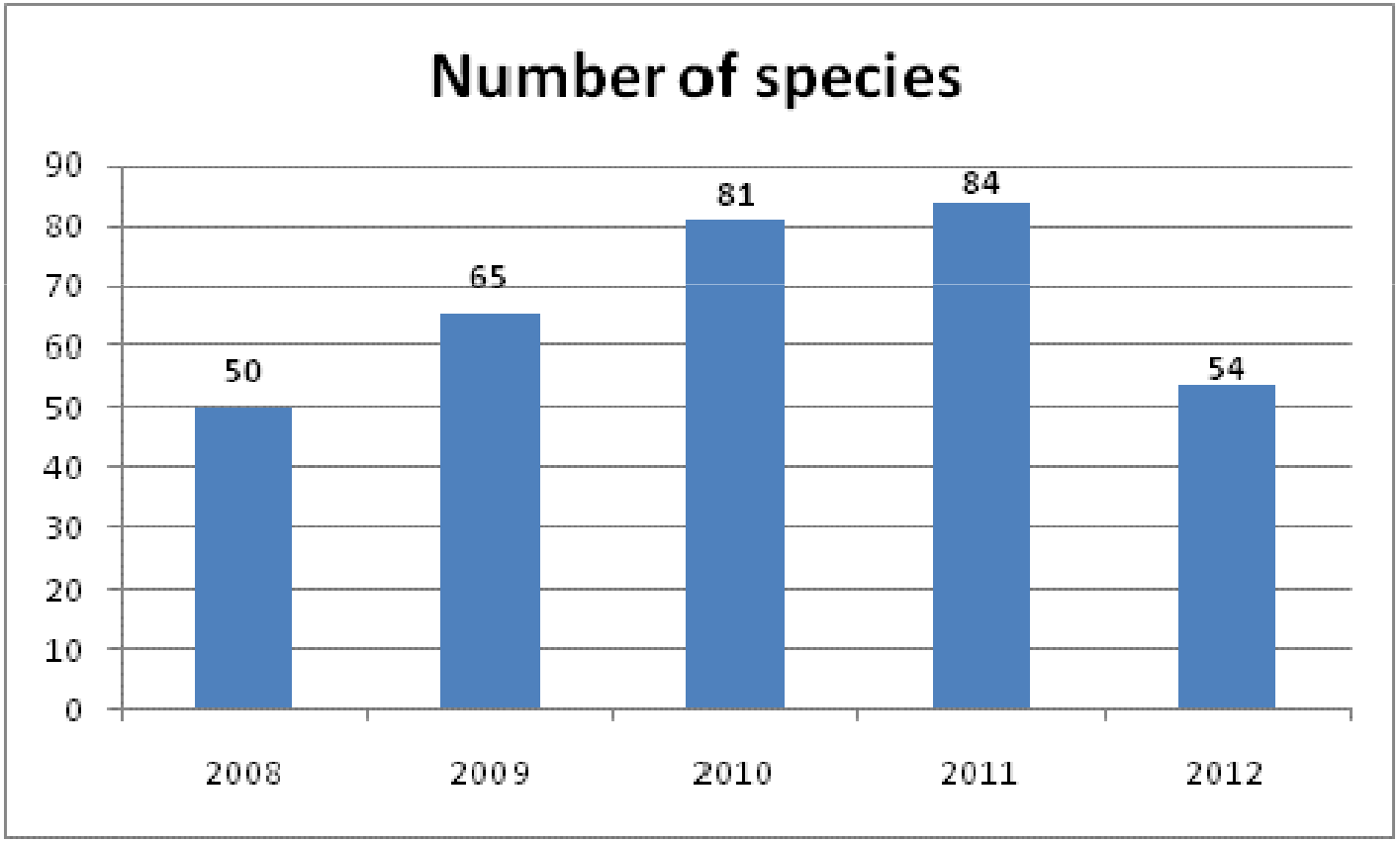
Results



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Mixed index of groups

Station	2008	2009	2010	2011	2012	Trophyc State
Aerator 1	9,67	16	8,3	9	7	Hypertrophy
Aerator 2	-	26	11,5	5	8	Hypertrophy
Middle 1	-	9	12,5	13	3	Eutrophy
Middle 2	-	-	8,3	18	9	Hypertrophy
Inflow	-	-	1,8	17	9	Hypertrophy
Outflow	-	-	6,5	5	-	-
North	-	-	11,5	5,3	-	-
Beach 1	-	-	-	3	9	Hypertrophy
Beach 2	-	-	-	-	5	Eutrophy

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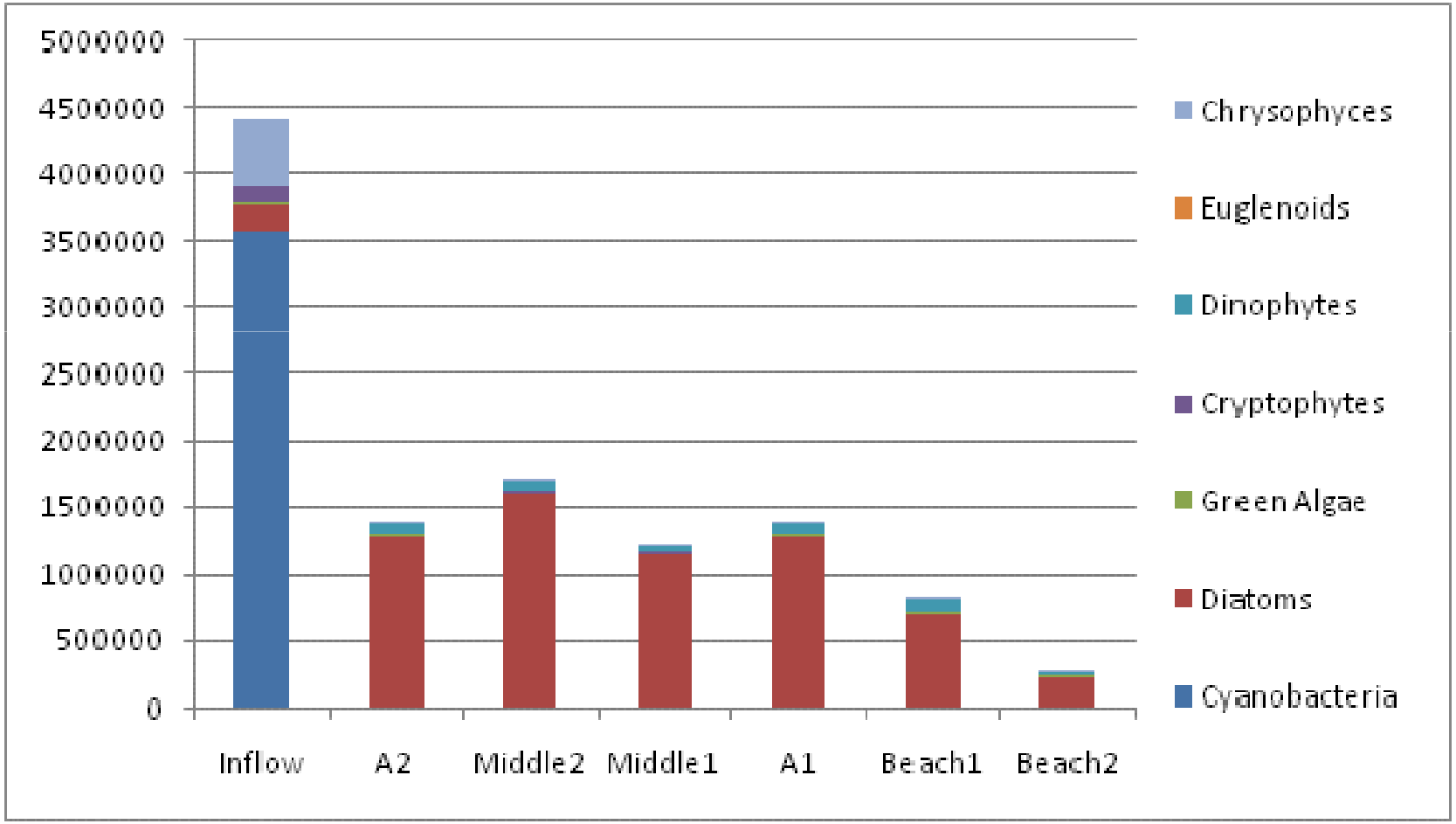
Quantity Dominance



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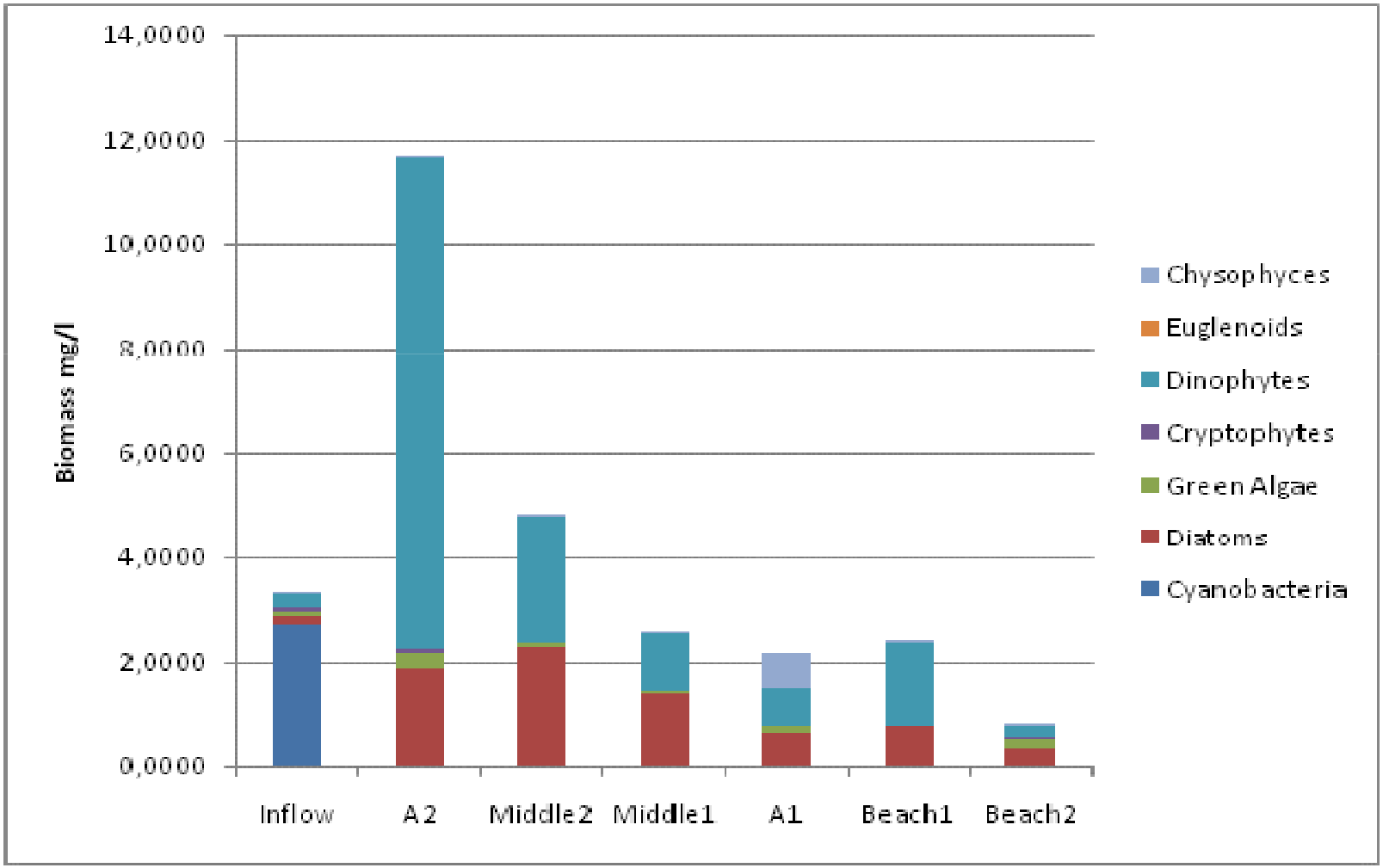
Biomass Dominance



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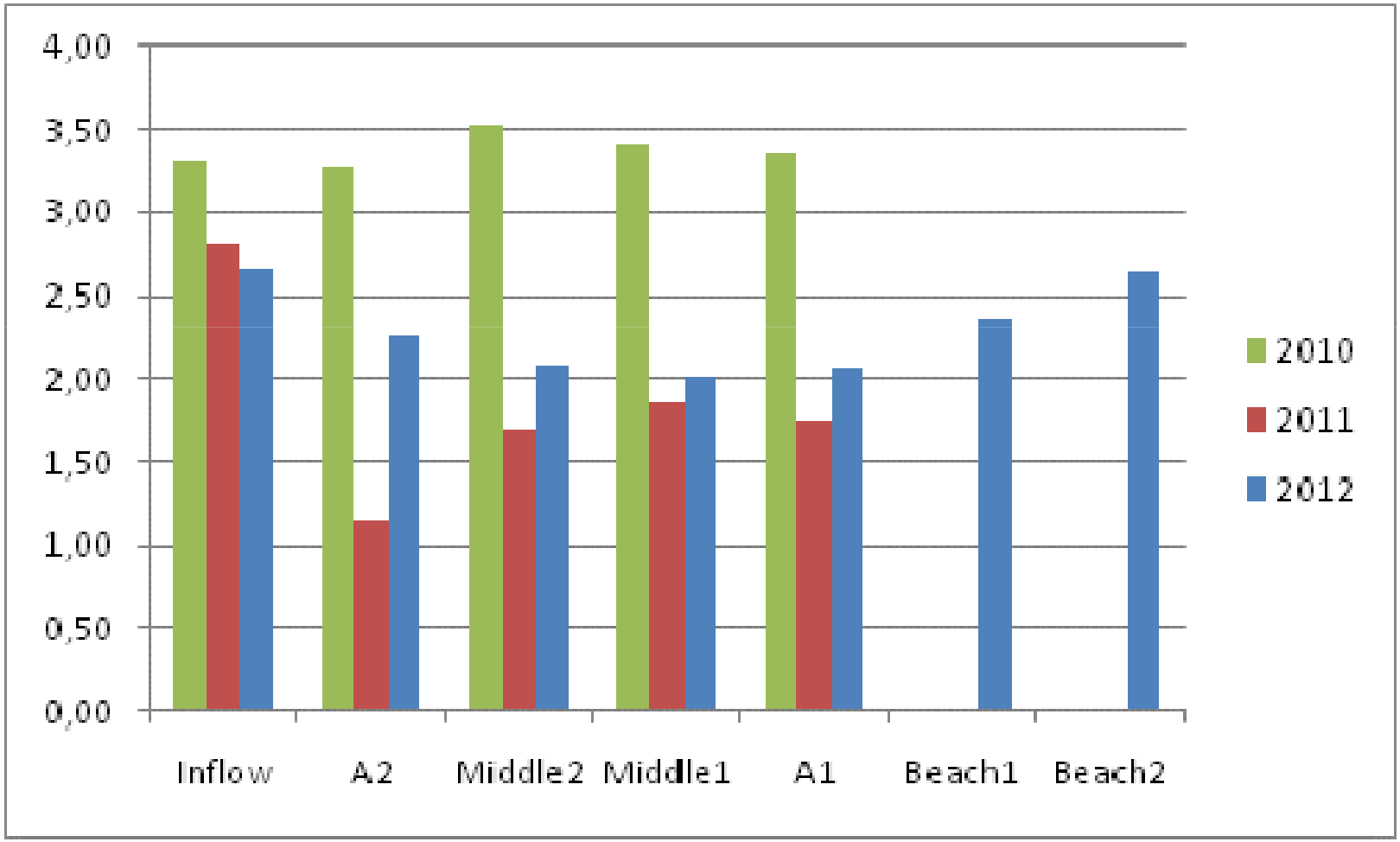
Shannon – Weaver Index



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Jaccard Index

Year	2009	2010	2011	2012
2008	0,84	0,51	0,43	0,33

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Periphyton – dominant species in quantity (%)

	site1	site2	site3	site4	site5	site6	site7	site8
Bacillariophyceae								
Achnanthes exigua Grun.								9
Achnanthes minutissima Kützing	56	12	15	3	6	8	8	8
Amphora ovalis Kützing							9	
Amphora pediculus (Kütz.) Grunow			8			6		6
Cocconeis placentula Ehr.	5	12	7			17	9	19
Cyclotella radiosa (Grun.) Lemm.					6			7
Cymbella affinis Kützing	5	9	8					
Cymbella minuta Hilse		15		5				
Eunotia praerupta Ehr.							8	
Fragilaria arcus (Ehr.) Cleve								
Fragilaria capucina (Desm.) Rabenhorst						8	7	
Fragilaria crotonensis Kitton	5							
Fragilaria martyi (Heribaud) Lange-Bertalot			7					
Fragilaria ulna (Nitzsch) Lange-Bertalot	5							
Gomphonema intricatum Ehr.				21	9			
Gomphonema olivaceum (Horn.) Breb.				12	29	16		
Gomphonema parvulum (Kütz.) Kütz.				44	6			

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Diatom Index

2010	2011	2012
0,29	**0,28**	**0,32**

2010	2011	2012
0,28	**0,26**	**0,33**

2010	2011	2012
0,39	**-**	**0,21**

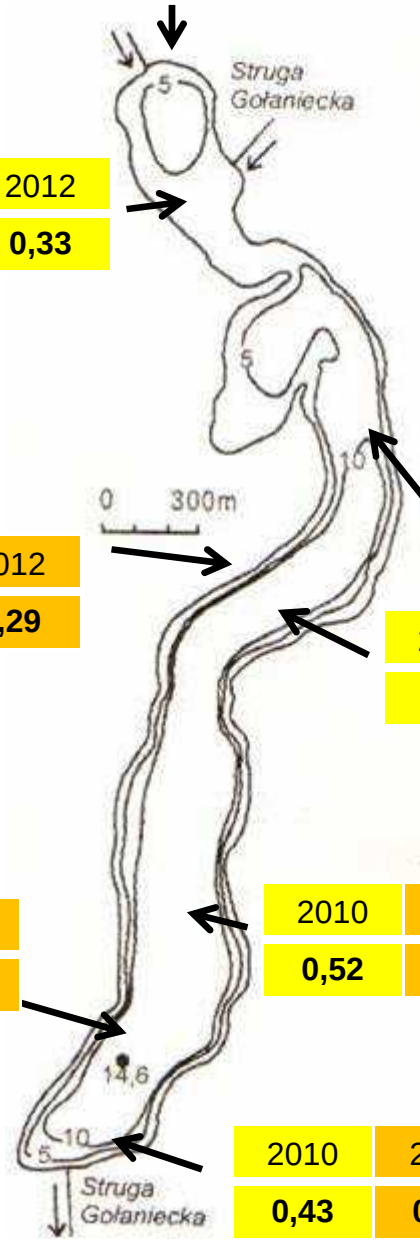
2010	2011	2012
0,43	**0,29**	**0,29**

2010	2011	2012
0,40	**0,20**	**0,54**

2010	2011	2012
0,36	**0,30**	**0,23**

2010	2011	2012
0,52	**0,22**	**0,23**

2010	2011	2012
0,43	**0,23**	**0,31**



> 0,83
0,55
0,30
0,15
<0,15

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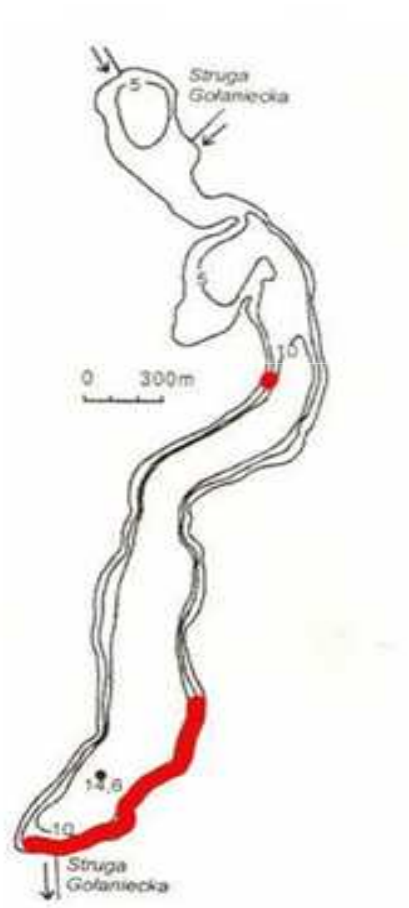
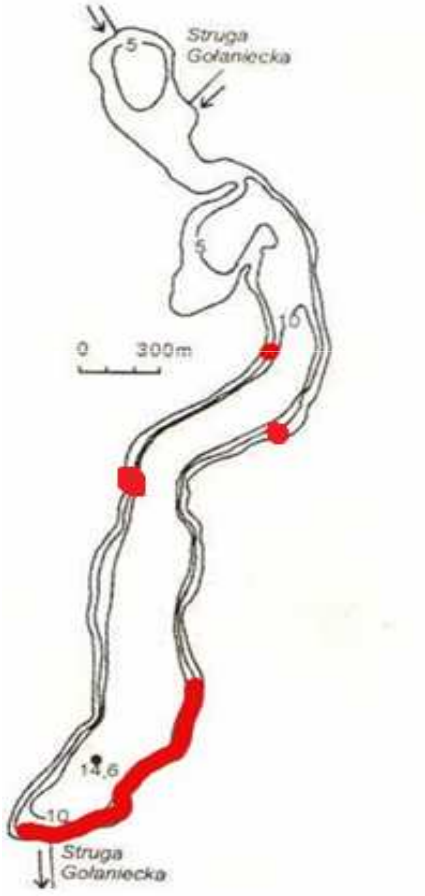
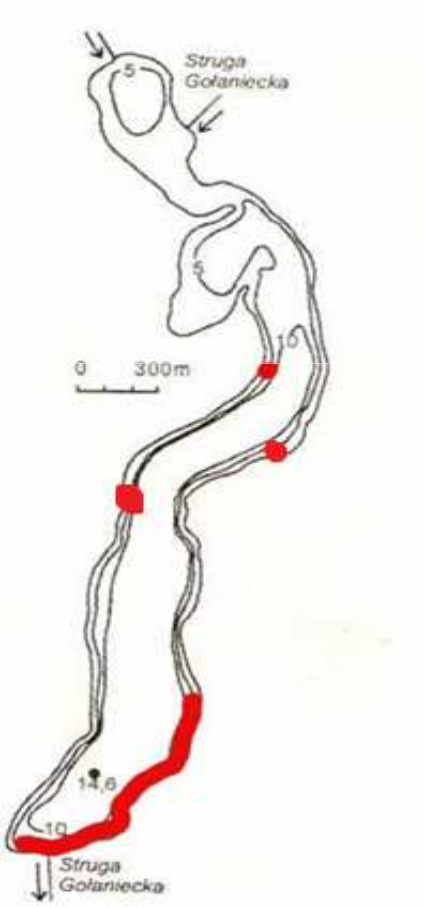
Fresh Water Red Algae – *Hildebrandia rivularis*



2010



2011



2012

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Conclusion

- number of taxa decreased due to zooplankton grazing;
- dominance of Cyanobacteria only in inflow;
- increasing abundance of species indicating high oxygen level;

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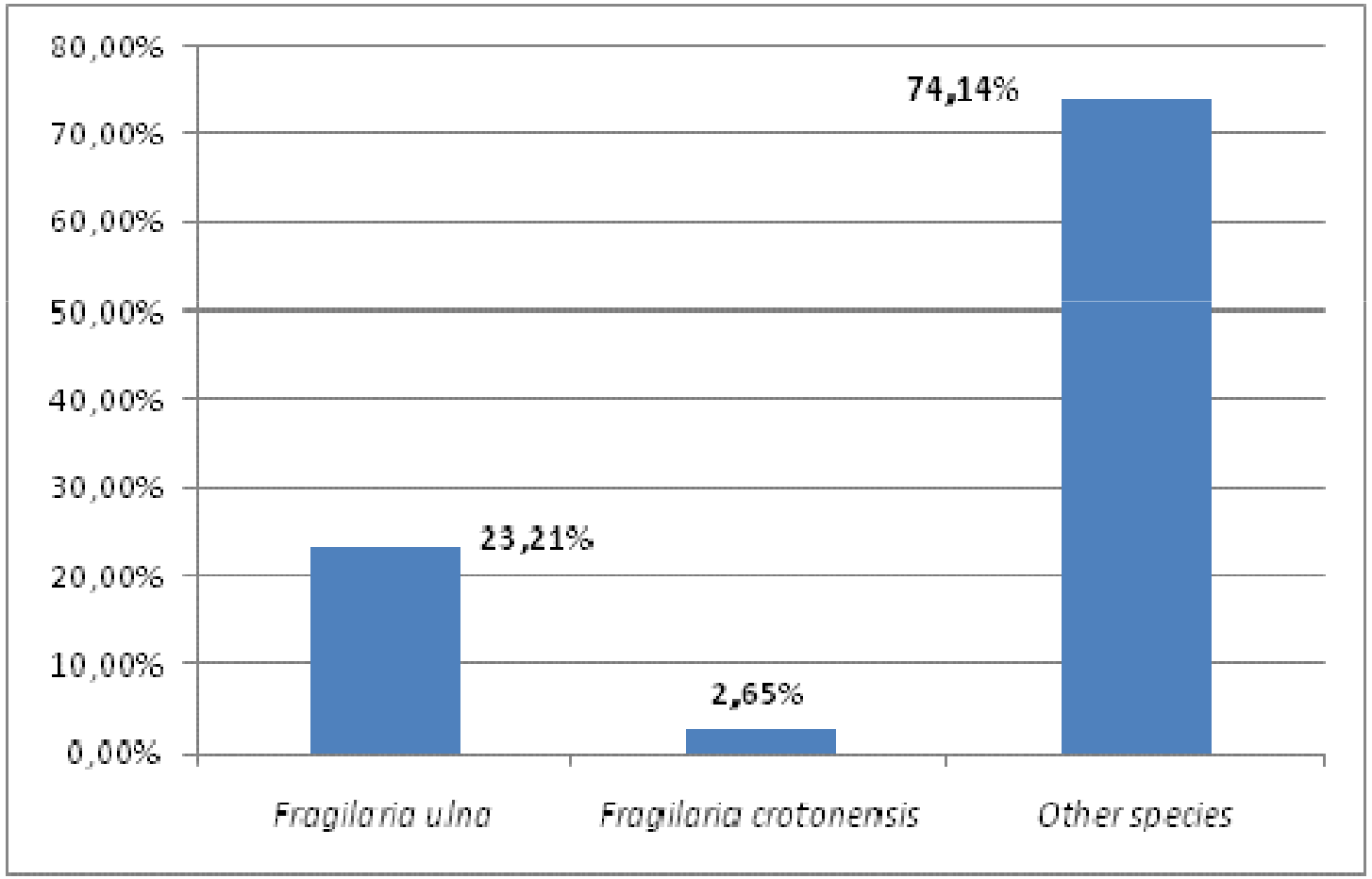
Fragillaria Biomass



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Conclusion

- improvement of water quality shown by mixed index, Jaccard index and diatom index;

Thank you for your attention!