

# The results of Lake Durowskie in Wągrowiec 2010



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# Water Quality in Lake Durowskie Wągrowiec Poland

2010



# Presentation plan

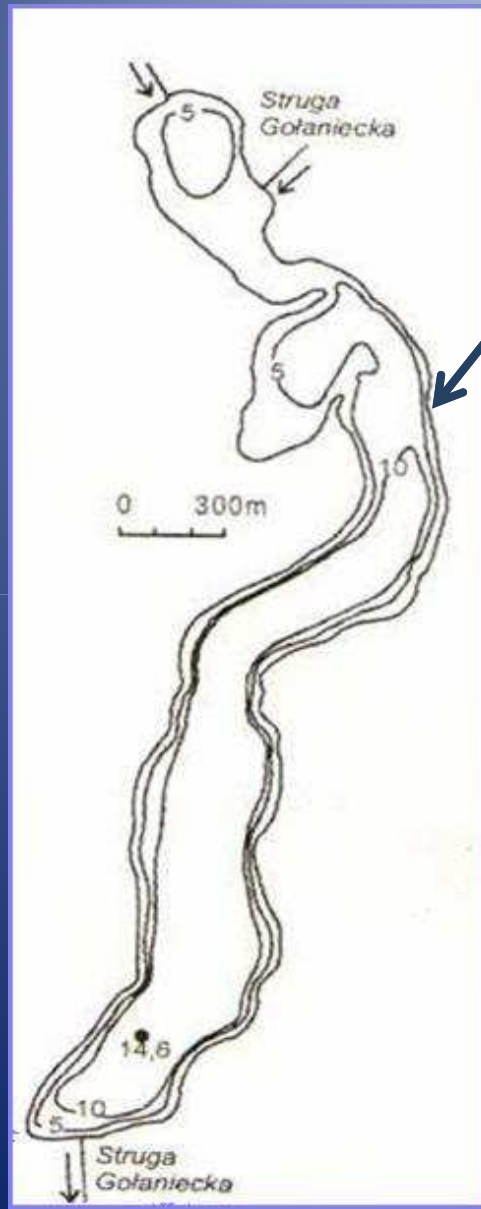
1. Aims
2. Study area
3. Sampling sites
4. Methods
5. Results
6. Comparing results from this year with previous year
7. Conclusions
8. Advices

# 1. Aims

- What is presented trophic state (by TSI) in the lake (different zones and depths) and its tributaries
- What is trophic state (also by TSI) trend from 2009 to now (increase, decrease, others)
- Try to find out reasons probably caused that changes
- Giving some advice, solutions or management strategy

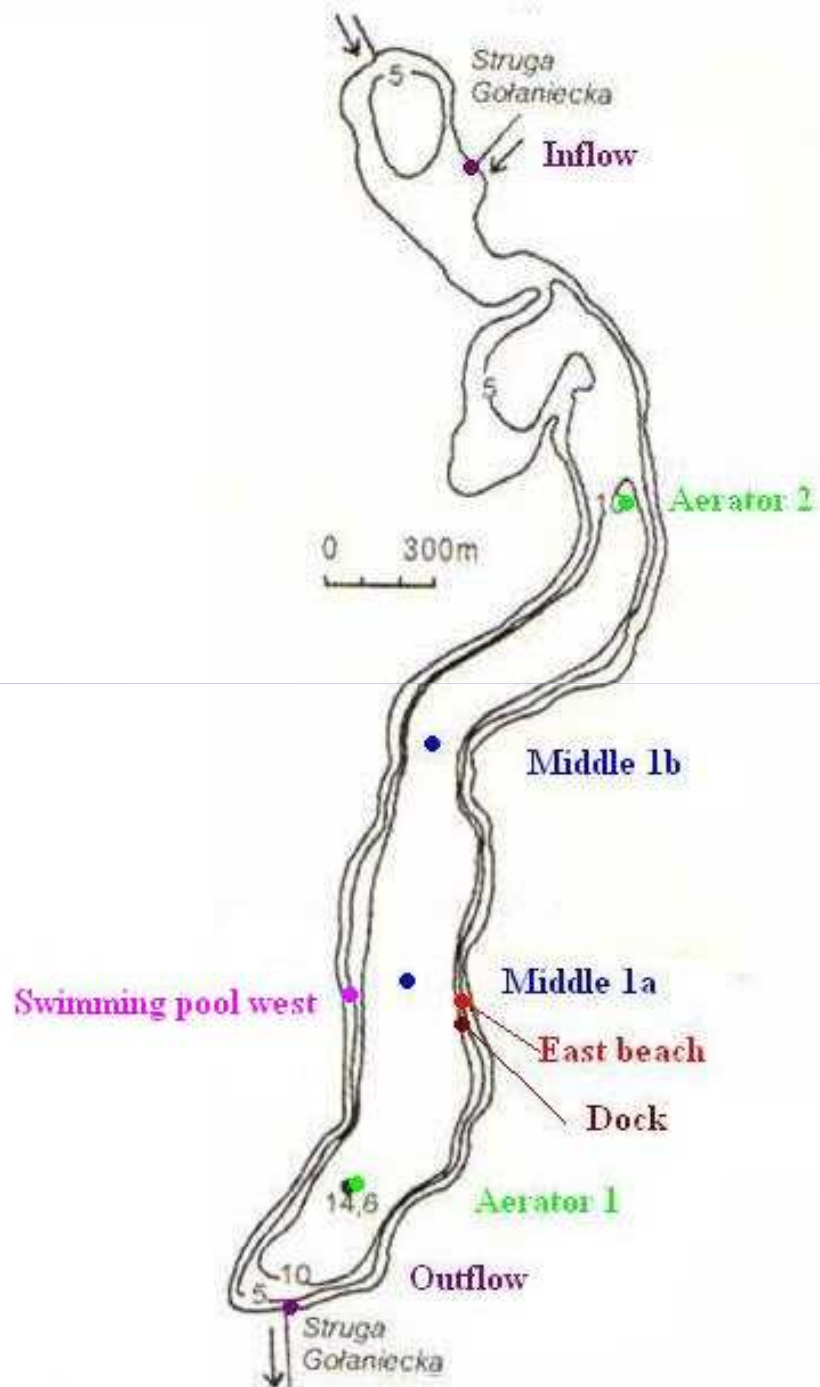


## 2. Study area



Surface	143.7 ha
Volume	11,322,900 m <sup>3</sup>
Max depth	14.6 m
Mean depth	7.9 m
Main tributary	Struga Gołaniecka
Surface of the whole catchment area	236.1 km <sup>2</sup>
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%

# 3. Sampling sites



Number	Sampling sites
1.	Aerator 1
2.	Aerator 2
3.	Middle 1a
4.	Middle 1b
5.	Swimming pool west
6.	East beach
7.	Dock near swimming pool
8.	Inflow
9.	Outflow

# 4. Methods

## Field methods

- Chlorophyll *a* – bathometer
- Water parameters – computer sonde of the YSI incorporated type (556 MPS)
  - Cycle of aerator – counting
- Secchi disc transparency – SD into water
  - Fishing sites and beaches - counting



Bathometer  
used to taking  
samples of  
chlorophyll *a*







Computer  
sonde of the  
YSI  
incorporated  
type (556  
MPS)



YSI



# Chlorophyll *a*

1. Sampling
2. Storage of chlorophyll sample
3. Filtration
4. Drying of filters
5. Storage and preservation of filters
6. Extraction and homogenization
7. Spectrophotometric reading
8. Volume of chlorophyll sample, of acetone and length of cell



# 5. Results

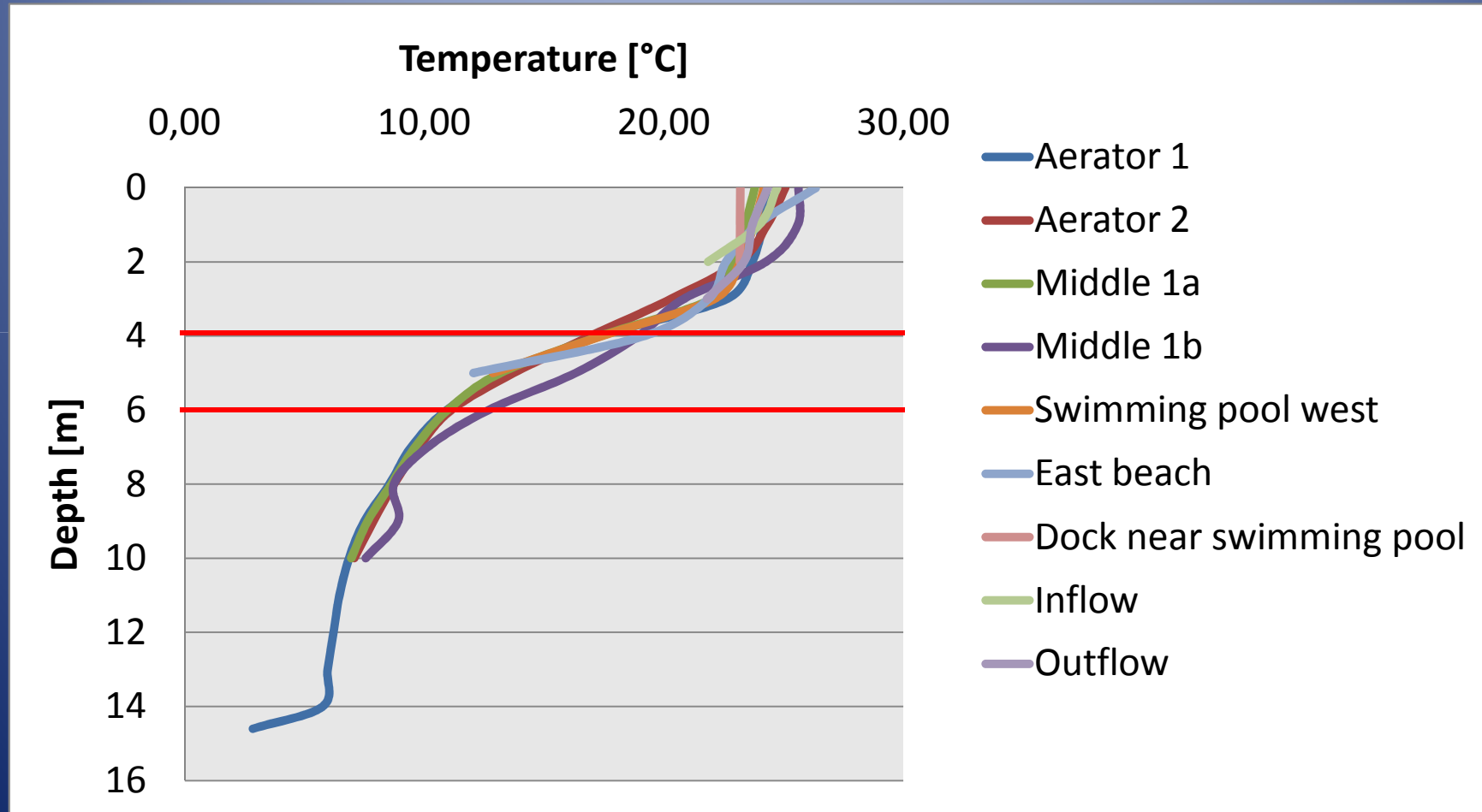
1. Water parameters
2. Cycle of aerators
3. Secchi disc transparency
4. Amount of fishing and swimming localities







# Temperatura [°C]





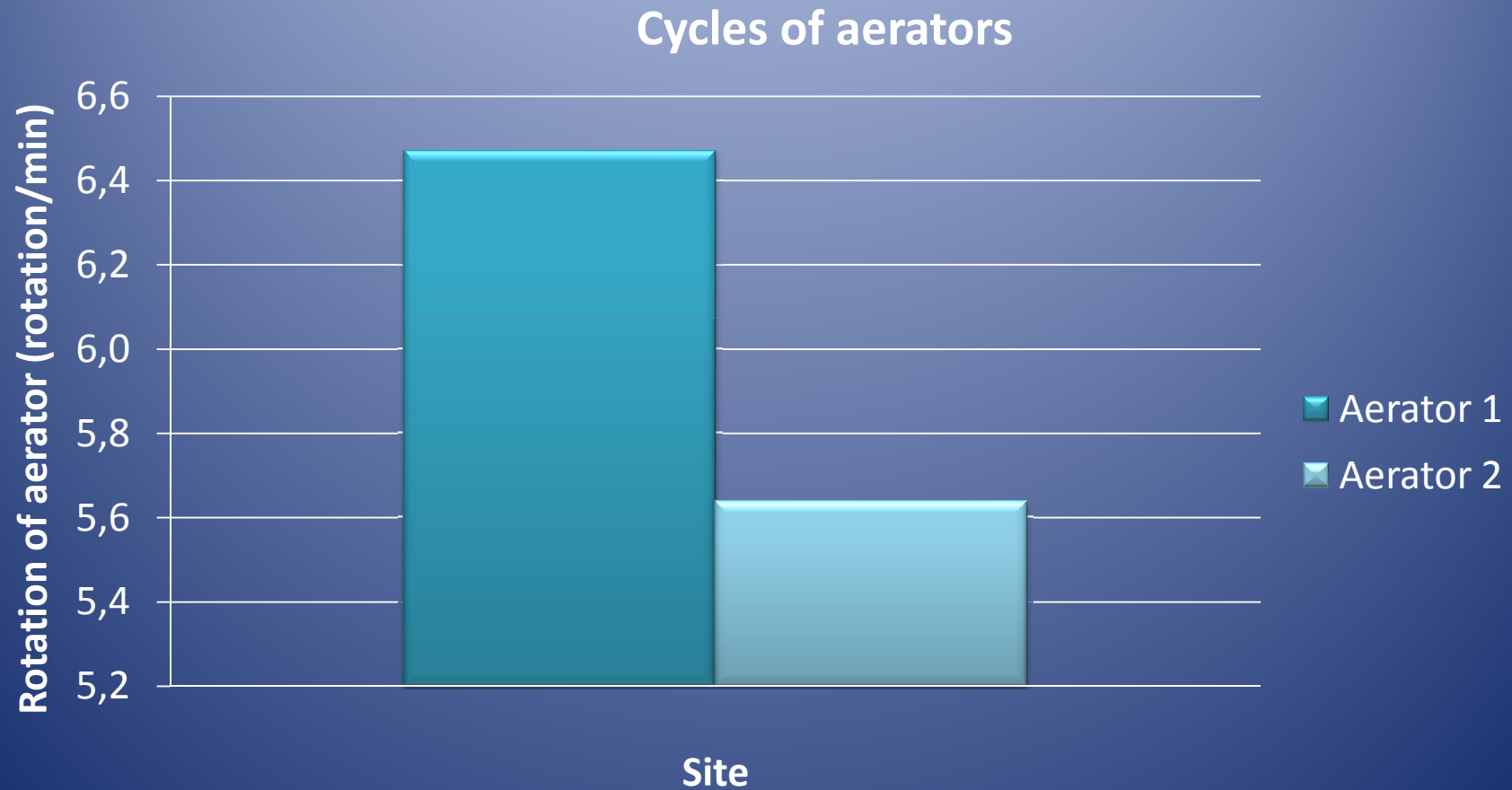




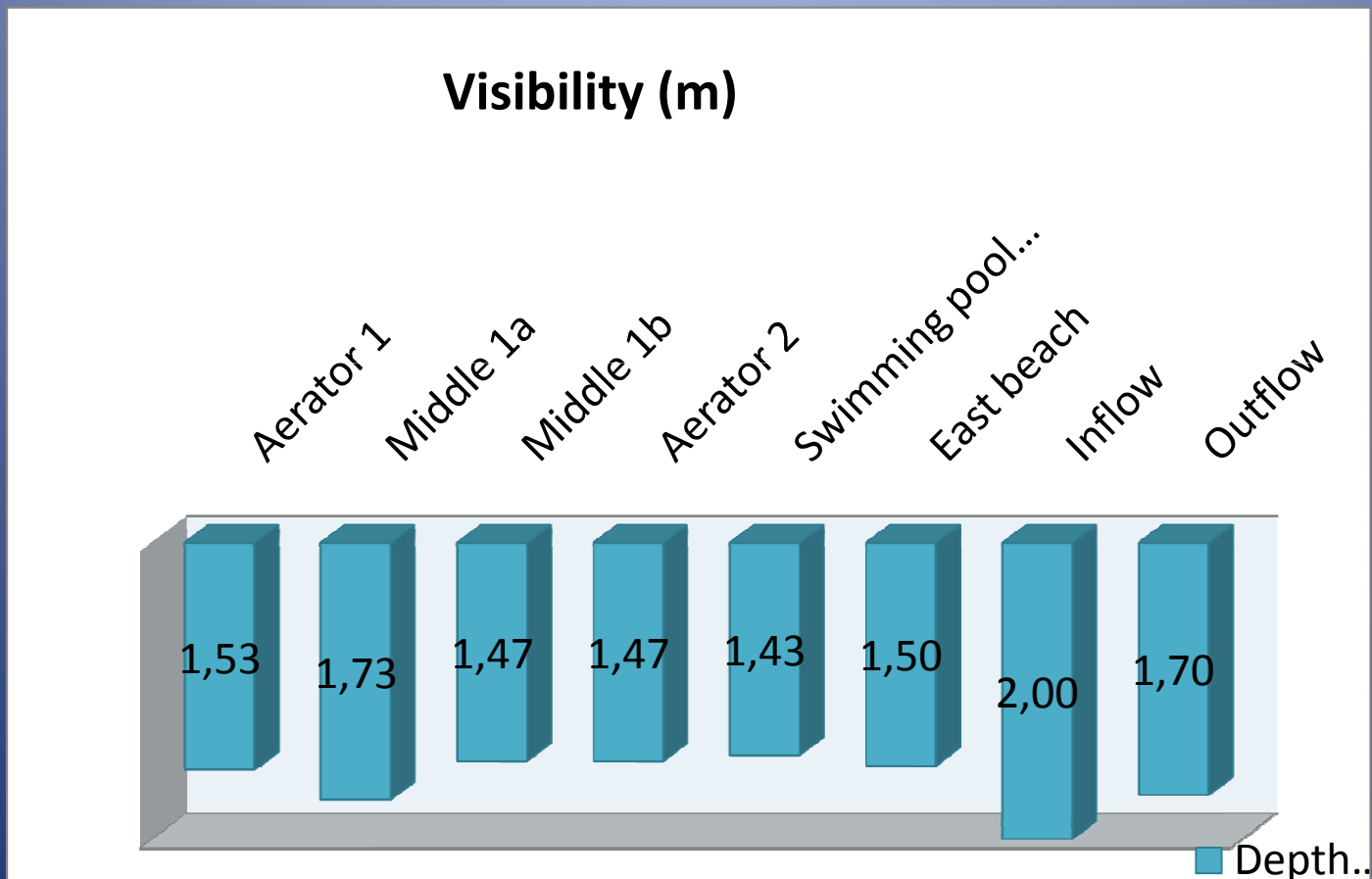




## 2. Obroty aeratorów



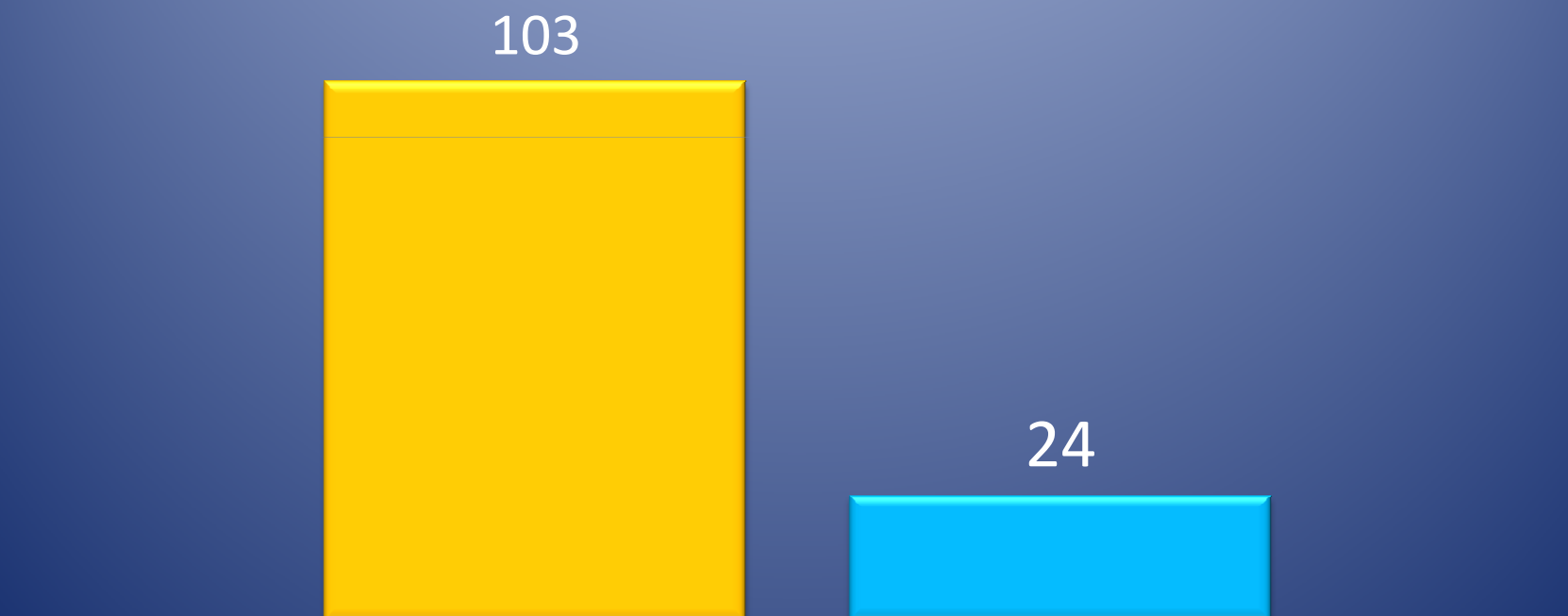
### 3. Secchi disc transparency (SD) Widzialność krążka Secchiego



# 4. Liczba stanowisk wędkarskich i plaż

## Amount of fishing and swimming localities

■ Lake Durowskie Fishing sites    ■ Lake Durowskie Swimming sites



Z reguły 50 % aktywnych stanowisk wędkarskich !



Beach



Fishing station

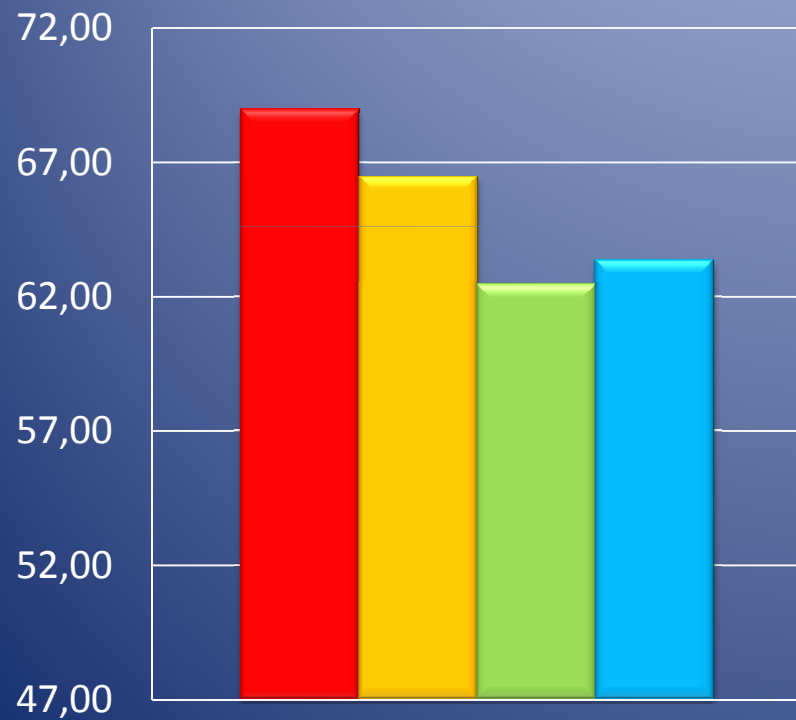


# 6. Comparison results

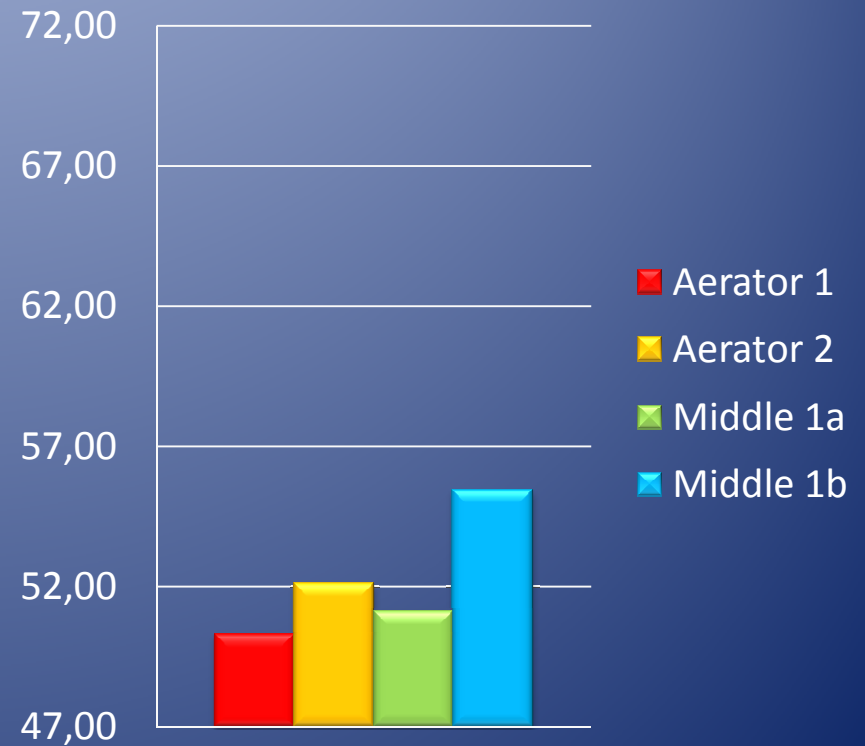


# TSI

## TSI (Chl) in 2009



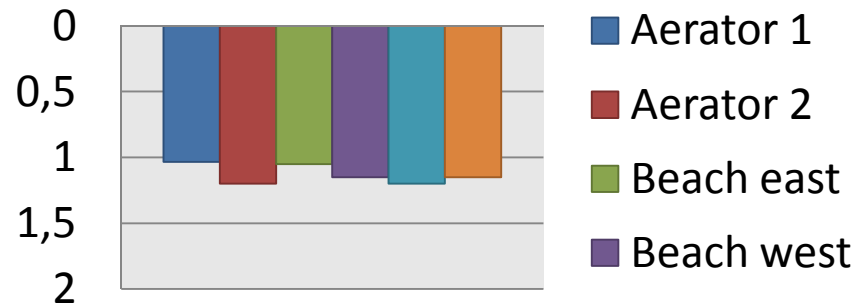
## TSI (Chl) in 2010



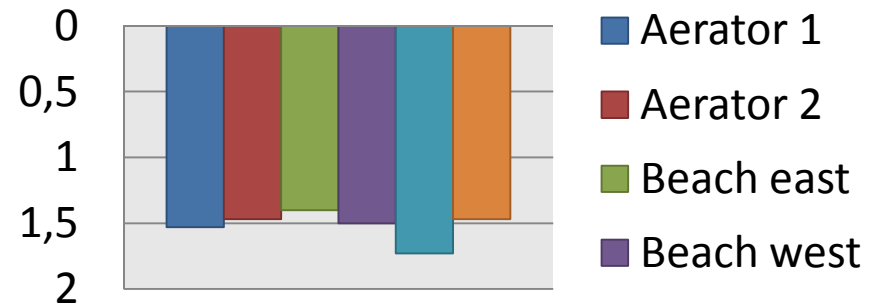
**EUTROPHIC STATE!!! (Carlson)**  
Eutrophy – 51- 85  
Mezo – Eutrophy 45 - 50

# Widzialność krążka Secchiego

Visibility of Secchi disc  
(SD) (m) in 2009



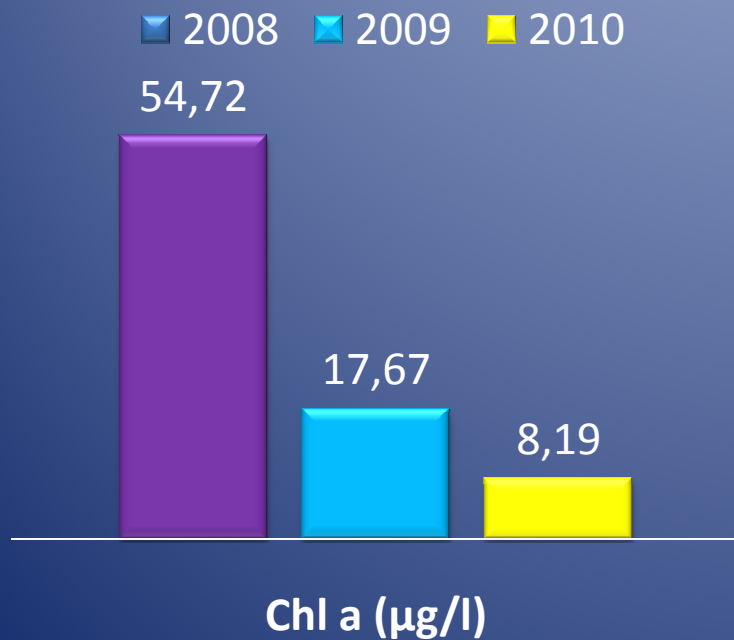
Visibility of Secchi disc  
(SD) (m) in 2010



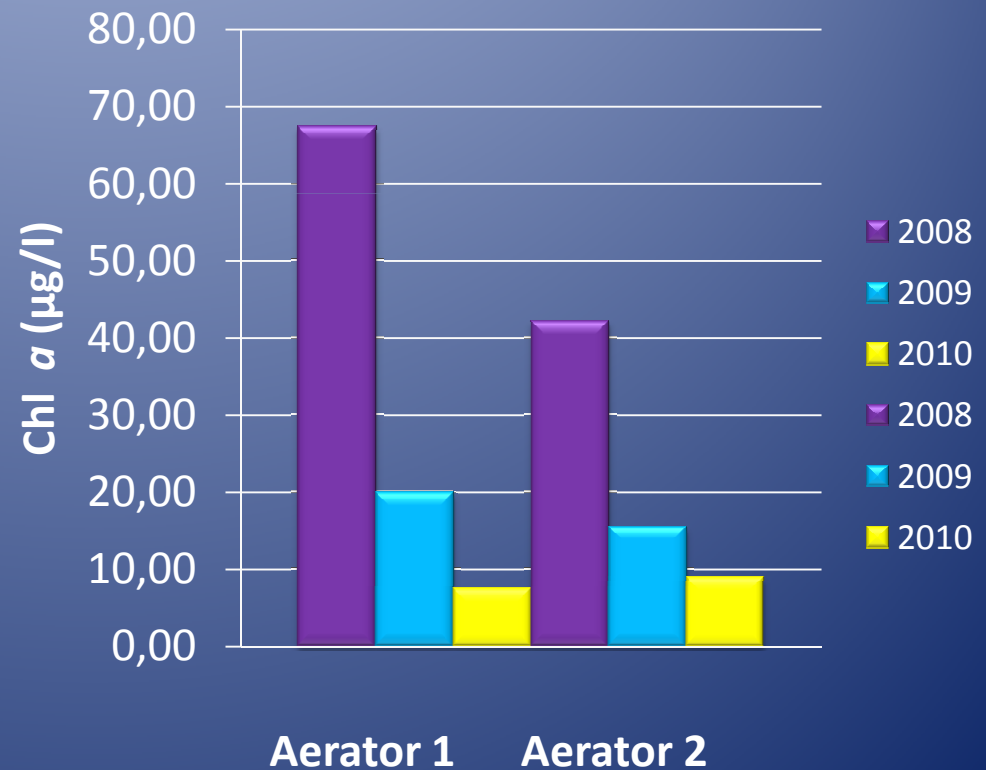


# Porównanie średnich koncentracji chlorofilu *a*

Compare average of chlorophyll *a* 2008-2010

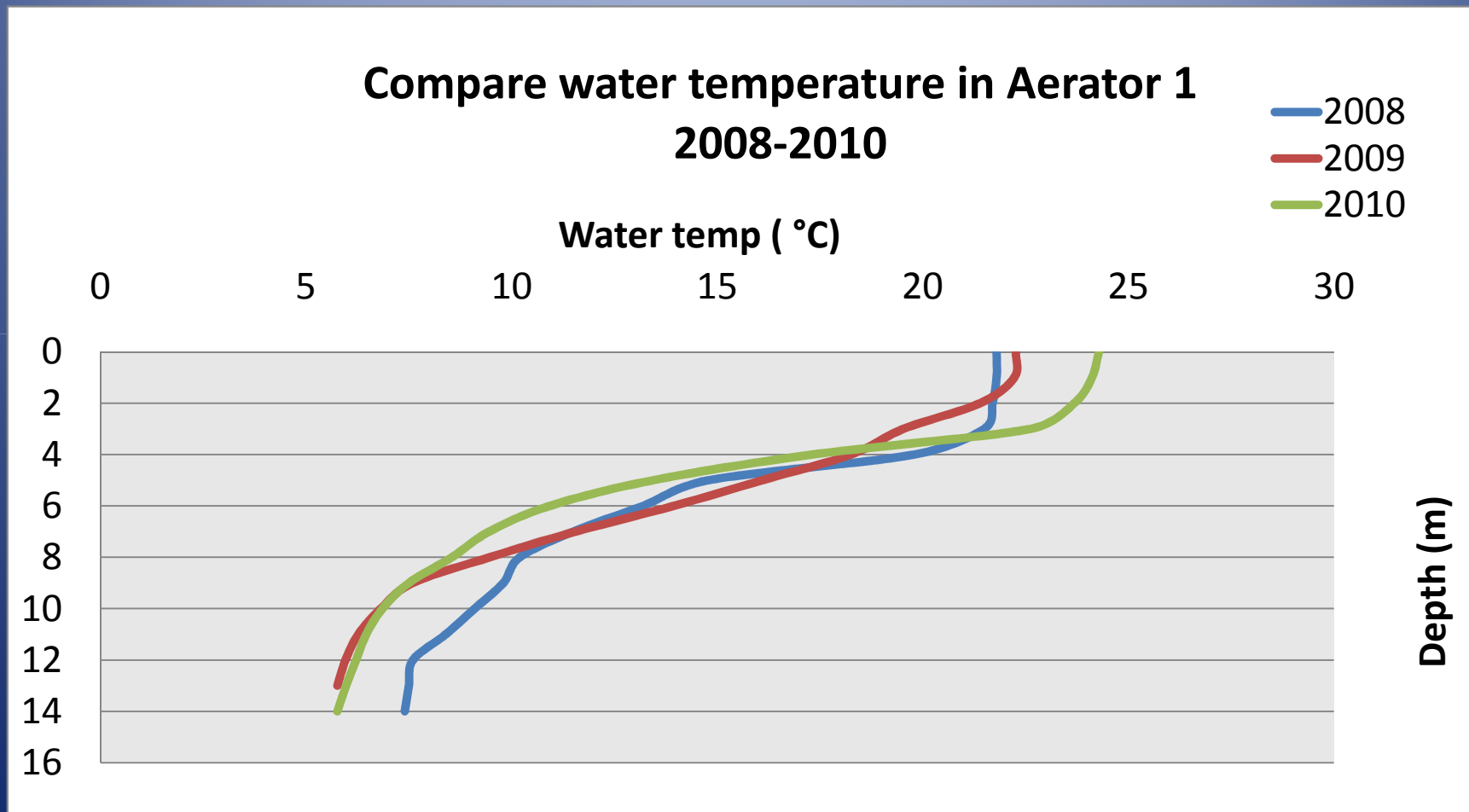


Compare work of Aerator 1 and Aerator 2 in 2008-2010



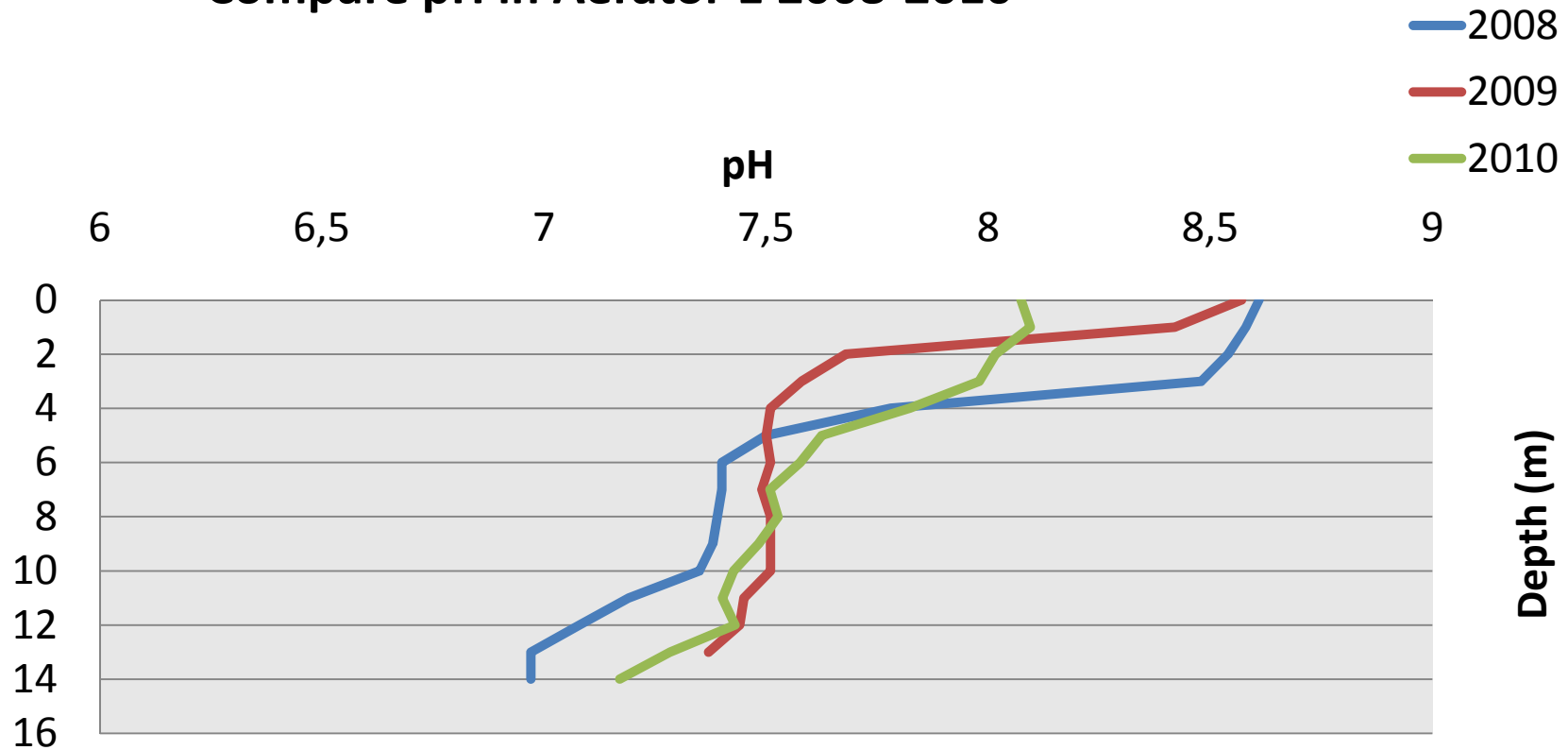
Chl *a* (µg/L) 7.3—56 Eutrophic !!!(Carlson)

# Porównanie temperatury wody w Aeratorze 1



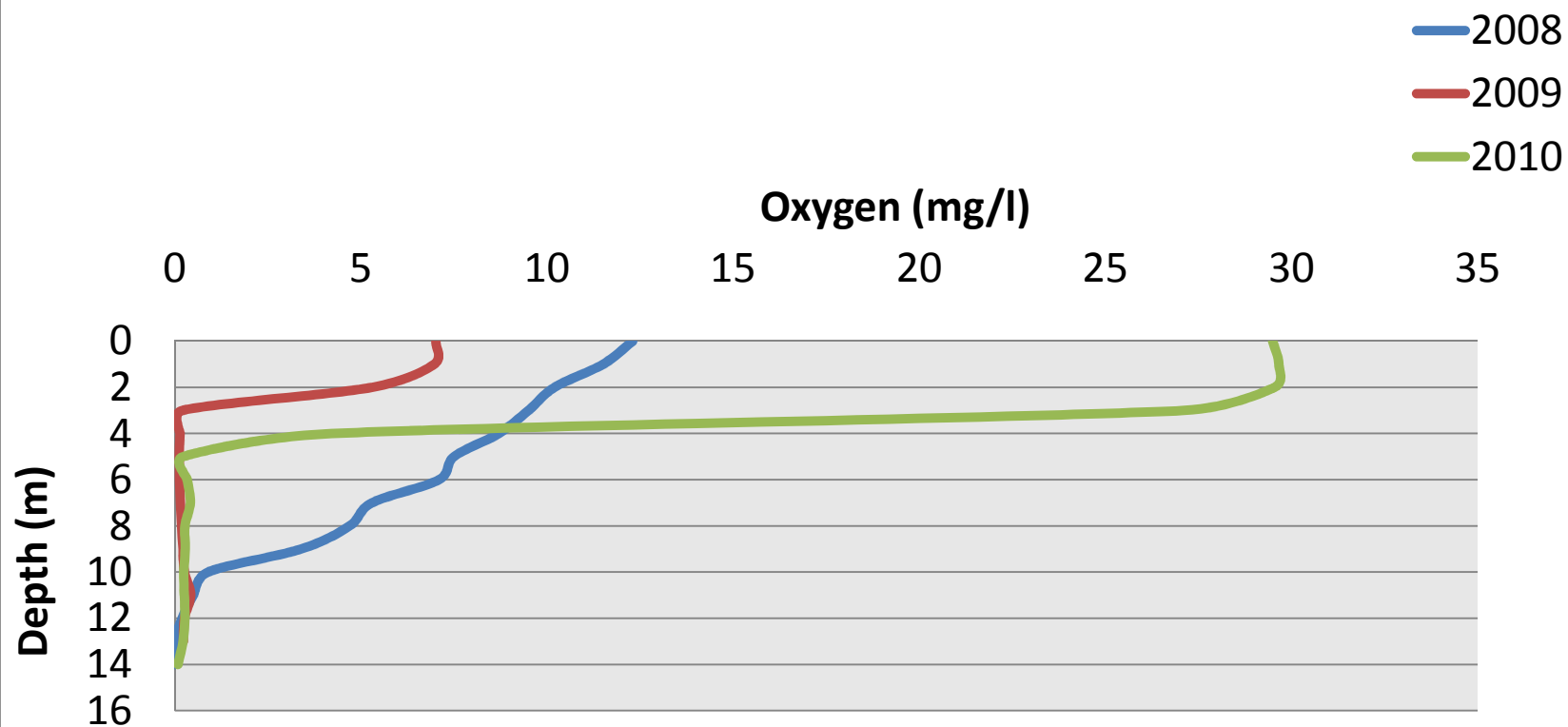
# Porównanie pH w Aeratorze 1

Compare pH in Aerator 1 2008-2010



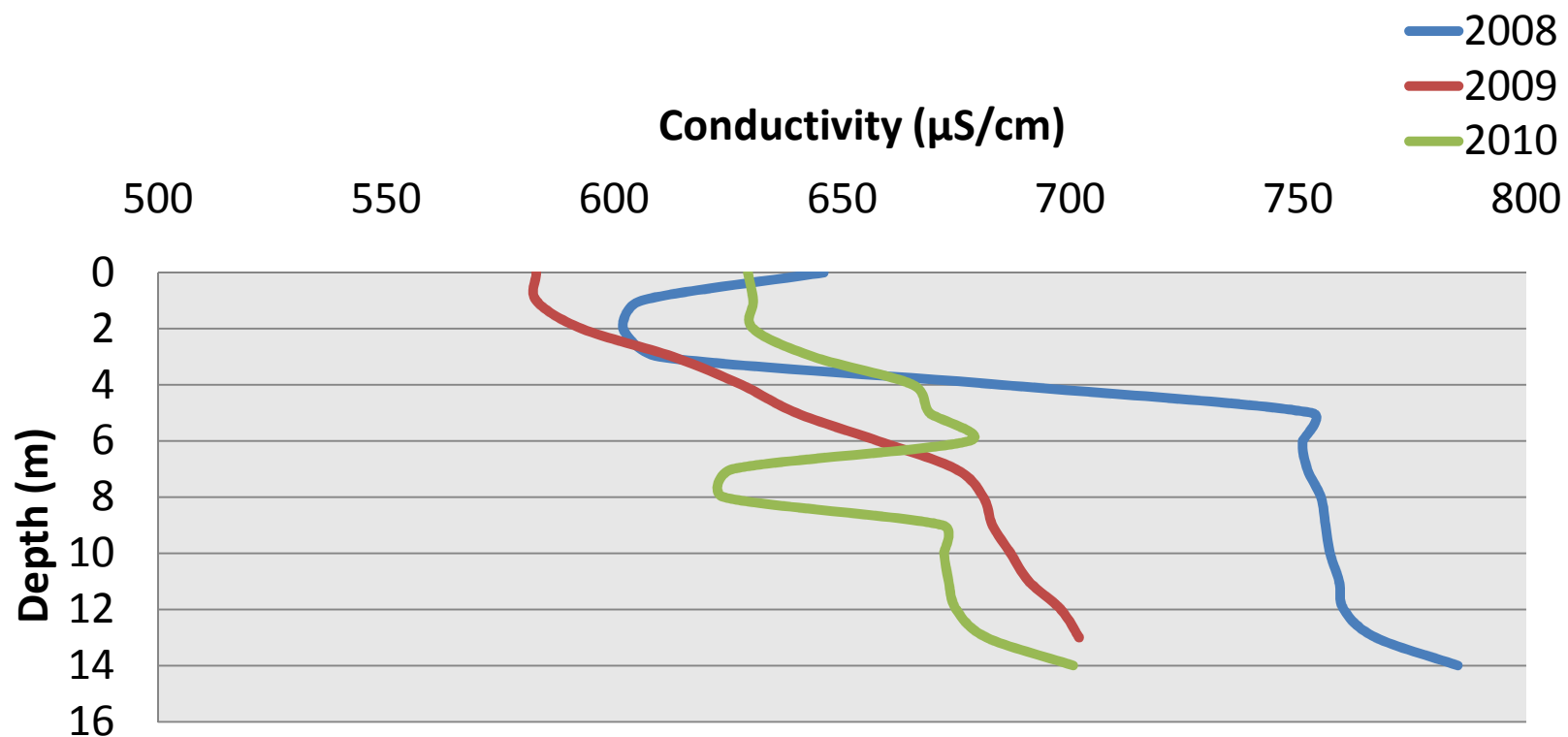
# Porównanie zawartości tlenu mg/l w Aeratorze 1

Compare oxygen (mg/l) in Aerator 1 2008-2010



# Porównanie przewodnictwa elektrolitycznego w Aeratorze 1

Compare conductivity ( $\mu\text{S}/\text{cm}$ ) in Aerator 1 2008-2010





# Compare with WFD

## Porównanie wyników z RDW

Aerator 1	2009	2010
SD (m)	1,03	1,53

Aerator 1	2006	2007	2008	2009	2010
Oxygen (mg/l)	7,1	7,3	12,3	7,0	29,5

P-PO4	2006	2007	2009	2010
Aerator 1	0,07	0,01	0,30	0,28

Aerator 1	2006	2007	2009	2010
N-NH4	0,04	0,22	0,57	0,59

Chlorophyll a	2009	2010
Aerator 1	19,9	7,44
Aerator 2	15,44	8,93

Stan ekologiczny
Bardzo dobry
Dobry
Umiarkowany
Słaby
Zły

# Gołaniecka stream- compare with WFD

## Struga Gołaniecka- porównanie z RDW

	2009	2010
N-NH4 (mg/l)	I	II

	2009	2010
P-PO4(mg/l)	II	Poza klasą II

# 7. Conclusions

Improvement	Worsening
Visibility	Nitrogen
Dissolved Oxygen	Phosphorus
Chlorophyll <i>a</i>	Conductivity

All index show that lakes is EUTROPHIC  
Aerators not working good in hypolimnion layer !

## 8. Advices

- Reduce fishing places and beaches
- Improve quality of Gołaniecka Stream
- Support rotating aerator 2
- Reduce the surface inflow to the lake
- Create drainage ditch

Thank you for your attention:-)

