

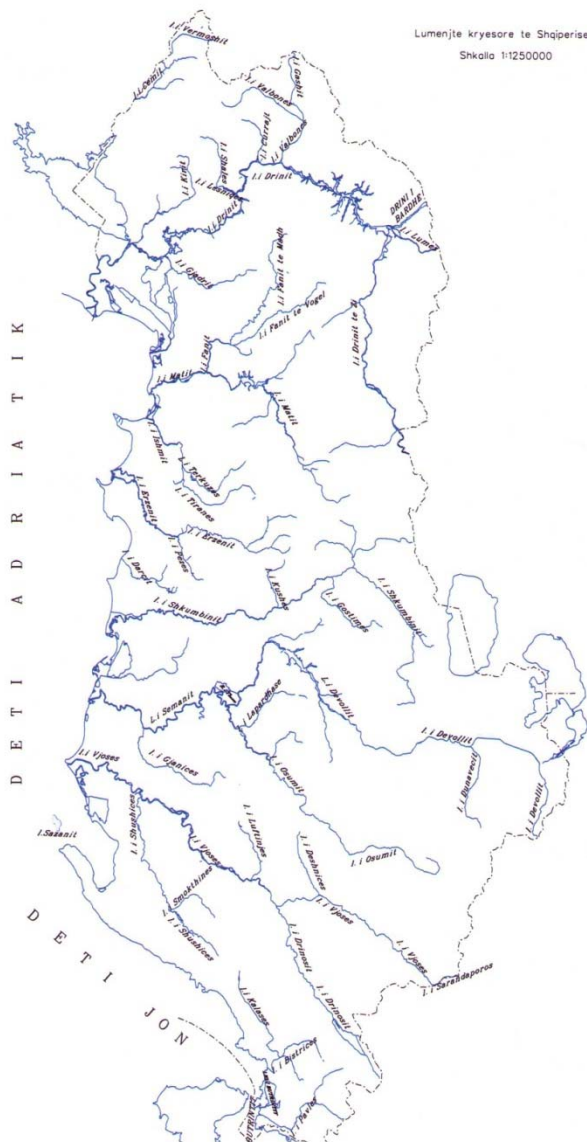


## The case of Lake Macro Prespa

Spase Shumka, Dusko Mukaetov and Eva Skarbøvik  
DRIMON



[WWW.DRIMON.NO](http://WWW.DRIMON.NO)



## Monitoring – national system STEMA proposal GO and challenges

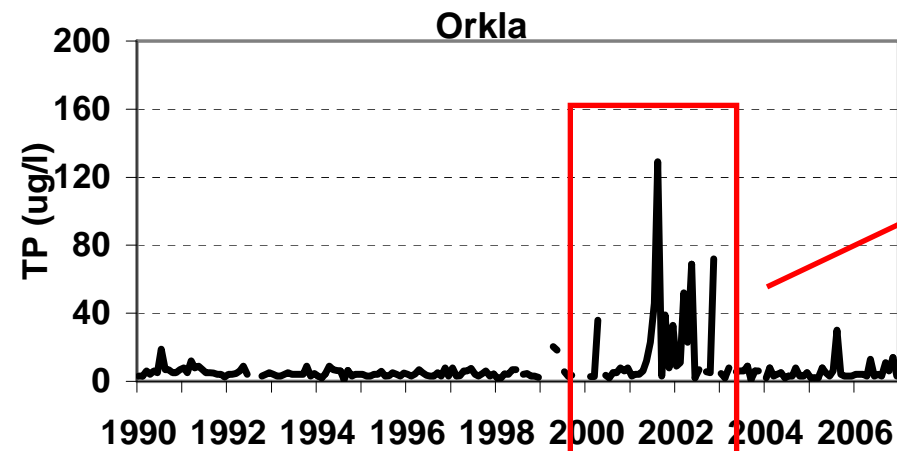


# Monitoring across borders - not such a simple task



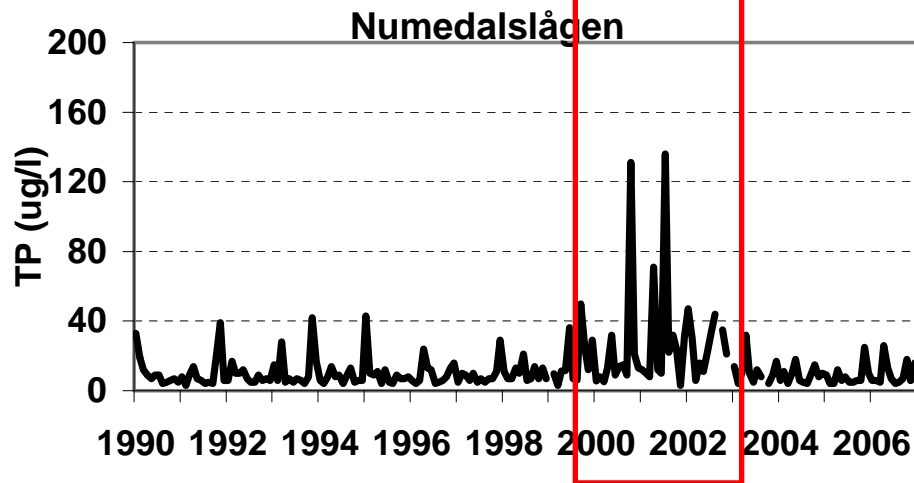
- Common goal for the monitoring
- Common environmental targets and goals
- Choice of parameters
- Laboratory methods and detection levels
- Choice of sampling frequency
- Common 'international' sampling stations? And/or sampling at the same time in national stations?
- Sharing of data?
- Common databases?

# Example from the Norwegian RID Programme



???

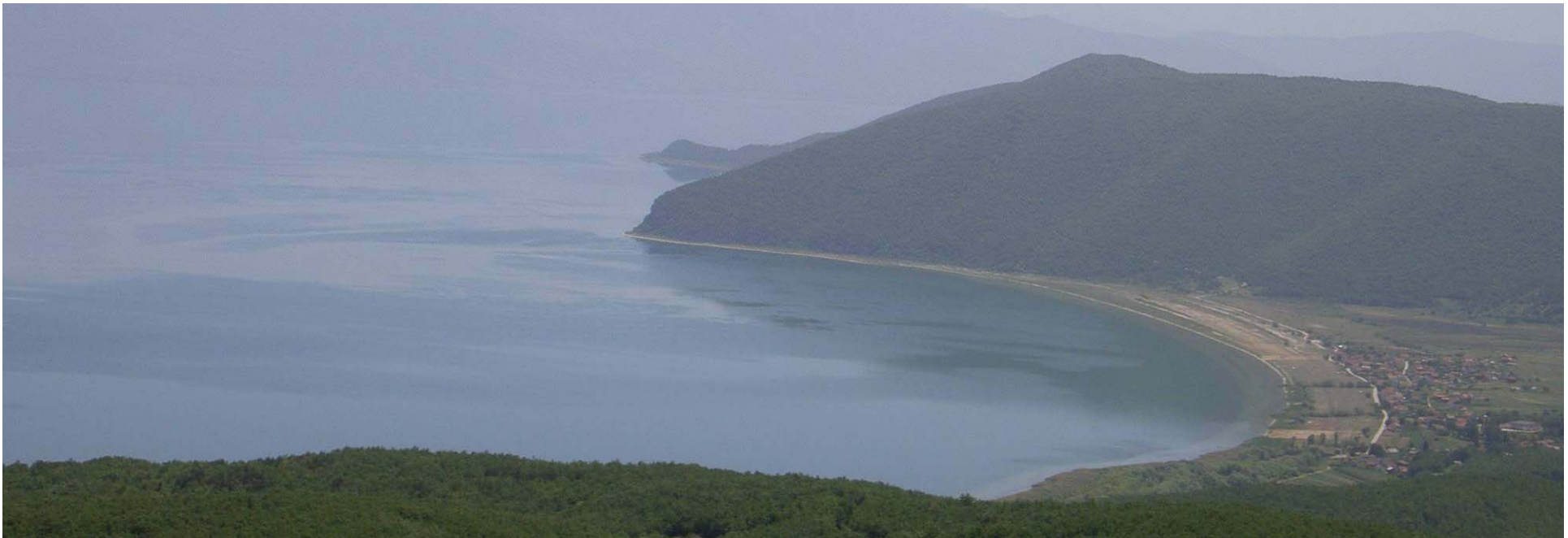
Change of lab



[WWW.DRIMON.NO](http://WWW.DRIMON.NO)

## CIS Guidance no. 7 - on MONITORING

- "To evaluate the comparability of monitoring data throughout the Member States, participation in external quality audits ... like international laboratory proficiency testing ... is highly recommended"



## Lake Macro Prespa

- Shared between 3 countries
- 1 EU (WFD) member state and 2 non-EU
- Large, shallow lake (surface area 254 km<sup>2</sup> average depth 14 m)
- about 849 m asl.
- Total population about 25,000; 75% in Macedonia
- Rich in biodiversity



## Main threats

1. Nutrient inputs from untreated sewage, solid waste and agricultural runoff (apple production) => Eutrophication.



2. Water level is declining -  
which will increase the  
eutrophication problem





# Results: DRIMON's transboundary monitoring in Lake Prespa

- Present state as compared to suggested environmental goals



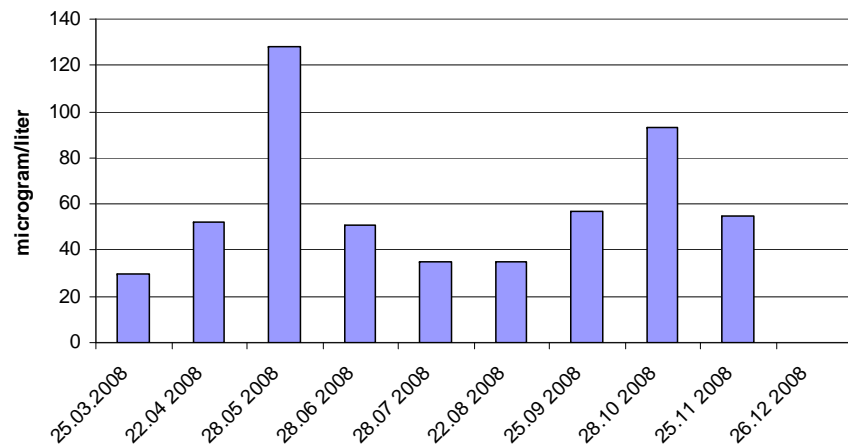
[WWW.DRIMON.NO](http://WWW.DRIMON.NO)

<b>Parameter</b>	<b>Albanian site</b>	<b>Macedonian site</b>	<b>Measurement period</b>
<b>Total Phosphorus (<math>\mu\text{g/l}</math>)</b>	<b>26</b>	<b>60</b>	<b>Mar-Aug</b>
<b>Total Nitrogen (<math>\mu\text{g/l}</math>)</b>	<b>517</b>	<b>677</b>	<b>Mar-Aug</b>
<b>Min. oxygen level (mg/l) (surface)</b>	<b>8.1</b>	<b>6.4</b>	<b>Mar-Aug</b>
<b>Min. oxygen level (mg/l) ( depth)</b>	<b>1.0</b>	<b>0.0</b>	<b>Mar-Sep</b>
<b>Transparency (secchi depth)</b>	<b>2.6</b>	<b>3.3</b>	<b>Mar-Sep</b>
<b>Chlorophyll a</b>	<b>-</b>	<b>9</b>	<b>Mar-Dec</b>

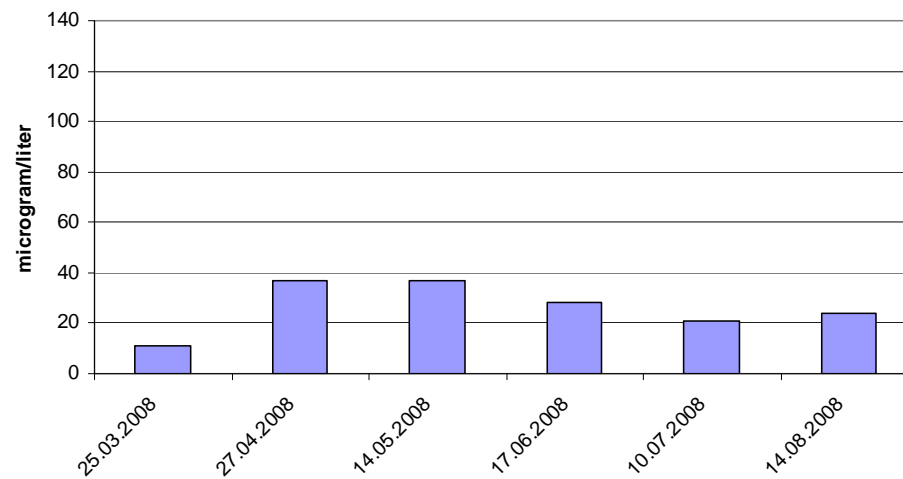


[WWW.DRIMON.NO](http://WWW.DRIMON.NO)

**Total phosphorus Macro Prespa, Macedonia 2008**

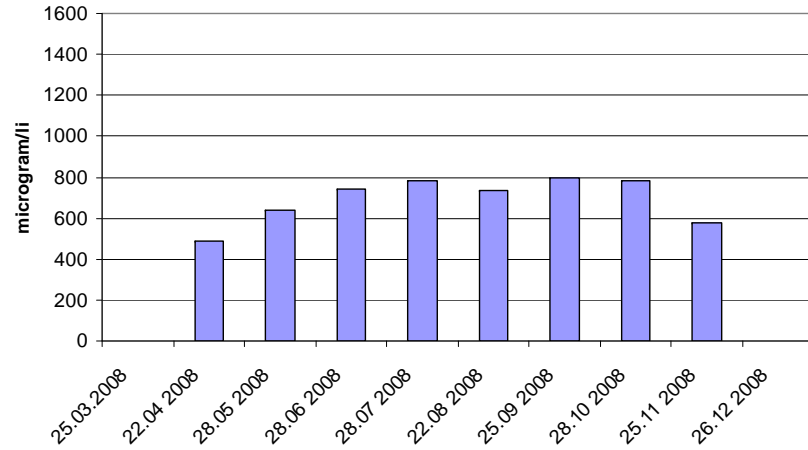


**Total Phosphorus Macro Prespa Albania 2008**

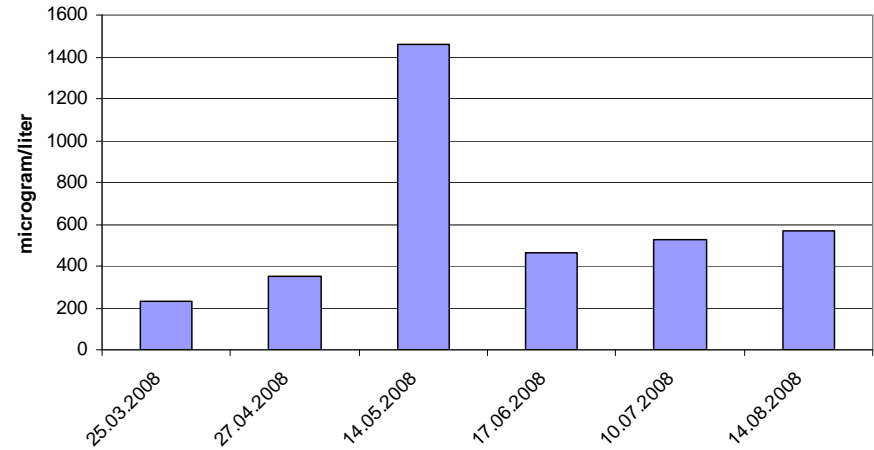


[WWW.DRIMON.NO](http://WWW.DRIMON.NO)

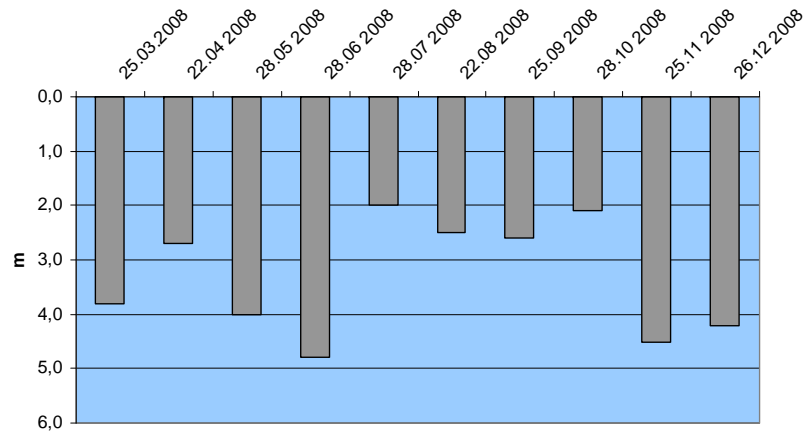
**Total nitrogen Macro Prespa, Macedonia 2008**



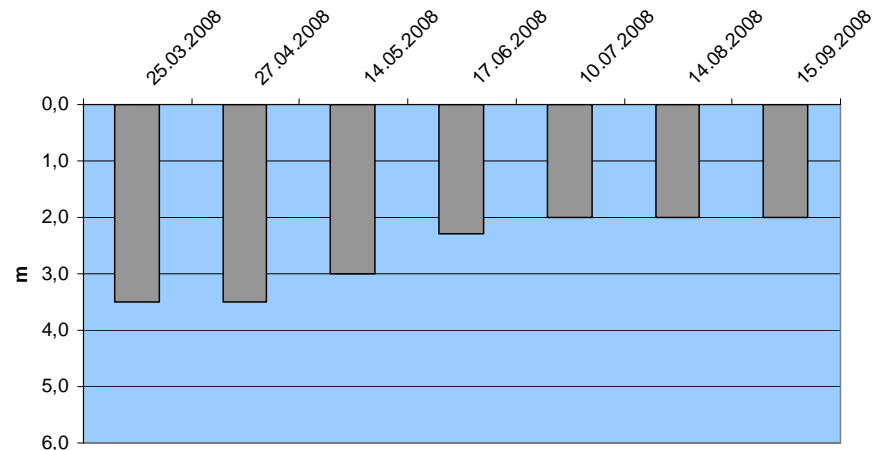
**Total Nitrogen Macro Prespa Albania 2008**



**Transparency (Secchi depth) Macro Prespa, Macedonia 2008**

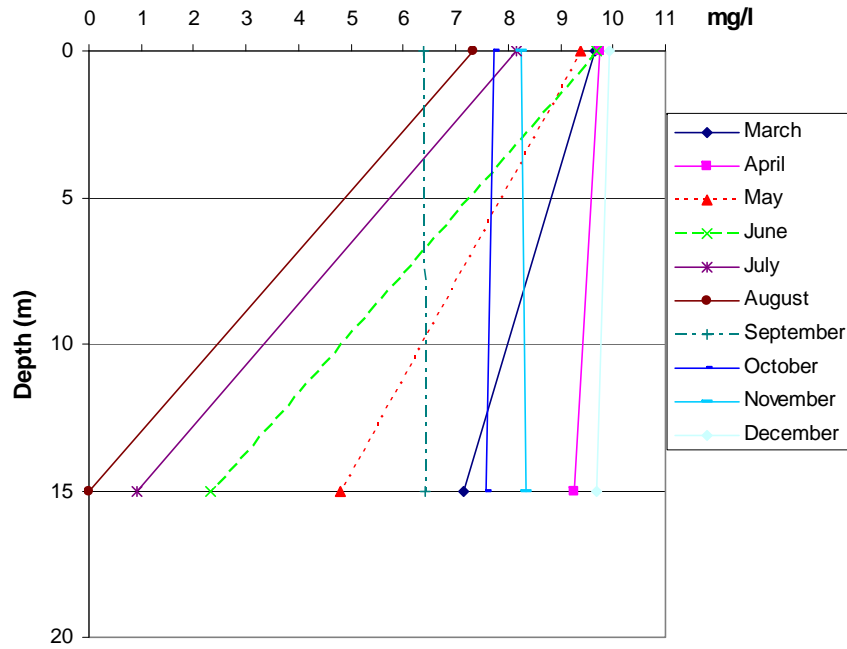


**Transparency Macro Prespa Albania 2008**

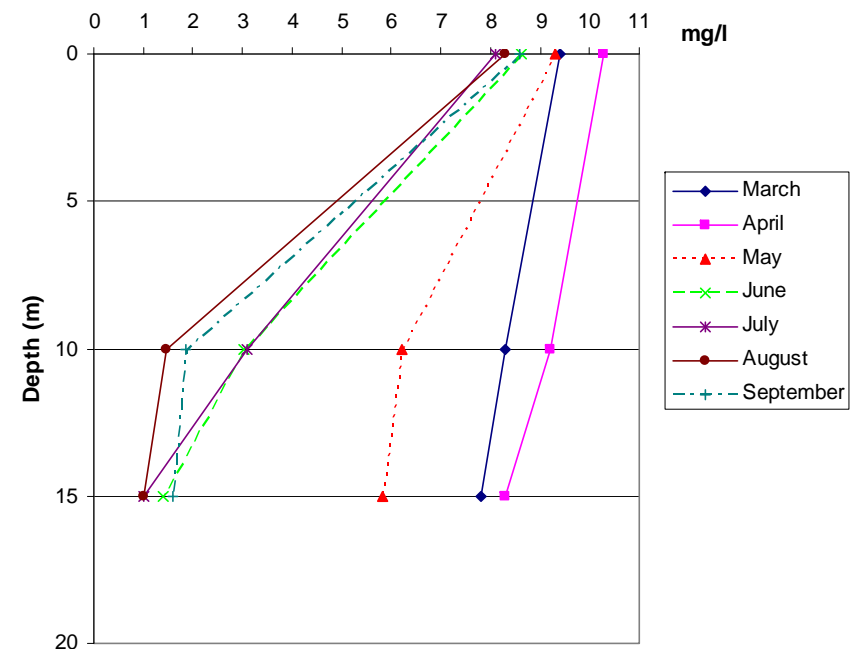


[WWW.DRIMON.NO](http://WWW.DRIMON.NO)

Oxygen Lake Macro Prespa Macedonia 2008

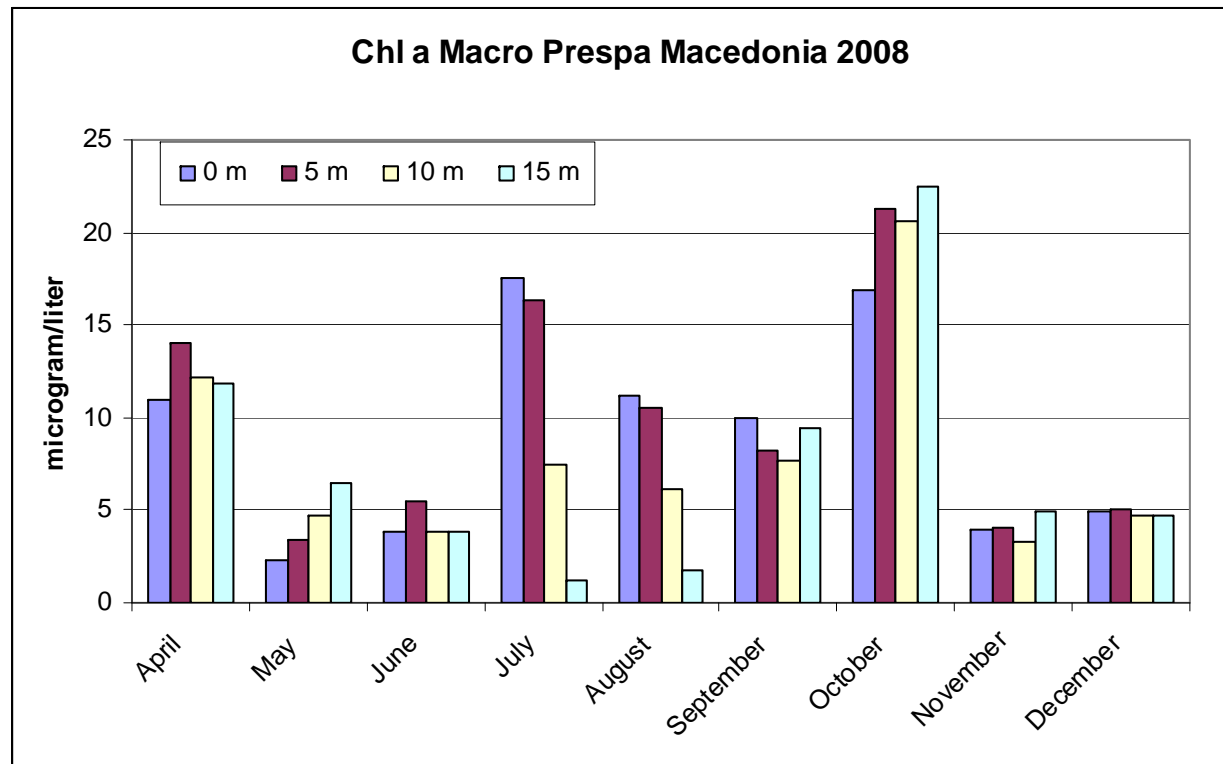


Oxygen Lake Macro Prespa Albania 2008



[WWW.DRIMON.NO](http://WWW.DRIMON.NO)

## Chl a - (Macedonian station): Goal: 6.6-8 $\mu\text{g/l}$



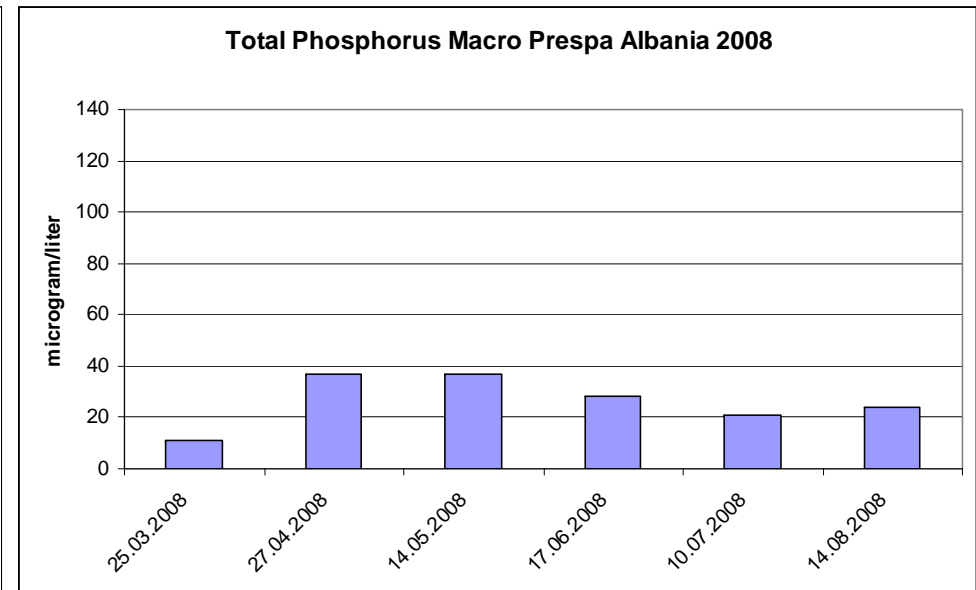
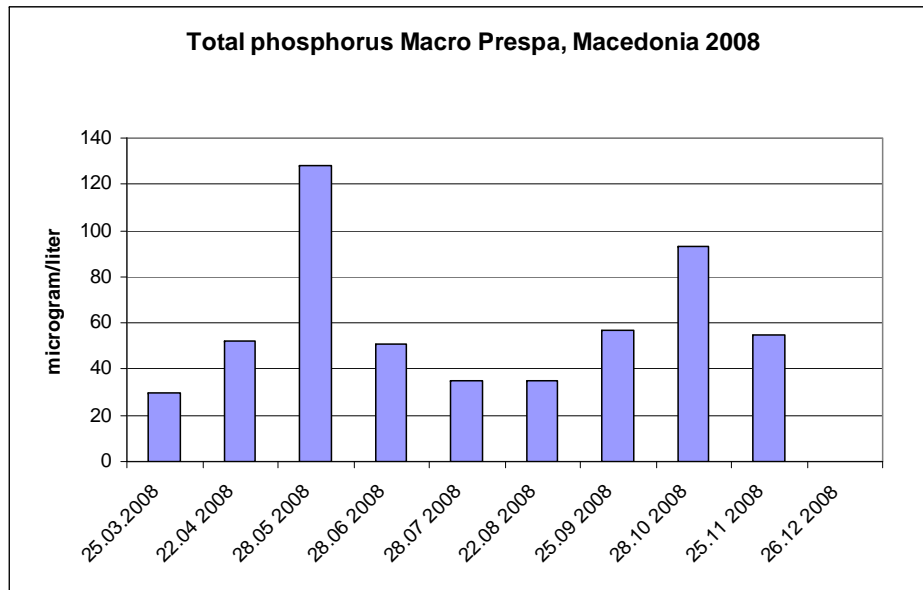
Mean surface concentration (0-5 m) is 10.7  $\mu\text{g/l}$

– *this is 2.7  $\mu\text{g/l}$  more than the environmental goal*

# State: Total Phosphorus Goal= ? (8-20...)

Macedonia: 60  $\mu\text{g/l}$

Albania 26  $\mu\text{g/l}$

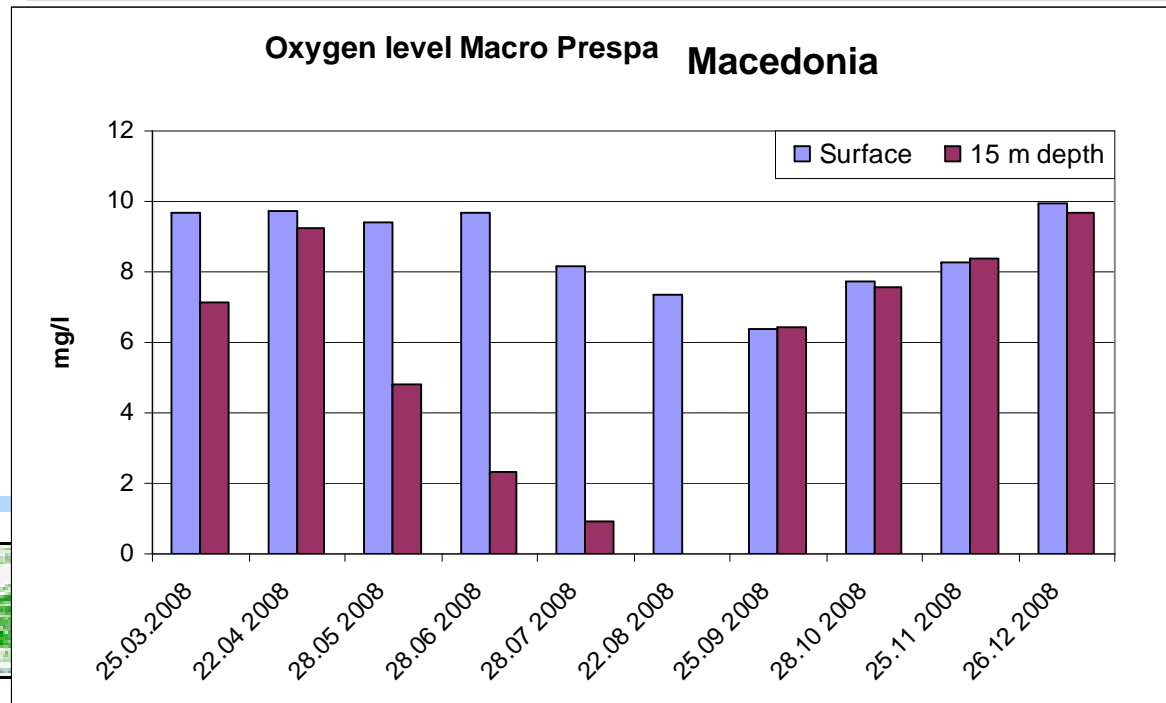
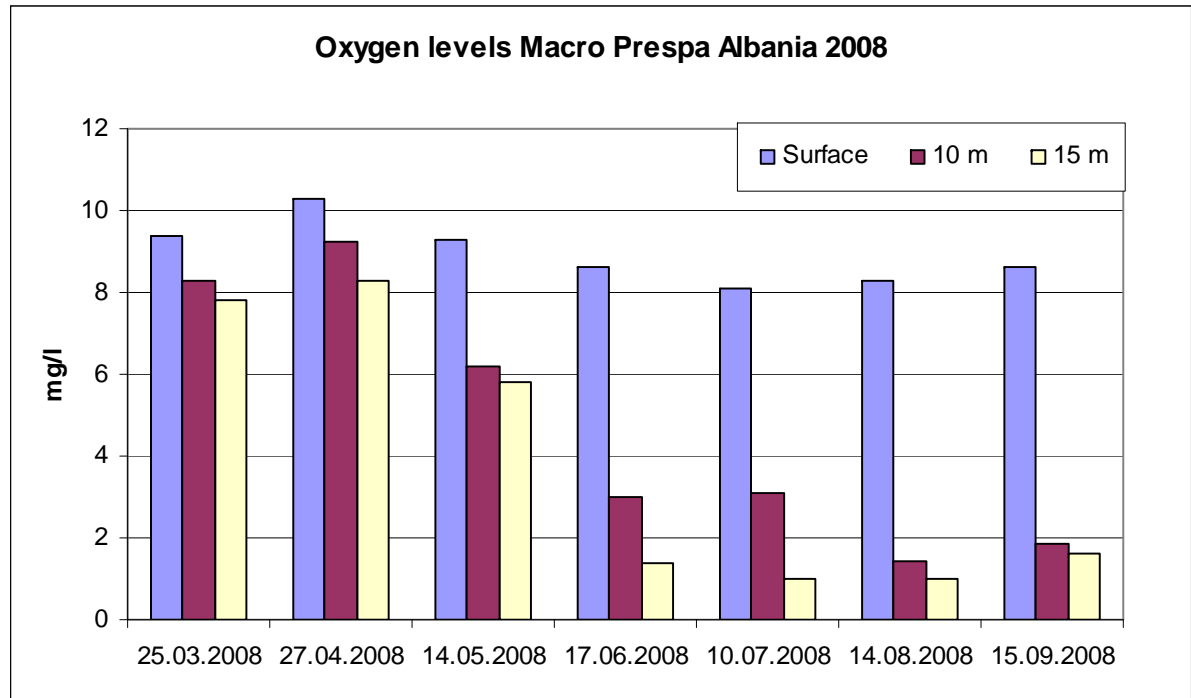


[WWW.DRIMON.NO](http://WWW.DRIMON.NO)

# Oxygen levels

Anoxic at the bottom during the summer in both sites

=> in itself a clear indication that mitigation measures are needed





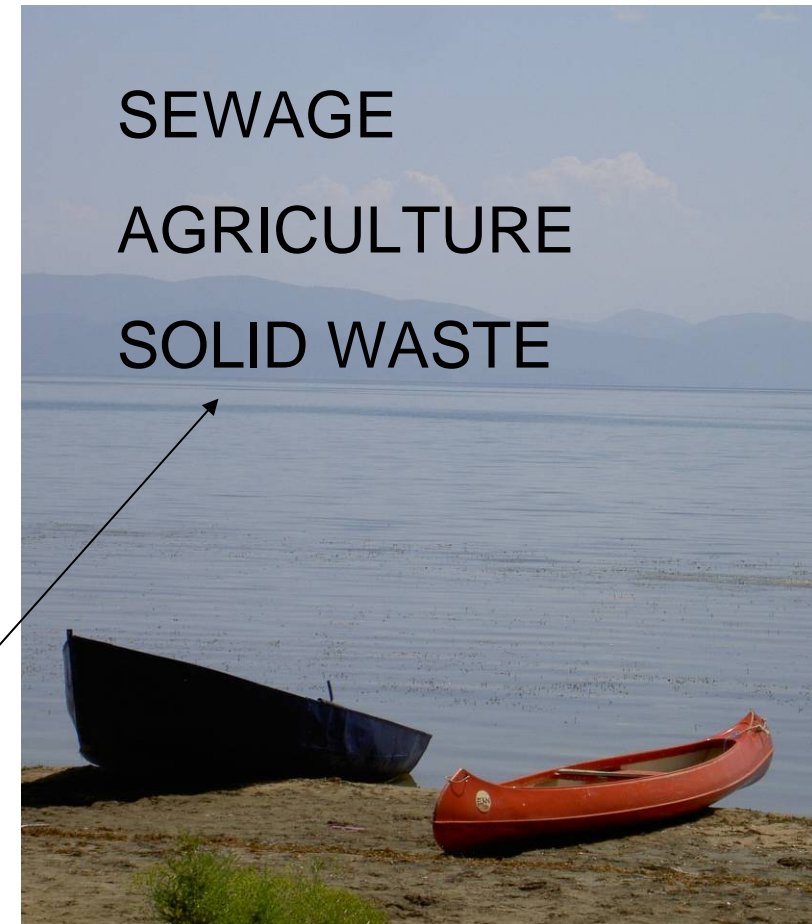
## Discussions

- Macedonian side higher population (sewage/solid waste); and more agricultural land (fertilizers). Also more rivers coming in.
- Unusual high TP as compared to Chl a - may be due to zooplankton or carp fish feeding on the phytoplankton.



## Conclusions and recommendations for Prespa

- Lake Prespa is eutrophic and P and Chl a levels are above the required status (environmental goal)
- The lake level decrease will intensify this situation
- => Mitigation measures need to be initiated





Biodiversity threats?



Needs for monitoring!



[WWW.DRIMON.NO](http://WWW.DRIMON.NO)



*Cobitis taenia*

- Fishery and WFD
- Needs for common methodological approaches
- Institutional and legal enforcement
- Cooperation



*Phoxinela*



Global issues reflected in Prespa  
The CBD and Non native freshwater species in Prespa  
How to prevent the invasion?



## Conclusions and recommendations for Prespa cont.

- Co-operation between riparian states on transboundary monitoring is highly recommended;
- Laboratory intercomparison exercises should be done on a regular basis
- This will give a common basis for improved management of the lake



**Thank you for your attention**

