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An operational monitoring system for cyanobacterial blooms

Application to water bodies in the South-Western France

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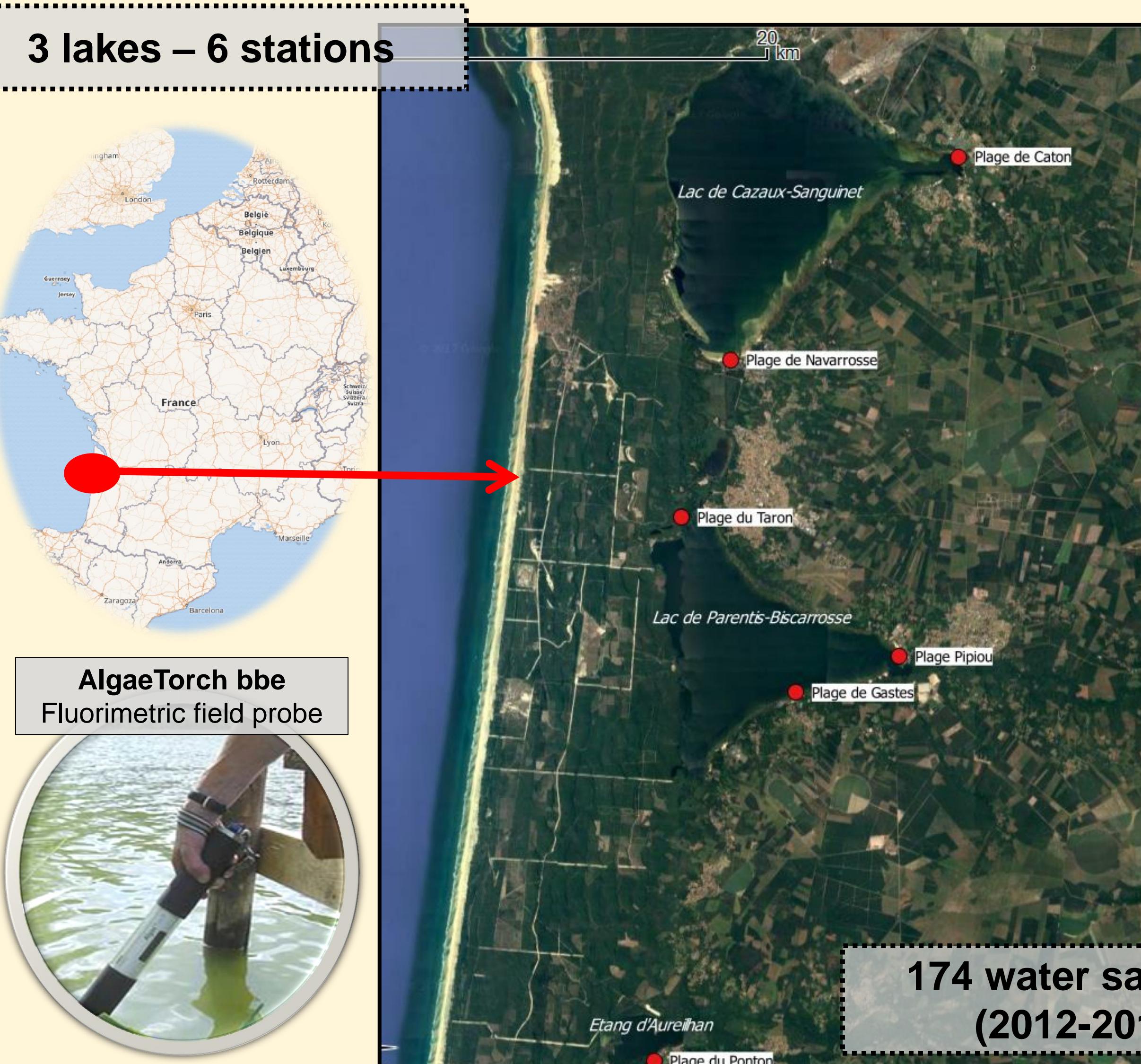
² Communauté de Communes des Grands Lacs (CCGL), 136 rue Jules Ferry B.P. 64, F-40161 Parentis-en-Born Cedex, France.

Context

Large lakes of South-Western France are largely concerned by recreational activities and constitute an important touristic place during summer. These lakes have bathing areas regularly monitored for public health. In France, regulation impose biological monitoring, especially for cyanobacteria that could be potentially toxic. However, current survey induces long time delay detrimental to health security and resulting in high financial costs.

Sites and methods

3 lakes – 6 stations



174 water samples
(2012-2013)

Objectives

The present work, carried out between scientists and managers, proposed to modify the reglementary alert decision tree in :

- reducing the time delay
- limiting the financial costs
- conserving the safety level

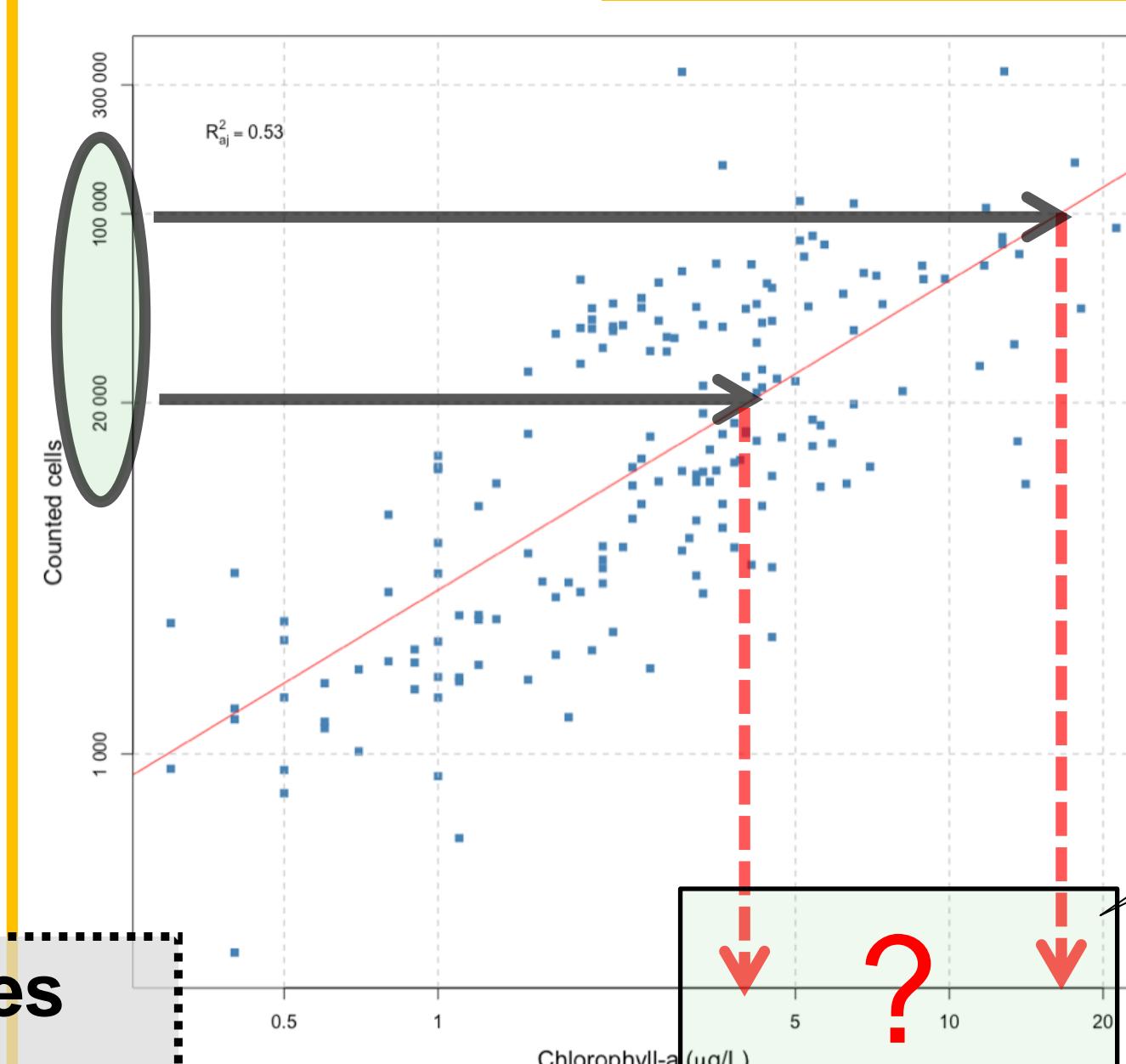
REGLEMENTARY

TOOLS	Laboratory ► Microscopy
METHODS	Counted cells ► CC.ml ⁻¹
TIME DELAY	36 hours
HEALTHCARE THRESHOLDS	≥ 20 000 CC.ml ⁻¹ ≥ 100 000 CC.ml ⁻¹

PROPOSED

In situ
► Fluorimetric field probe
[cyanobacteria chlorophyll-a]
► µg/l
Immediately
≥ ? µg/l
≥ ? µg/l

Thresholds definition



20 000 CC.ml⁻¹ ► 4 µg/l

100 000 CC.ml⁻¹ ► 17 µg/l

Correlation between cyanobacteria chlorophyll-a concentration and cyanobacteria cell numbers from microscopic counting.

Results

Validation

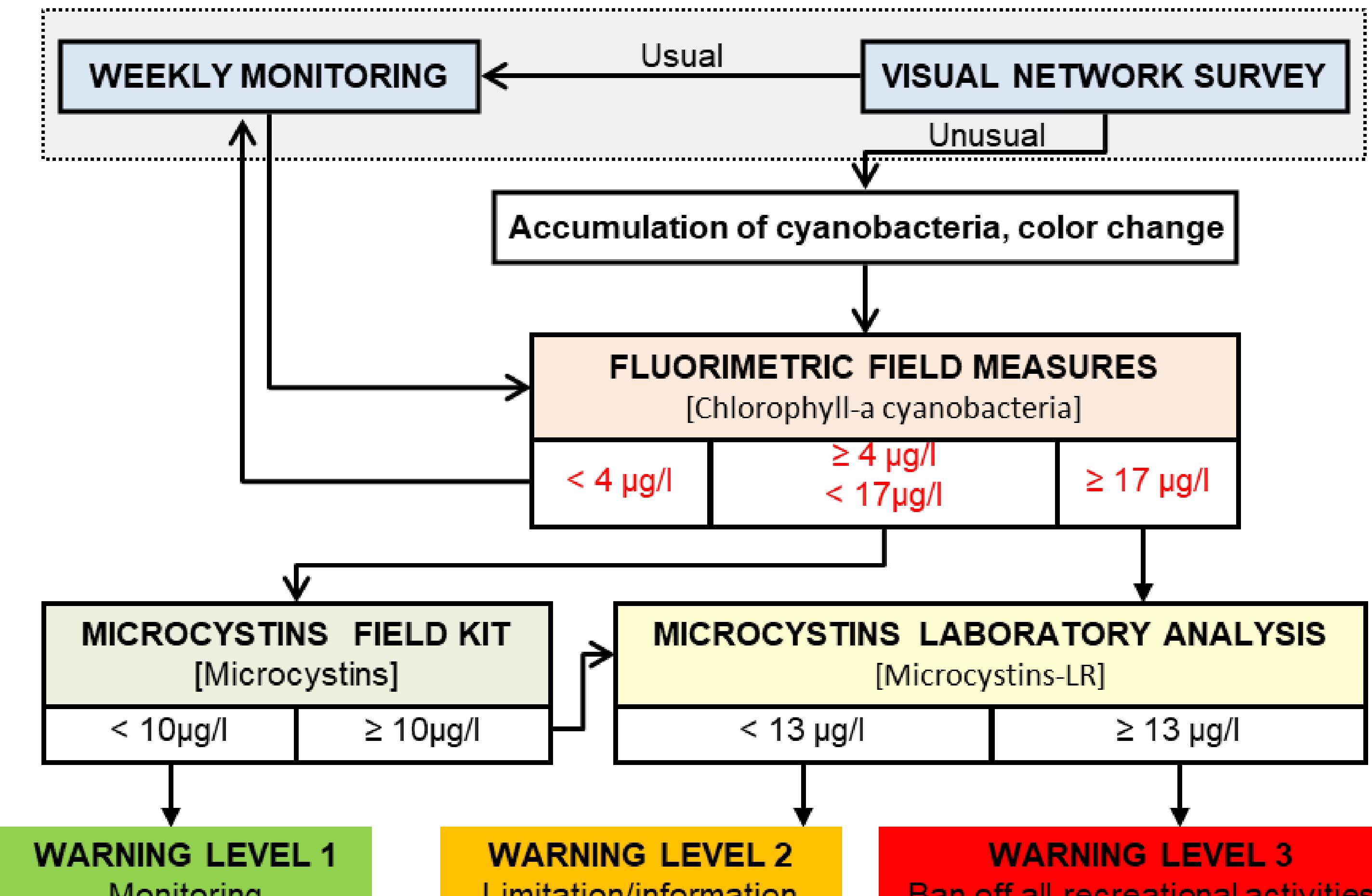
PROPOSED				
Warning level				
REGLEMENTARY	0	1	2	3
0	85	19	0	0
1	27	34	2	0
2	2	4	1	0
3	0	0	0	0

70 % IDENTICAL

20 % UNDER EVALUATED
Small species non toxic
Better assessment

10 % OVER EVALUATED
Bigger species potentially toxic
More precautionary

THE NEW ALERT DECISION TREE



Conclusions and perspectives

This new decision tree provides at least the same safety level and is, sometimes, more precautionary than the regulatory method. This new method need however to be tested on other lakes with different cyanobacteria taxa and biomass, but provide encouraging results for bathing areas management and is already used for management of lake beaches of the large lakes of South-Western France.

Full study available in LAPLACE TREYTURE, C., MOREIRA, S., GOGIN, S., PICKHAHN, L., EON, M., JAMONEAU, A. - 2017. Un système opérationnel de surveillance et d'alerte des proliférations de cyanobactéries : application aux plans d'eau landais. *Sciences Eaux et Territoires*, vol. Hors série, n° 37, 6 p.

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