An operational monitoring system for cyanobacterial blooms: application to water bodies in the South-Western France

Sylvia Moreira, Christophe Laplace-Treyture, S. Gogin, L. Pichahn, Mélissa Eon, Aurélien Jamoneau

An operational monitoring system for cyanobacterial blooms

Application to water bodies in the South-Western France

Sylvia Moreira[1], Christophe Laplace-Treyture[1], Sarah Gogin[1], Laurent Pickhahn[2], Mélissa Eon[1], Aurélien Jamoneau[1]

[1] Irstea, UR EABX, 50 avenue de Verdun, F-33612 Cestas Cedex, France.

[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.

Objectives

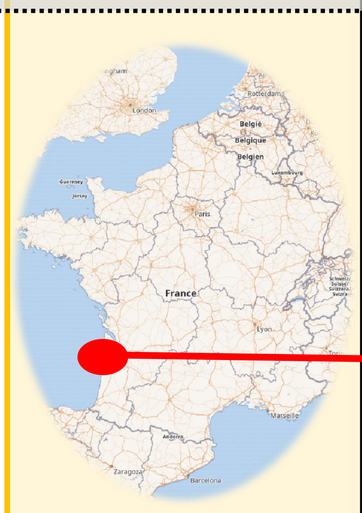
The present work, carried out between scientists and managers, proposed to modify the reglementary alert decision tree in :

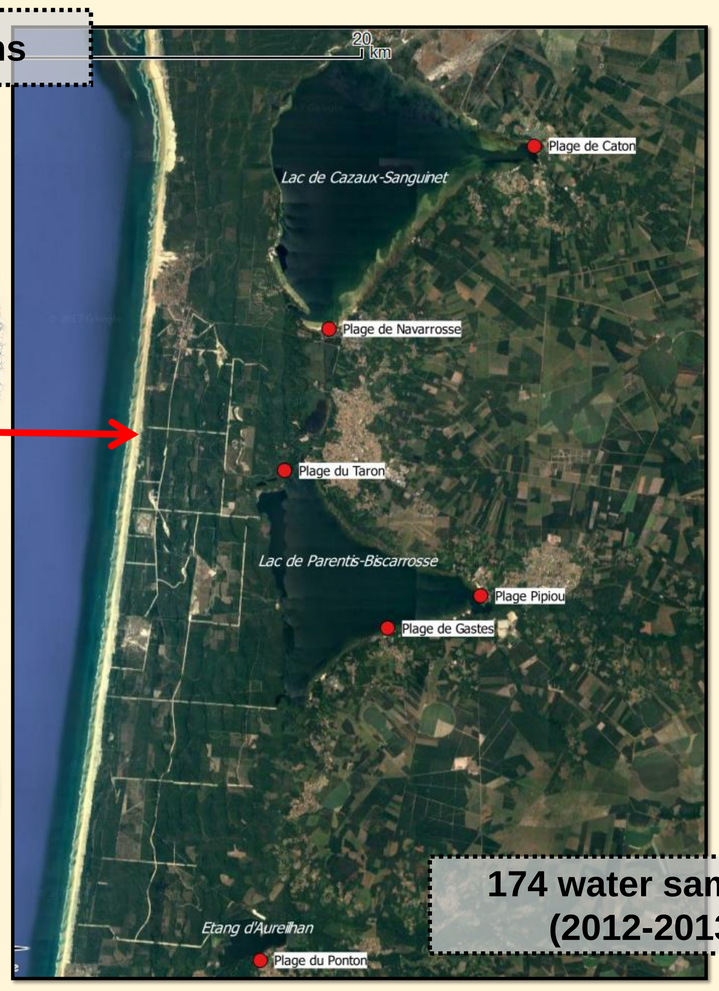
- reducing the time delay
- limiting the financial costs
- conserving the safety level

	REGLEMENTARY	PROPOSED
TOOLS	Laboratory ► *Microscopy*	In situ ► *Fluorimetric field probe*
METHODS	Counted cells ►CC.ml^{-1}	[cyanobacteria chlorophyll-a] ►µg/l
TIME DELAY	36 hours	Immediately
HEALTHCARE THRESHOLDS	≥ 20 000 CC.ml^{-1} ≥ 100 000 CC.ml^{-1}	**≥ ? µg/l ≥ ? µg/l**

Sites and methods

3 lakes – 6 stations

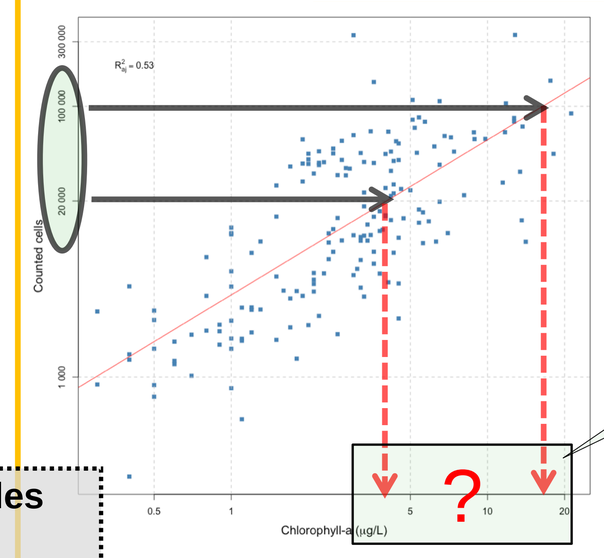




AlgaeTorch bbe
Fluorimetric field probe

174 water samples (2012-2013)

Thresholds definition



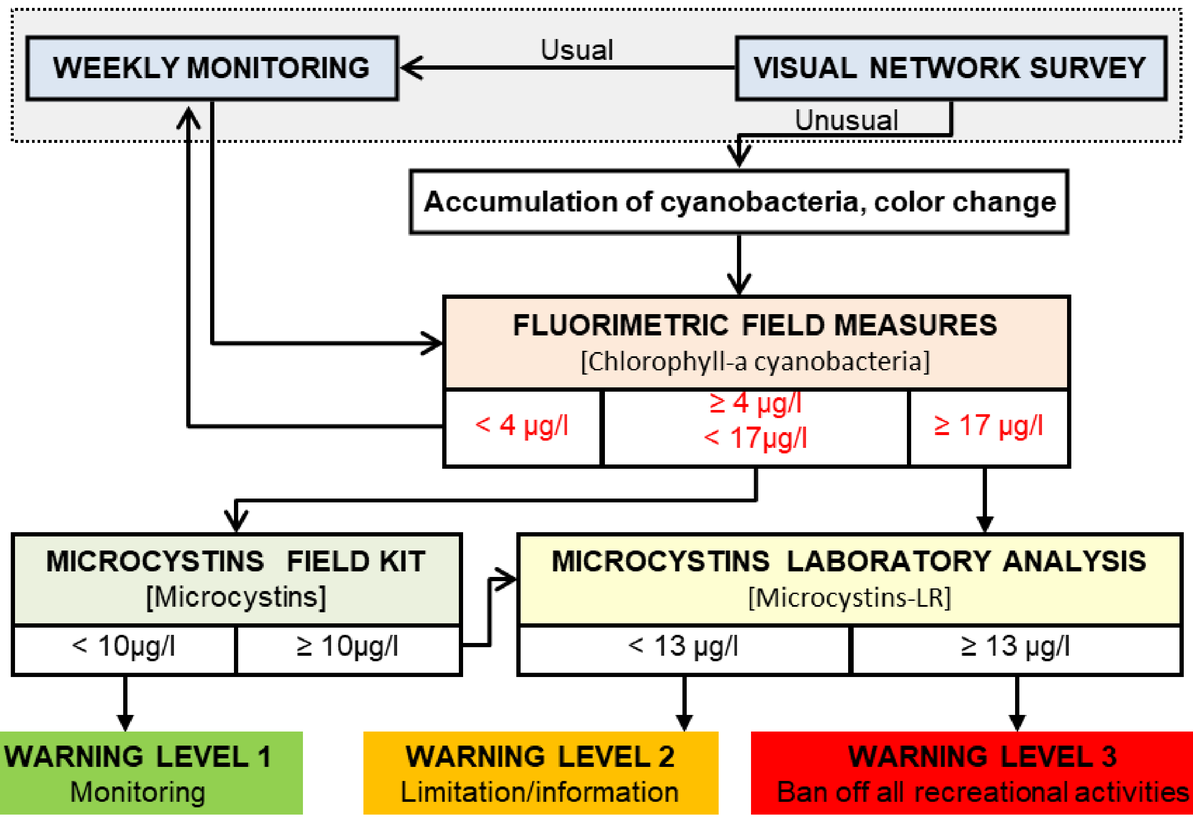
20 000 CC.ml^{-1} ► 4 µg/l

100 000 CC.ml^{-1} ► 17 µg/l

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

Results

THE NEW ALERT DECISION TREE



Validation

REGLEMENTARY Warning level	PROPOSED Warning level 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

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.

Institut national de recherche en sciences et technologies pour l'environnement et l'agriculture

CONTACT :
Moreira Sylvia – *sylvia.moreira@irstea.fr*
Tél. +33 0(5) 57 89 27 23
Centre de Bordeaux - UR EABX - ECOVEA

www.irstea.fr/bordeaux