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# An operational monitoring system for cyanobacterial blooms

## Application to water bodies in the South-Western France

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### 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

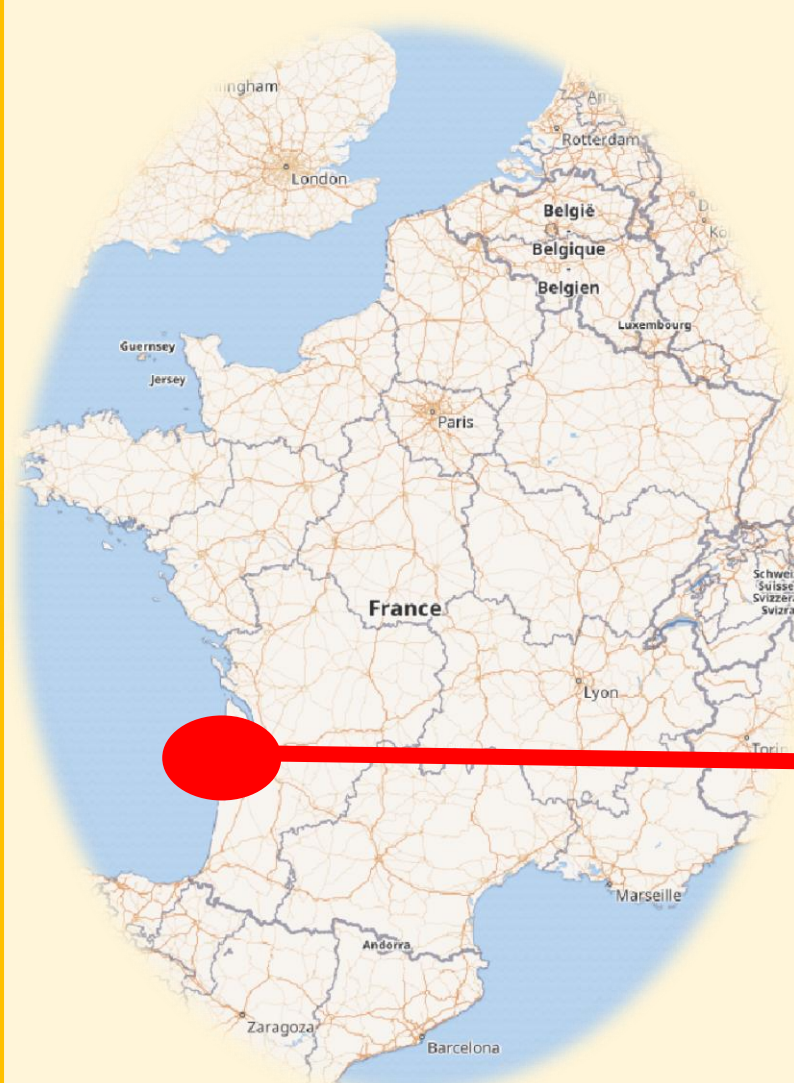
The present work, carried out between scientists and managers, proposed to modify the reglementary alert decision tree in :

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

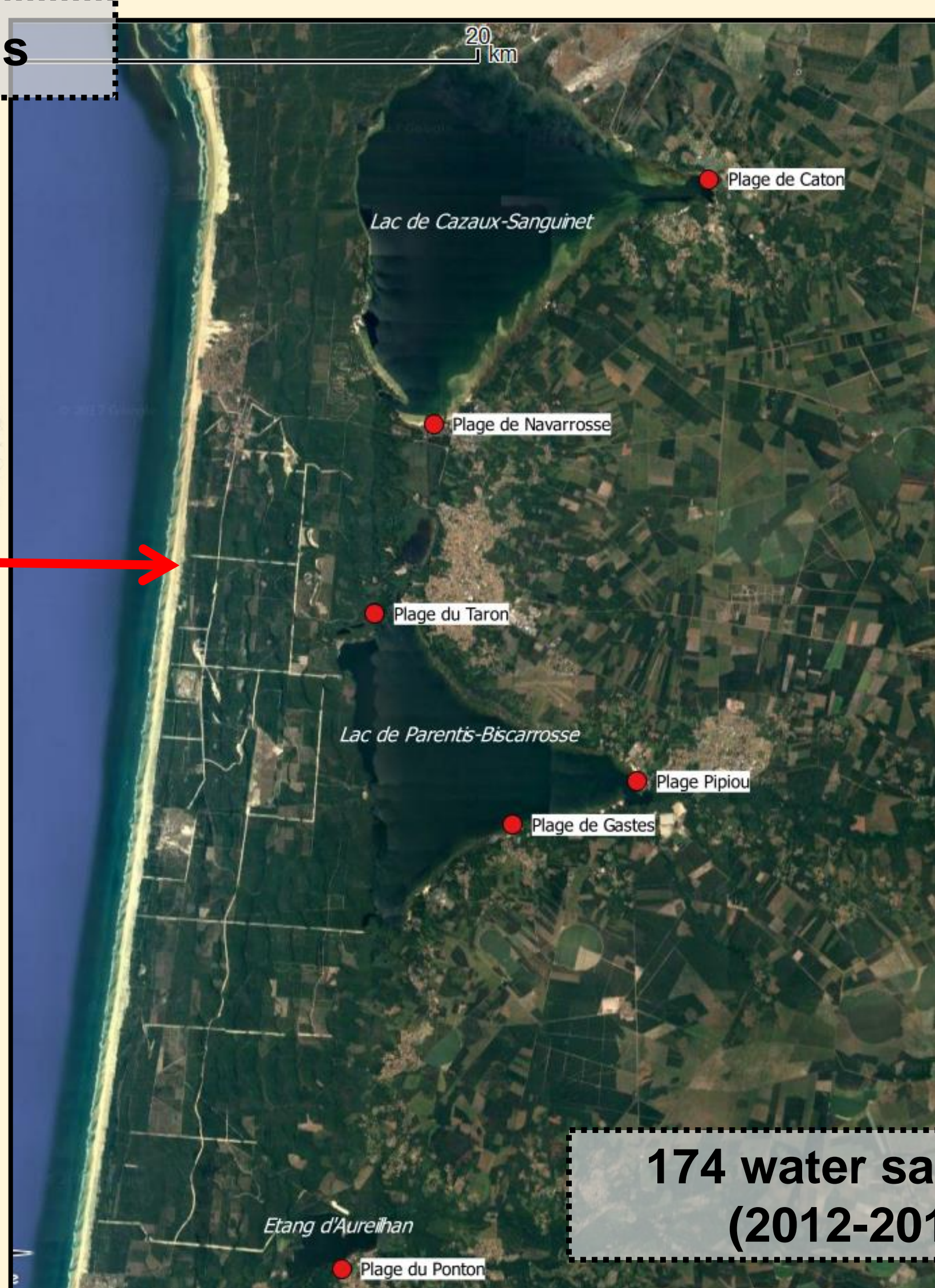
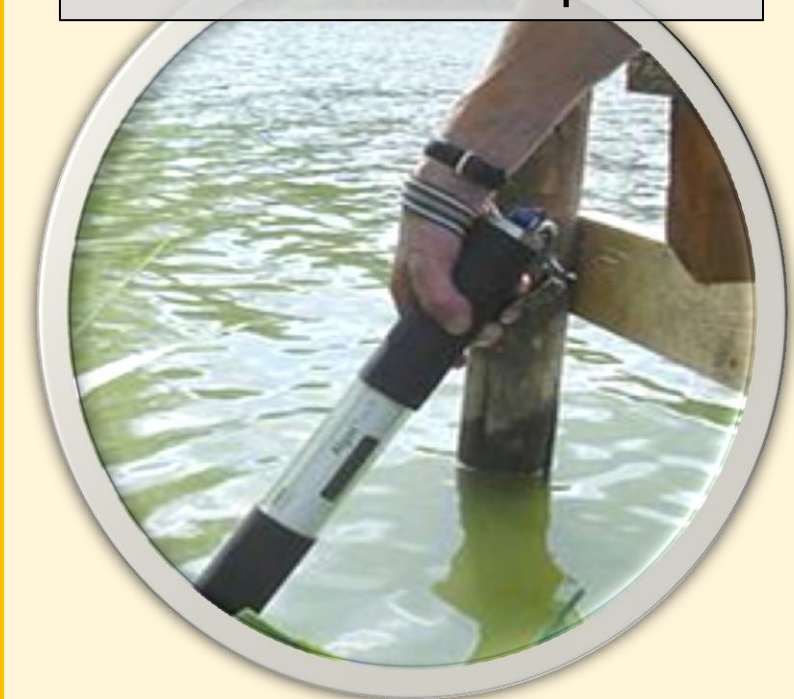
	REGLEMENTARY	PROPOSED
TOOLS	Laboratory ► Microscopy	In situ ► Fluorimetric field probe
METHODS	Counted cells ► CC.ml <sup>-1</sup>	[cyanobacteria chlorophyll-a] ► µg/l
TIME DELAY	36 hours	Immediately
HEALTHCARE THRESHOLDS	≥ 20 000 CC.ml <sup>-1</sup> ≥ 100 000 CC.ml <sup>-1</sup>	≥ ? µg/l ≥ ? µg/l

### Sites and methods

3 lakes – 6 stations

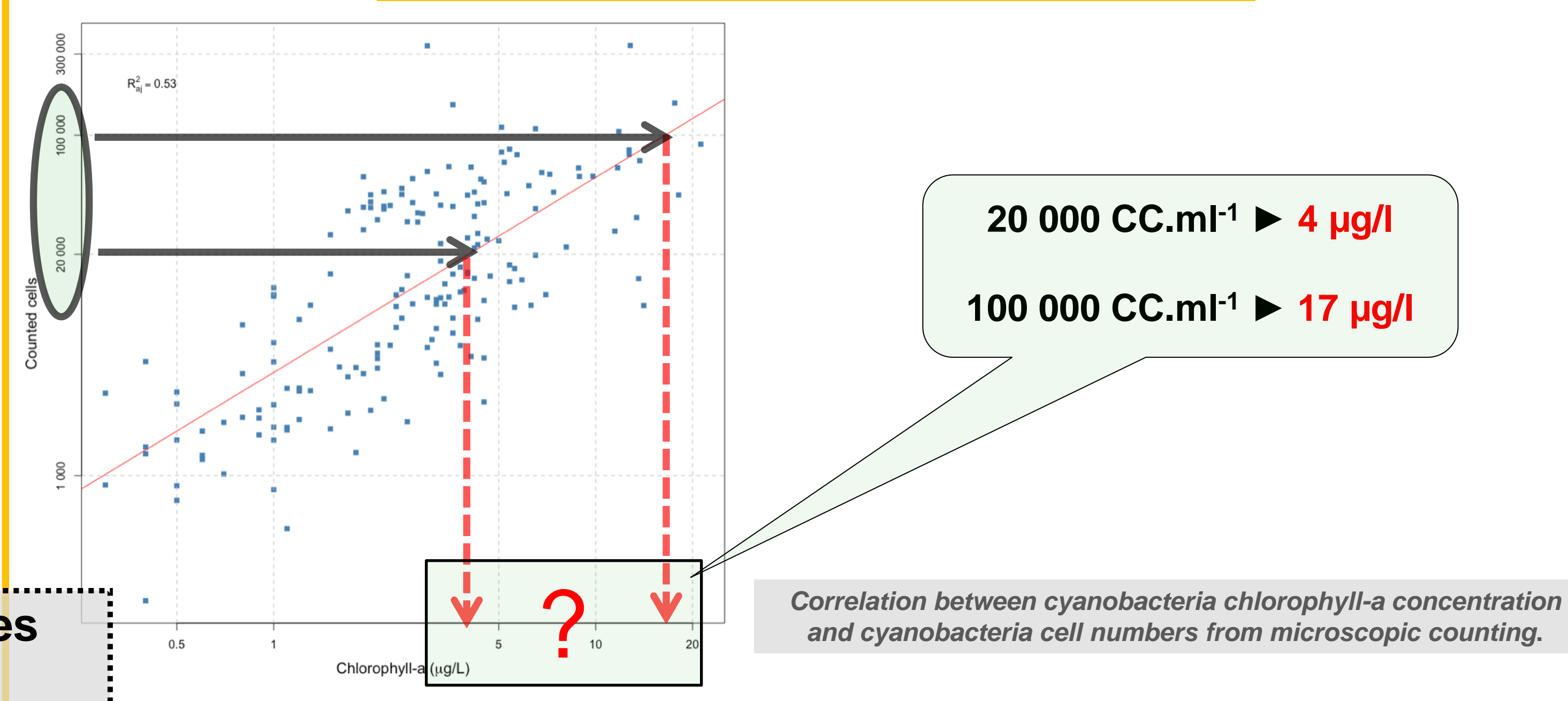


AlgaeTorch bbe  
Fluorimetric field probe



174 water samples  
(2012-2013)

### Thresholds definition



### THE NEW ALERT DECISION TREE

Results

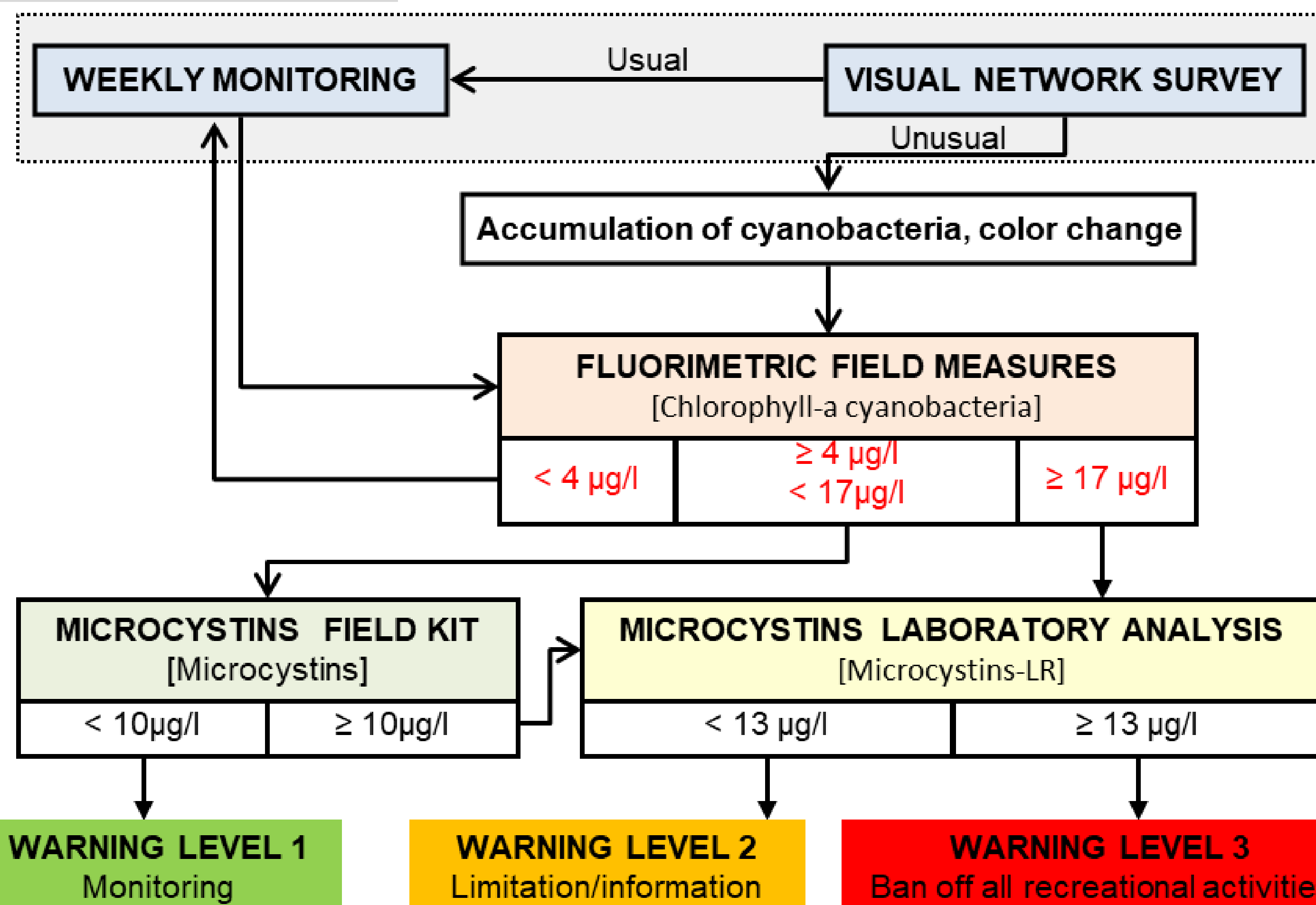
#### Validation

		PROPOSED Warning level			
		0	1	2	3
REGLEMENTARY Warning level	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.