The mitigation actions carried out on the watershed of Thau lagoon since two decades have induced a modification of phytoplankton communities. Our results highlighted a decrease of chlorophyll-a concentrations and of diatom abundances. They also evidenced a spatial heterogeneity of phytoplankton communities. To address the issue of the potential limiting capacity of the ecosystem, further analyses focusing on species composition and integrating the important part of biomass represented by nano- and pico-phytoplankton (Bec et al., 2014) need to be performed.

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**Fig. 1.** Thau lagoon’s location, shellfish farming areas and sampling stations.

**Fig. 2.** Chl-a biomass, Ochrophyta abundances, and Ochrophyta/Ochrophyta ratio (Rat) from 1994 to 2016 at Bouzigues station (left panel) and at Marseillan station (right panel).

**RESULTS**

**AIMS OF THE STUDY**

1) to highlight the changes in the biomass, abundance and composition of phytoplankton in Thau lagoon, in response to the reduction of nutrient inputs since the late 20th century;
2) to compare results collected on two stations to highlight a potential spatial heterogeneity.

**MATERIALS & METHODS**

**PHYTOPLANKTON MONITORING**

- Sampling twice a month, since 1994 at Bouzigues station and since 2009 at Marseillan station (Fig. 1; BREMER, 2015).

**IMPROVEMENT OF WATER WFD ECOSYSTEMAL STATE**

- DIP concentrations measured in water during summer months (triangles: median values) at historic station from 1972 to 1993* and at WFD stations from 1998 to 2016 (Fig. 3).
- Levels of Chl-a concentrations in 1994 to 0.93 µg.L-1 in 2016 (Fig. 4a).
- Maximum levels were reached during summer. Another bloom of lower magnitude was observed during spring until 2005.

**CHLOROPHYLL-A BOUZIGUES**

- Levels of Chl-a concentrations decreased by 56.5% from 2.14 µg.L-1 in 1994 to 0.93 µg.L-1 in 2016 (Fig. 4a).
- Maximum levels were reached during summer. Another bloom of lower magnitude was observed during spring until 2005.

**DIATOMS (OCHROPHYTA) BOUZIGUES**

- Levels of diatom abundances decreased by 78% from 188 500 cell.L-1 in 1994 to 41 000 cell.L-1 in 2016 (Fig. 4c).

**MAREILLAN**

- From 2009 to 2016, levels of diatom abundances were on average 3.6 times lower at Marseillan than at Bouzigues. Chl-a decreased by 34% from 1.01 µg.L-1 in 2009 to 0.67 µg.L-1 in 2016 (Fig. 4d).

**ECONOMY AND BIODIVERSITY**

- From 2009 to 2016, the number of shellfish farms decreased by 56% from 10 000 to 4 500 in 2016.
- The ratio was mainly driven by diatom abundances, as abundances of dinoflagellates remained stable (~4 000 cell.L-1).

**RATIO DINOFLAGELATES/DIATOMS BOUZIGUES**

- Dinoflagellates were dominant (ratio ~1) (Fig. 4e).

**DISCUSSION**

- From congener abundances: From five years to four times in 2014 (Fig. 4f).
- Abundances of diatom abundances decreased by 55%, from 3 800 cell.L-1 in 2009 to 1 700 cell.L-1 in 2016.