



## Anses recommendations to prevent human poisoning linked to the proliferation of *Ostreopsis* on the south-west French coast

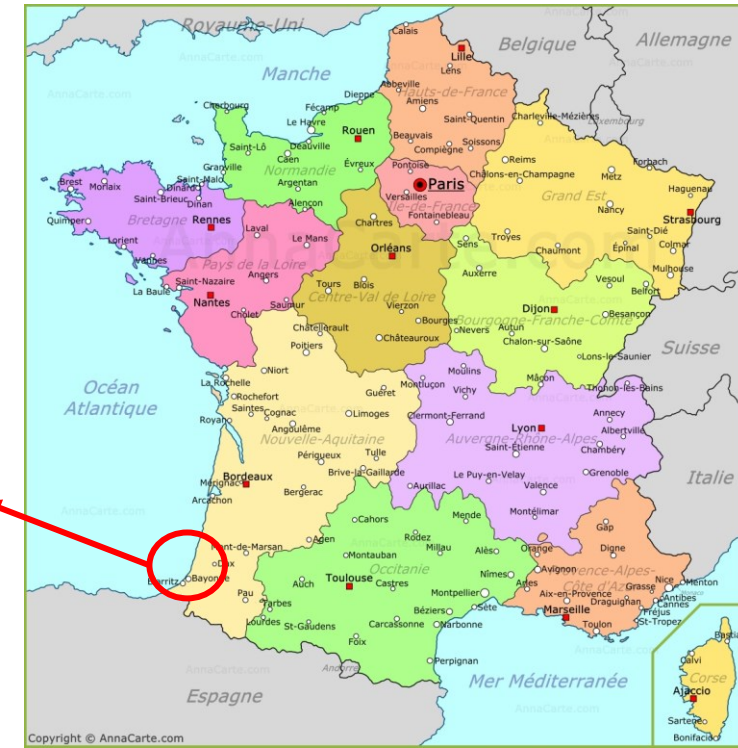
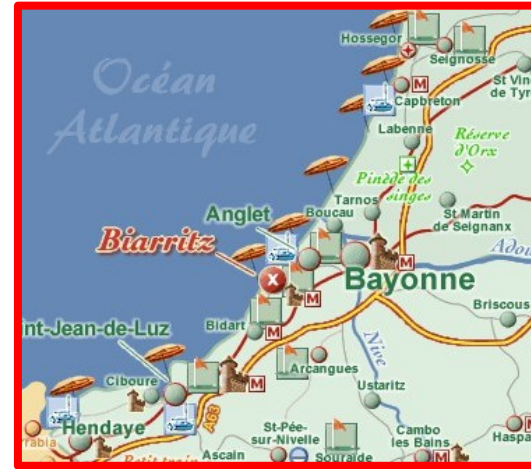
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French Agency for Food, Environmental and Occupational Health Safety

Aquatic toxins symposium – BfR, Berlin 10-11 June 2024

# Context

- ❖ Several beaches along the Basque coast have been affected by *Ostreopsis* proliferation since 2021
- ❖ The main route of exposure is via aerosols
- ❖ The origin of the poisoning is still unknown (cells, cellular debris or toxins)
- ❖ Exposure of professional, recreational or sporting activities
  - in the sea (bathers, lifeguards, professional fishermen, surfers, etc.);
  - in the vicinity of the beach (holidaymakers, lifeguards, beach cleaners, restaurant owners, etc.);



# Epidemiological review

**2021 : 830 reports collected by the poison centres and 674 cases retained**

2022 : Reporting poisoning to the health regional agency via medical consultation → **103 cases retained**

**Change in the system for collecting reports of human poisoning → data for 2021 and 2022 cannot be compared**

Flue-like syndrome including the following symptoms :

- Cough
- Headache
- Oropharyngeal pain
- Dyspnea
- Rhinorrhea
- Odynophagia (painful swallowing)



# Request 2021-SA-0212

The General Directorates for Food (DGAI) and for Health (DGS) asked Anses to update the knowledge about *Ostreopsis* on which the Agency issued opinions in 2007 and 2008, and to make specific recommendations for the Atlantic coast



Afssa – Saisine n° 2007-SA-0227

Maisons-Alfort, le 22 Août 2007

→ Consumption of sea products in the presence of *Ostreopsis ovata*

## Appui Scientifique et Technique

de l'Agence française de sécurité sanitaire des aliments relatif à la consommation de produits de la mer en présence d'*Ostreopsis ovata*

LA DIRECTRICE GÉNÉRALE



AGENCE FRANÇAISE  
DE SÉCURITÉ SANITAIRE  
DES ALIMENTS

Afssa – Saisine n° 2007-SA-0303  
Saisine liée n° 2007-SA-0227

Maisons-Alfort, le 11 juillet 2008

→ Monitoring of the environment and food placed on the market in relation with *Ostreopsis*

## AVIS

de l'Agence française de sécurité sanitaire des aliments  
relatif à la pertinence de compléter le dispositif général de surveillance  
du milieu marin et des aliments mis sur le marché par la prise en compte de  
la microalgue épibenthique *Ostreopsis*

LA DIRECTRICE GÉNÉRALE

→ Expertise work carried out by a WG (15 scientists sharing a multidisciplinary expertise) and 3 specialized experts committees

# 1 — Synthesis of the expertise appraisal

# Ostreopsis

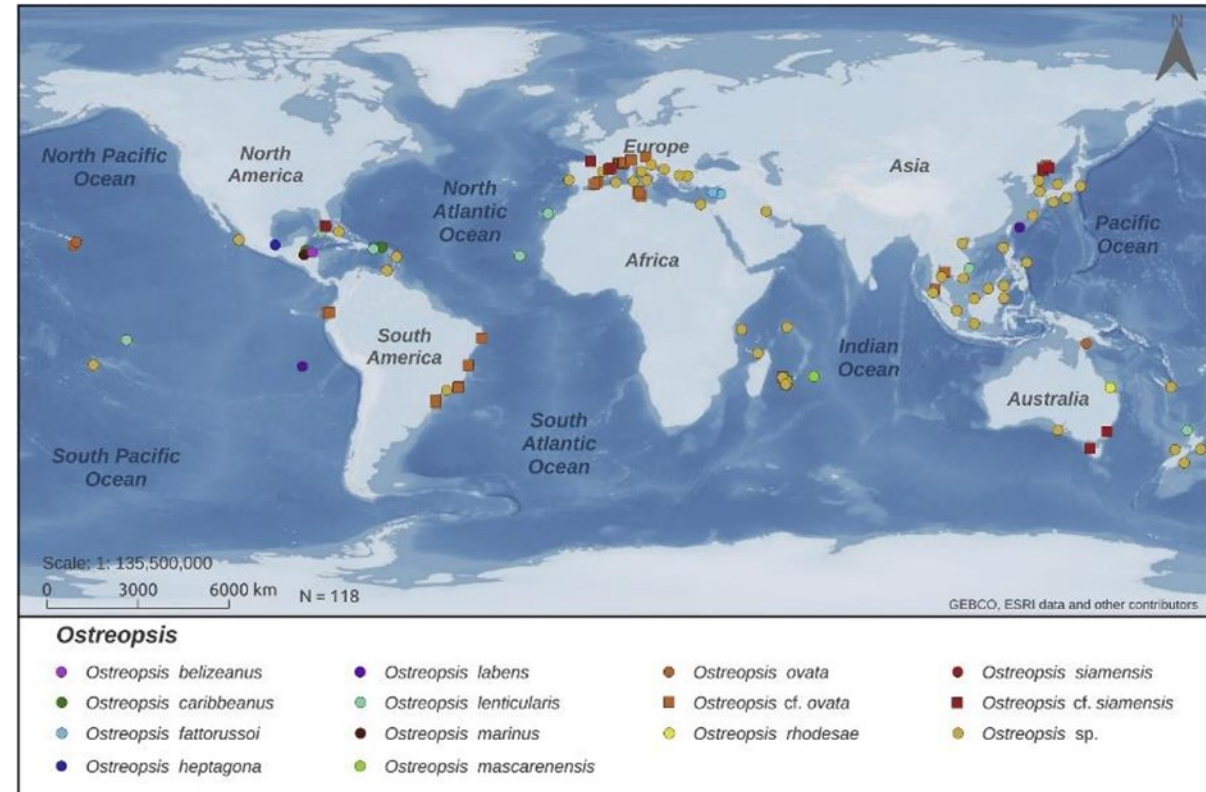
- ❖ Lentil-shaped microalgae (40 to 100  $\mu\text{m}$  long) with two flagella
- ❖ Genus easily recognized under light microscope but more difficult to go to the species level (12 species described)  $\rightarrow$  genetic identification required



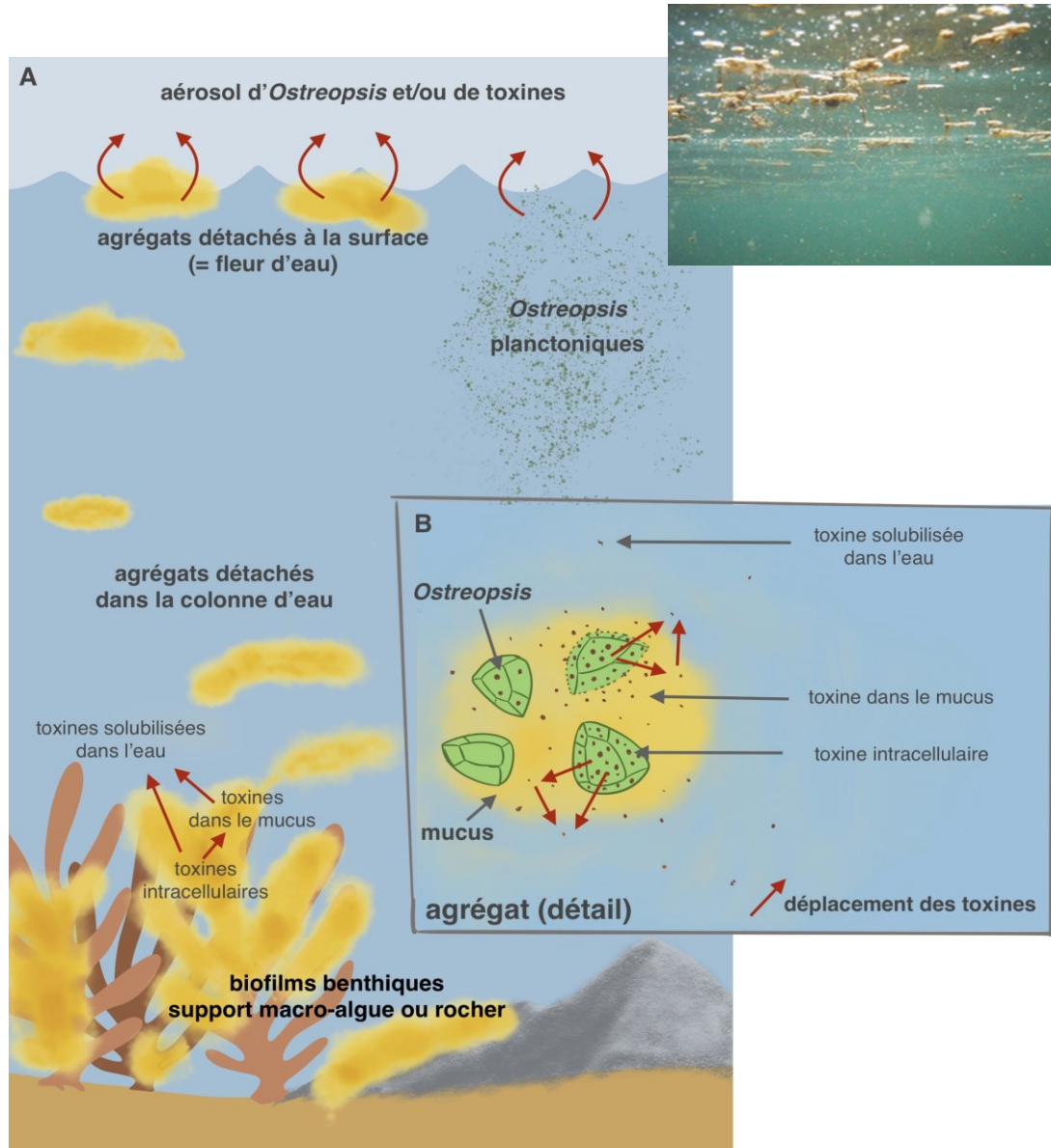
- ❖ Three species present in the Mediterranean: *O. cf. ovata*, *O. cf. siamensis* and *O. fattorussoi*

- ❖ *Ostreopsis cf. ovata* only species identified on the French Mediterranean coast

- ❖ *Ostreopsis cf. siamensis* was initially the only species in the Bay of Biscay (European Atlantic coast), but since 2021, *O. cf. siamensis* and *O. cf. ovata* are both present on the French Basque coast



# Ostreopsis ecology



- ❖ *Ostreopsis cf. ovata* life cycle includes 2 phases:
  - Benthic phase: cells in a biofilm colonizing substrates, either biotic (eg. macroalgae) or abiotic (eg. stones, rocks) → mucous
  - Planktonic phase: cells detached from the substrate and migrate into the water column
- ❖ In the Mediterranean, *O. cf ovata* most abundant
  - In the aggregates (benthic phase) between 8 am and noon
  - In the water column (planktonic phase) by the end of the afternoon

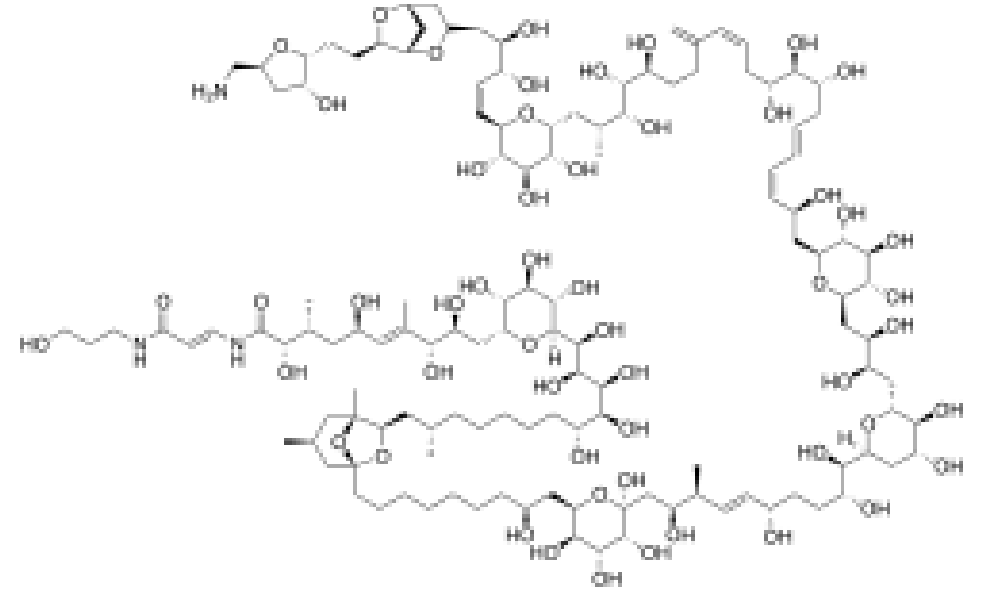
# Toxins produced by the species of the *Ostreopsis* genus

## Toxins of the palytoxin (PLTX) group

- Putative/isobaric palytoxine (isob-PLTX) (*Mediterranean*)
- Ovatoxins (OVTXs) (*Basque coast, Mediterranean*)
- *Ostreocins*
- *Mascarenotoxins*

## Toxins that do not belong to the PLTX-group

- *Ostreols*
- *Ostreotoxins*
- *Liguriatoxins et Rivieratoxins* (*Mediterranean*)



***Ostreopsis* cf. *ovata* does not produce PLTX but isob-PLTX**

***Ostreopsis* cf. *ovata* (Basque coast and Mediterranean strains) produces OVTXs**

**Use of PLTX as a proxy for the toxins of the PLTX group**





- ❖ Development of an acute oral toxicological reference value = **0.08 µg PLTX/kg bw/d** (derived from a NOAEL from Boente-Juncal et al., 2020)
- ❖ **No value for exposure to PLTX by inhalation or skin contact could be proposed (insufficient data)**
- ❖ *In vivo* and *in vitro* study results suggest that PLTX and OVTX-a have the same mechanisms of action on cells
- ❖ Acute toxicity data for OST-D shows effects similar to those of PLTX
- ❖ **the acute toxicological reference value for oral exposure applies to the unweighted mass sum of PLTX, OVTX and OST-D**

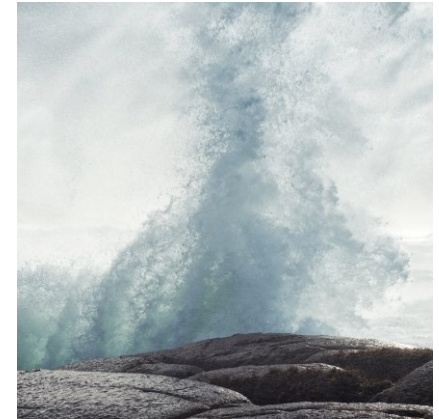
## Water contamination

It is not possible to exclude the risk of exposure through ingestion or skin contact with water contaminated with toxins from the PLTX group



## Air contamination

Despite the lack of sufficient knowledge about the nature of toxic compounds and the processes responsible for their transfer to the atmosphere, the experts on the 'Ostreopsis' WG confirm that the main route of human exposure is inhalation



## Seafood contamination

The WG considers that it is not possible to exclude the risk of oral exposure associated with the consumption of seafood contaminated with toxins from the PLTX group, especially for organisms consumed unviscerated



## **2 — Recommendations for the monitoring of Ostreopsis**

# Sampling strategy

- ❖ Health monitoring to be carried out **only on sites already affected by *Ostreopsis*** (beaches or water activities sites)

Outside these sites, surveillance must be triggered if:

- Presence of aggregates
  - Reporting cases of poisoning
  - **Metallic taste (without necessarily water ingestion)**
- ❖ The monitoring period must be at least the same as the bathing water monitoring period (15 June - 15 September)
  - ❖ It should be started earlier if spring temperatures are above seasonal normals
  - ❖ Samples must be taken in both compartments (benthic and planktonic) in the late afternoon
  - ❖ Maximum turnaround time for identification and enumeration results = 48 hours



**No aerosol monitoring recommendation at present**

# Sample collection and storage

## Aggregates

- ❖ Collected in a plastic bag or wide-mouth bottle
- ❖ Stored in the dark and at room temperature → laboratory
- ❖ Qualitative analysis only (*Ostreopsis* confirmation)



## Planktonic compartment

- ❖ Integrative sample taken between 20 and 50 cm deep (3 samples pooled)
- ❖ Use of lugol in the hour following sampling (storage in the dark and at room temperature)
- ❖ Quantitative analysis possible (number of cells/L)

## Benthic compartment

- ❖ Three samples taken from substrates located at a depth of 50 cm and spread across the zone
- ❖ Sampling of 5 to 10 g of macrophytes and surrounding water
- ❖ Use of lugol (storage in the dark and at room temperature)
- ❖ Quantitative analysis possible (number of cells/g fw)

**Maximum turnaround time for identification and enumeration results = 48 hours**

# Proposed guide value for toxins

- ❖ Lack of knowledge about the compound(s) responsible for human intoxications reported during episodes of *Ostreopsis* proliferation on the Basque coast → **no guide value** for the toxins produced by *Ostreopsis* in **water or aerosols**.
  - ❖ For shellfish, based on:
    - ✓ the acute oral TRV of 0.08 µg PLTX/kg bw
    - ✓ a default portion size of 400 g of flesh of bivalve mollusks (EFSA 2010)
    - ✓ default body weight of 70 kg
- recommendation of a guide value of **15 µg eq. PLTX.kg<sup>-1</sup> shellfish flesh** (whole body or in any edible part separately), **for the sum PLTX + OVTX + OST-D** (unweighted mass sum)

NB: EFSA (2009) recommended a guide value of 30 µg eq. PLTX.kg<sup>-1</sup> of shellfish flesh for the sum of PLTX + OST-D

## Proposed guide value for toxins

- ❖ No guide value for other sea products (→ contamination data required)
- ❖ Fish from a contaminated area must be eviscerated before consumption and freezing
- ❖ Small fish must not be eaten whole
- ❖ Sea urchins viscera should not be eaten either and the summer fishing ban must be respected where it exists
- ❖ Macroalgae should not be harvested throughout the *Ostreopsis* proliferation episode



# Seafood monitoring

- ❖ Monitoring of shellfish farming and shore fishing sites likely to be contaminated in Nouvelle-Aquitaine (→ EMERGTOX - monitoring the emergence of marine biotoxins in shellfish)
- ❖ At the national level, harmonisation of the shellfish sampling strategy and the analytical approach for identifying and quantifying the toxins involved
- ❖ Evaluation of the contamination of other fishery products exposed to *Ostreopsis* (cephalopods, crustaceans, gastropods, sea urchins, fish, algae for human consumption)
- ❖ Use of sea urchins as sentinel species?

## Limiting exposure of professionals and local residents

- ❖ Information, health surveillance, protection equipments...

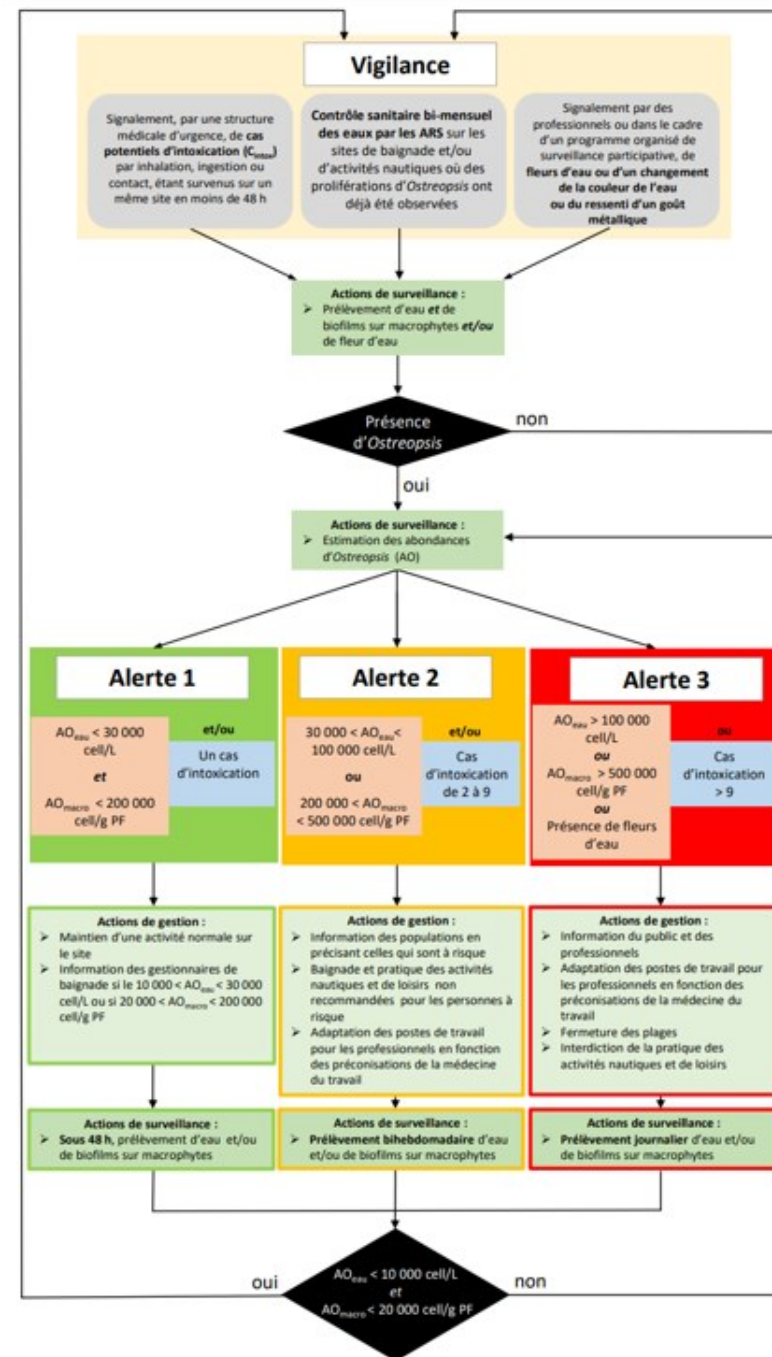
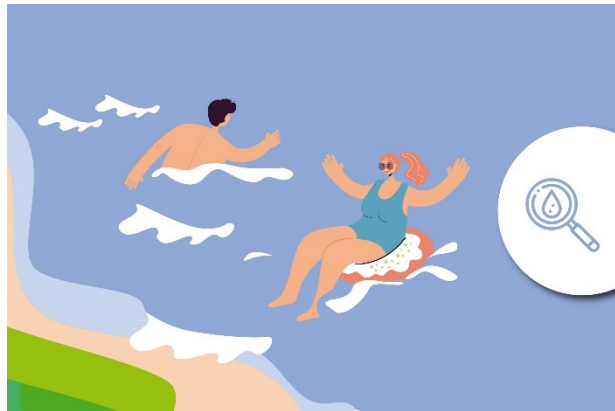




## 2 — Help with managing Ostreopsis proliferation

Four decorative orange leaf-like shapes are scattered across the slide. Two are positioned above the word "Ostreopsis" and two are positioned to the right of the word "proliferation".

# Local management support





- Carole Catastini
- Nathalie Arnich
- Members of the *Ostreopsis* WG
- Members of the specialized expert committees (Eaux – ERCA – VSR)

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Accueil > Toutes les actualités > Prévenir les intoxications par *Ostreopsis* sur la côte basque



20/06/2023 — Expertise ⌚ 1 min SANTÉ ET ENVIRONNEMENT

## Prévenir les intoxications par *Ostreopsis* sur la côte basque