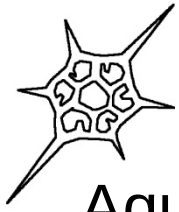
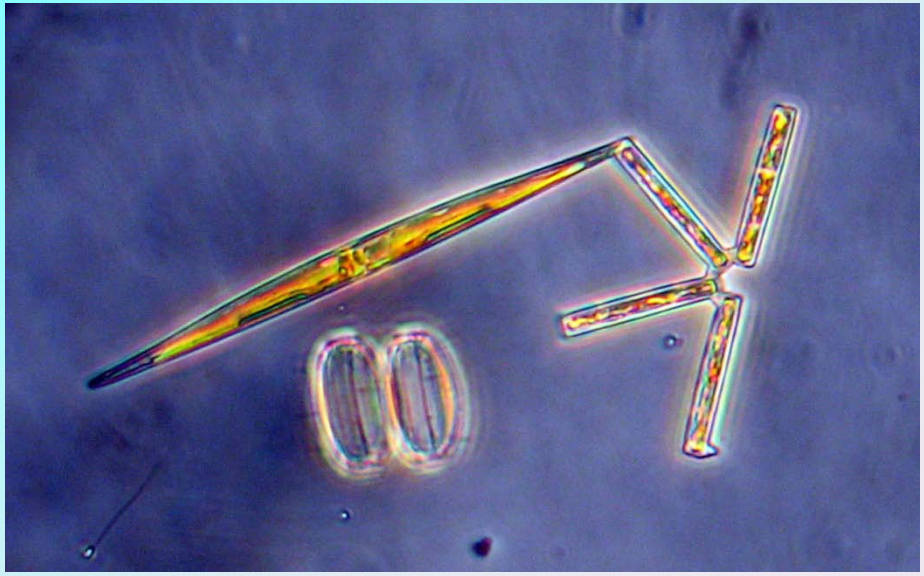
Phytoplankton diversity and screening for small shellfish growers

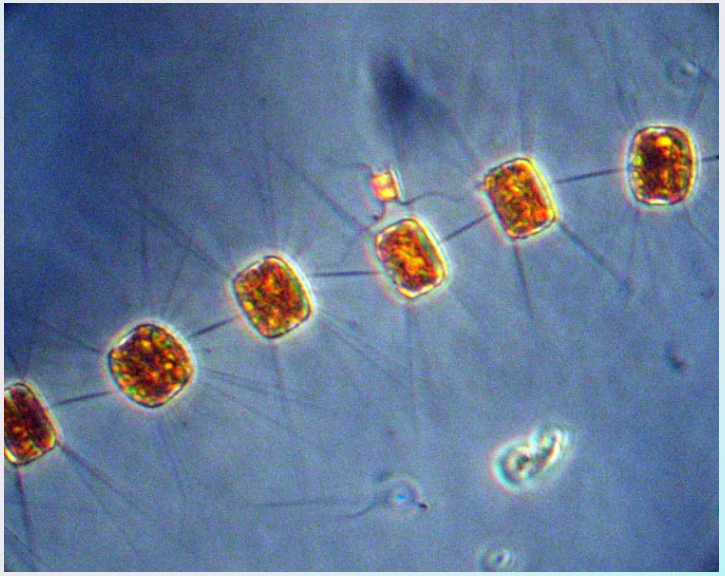
A volunteer-based harmful algae monitoring network

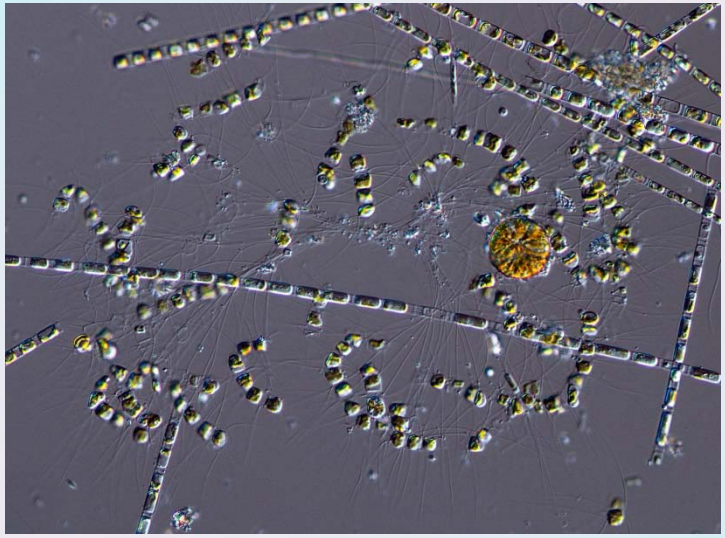


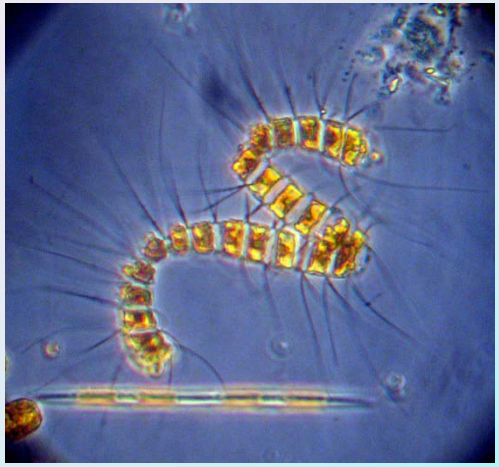
David Cassis
AquaBC Consulting

Diatoms = good food (most of them)





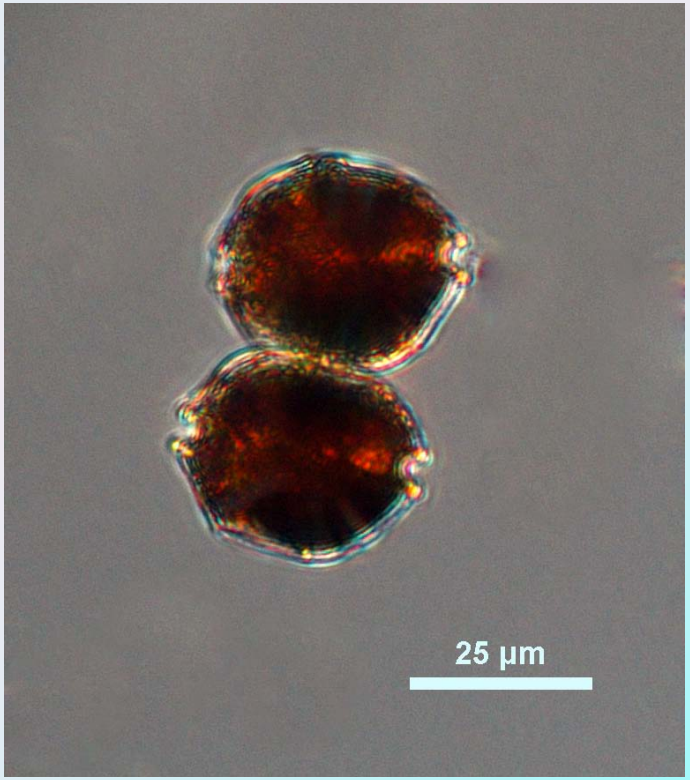


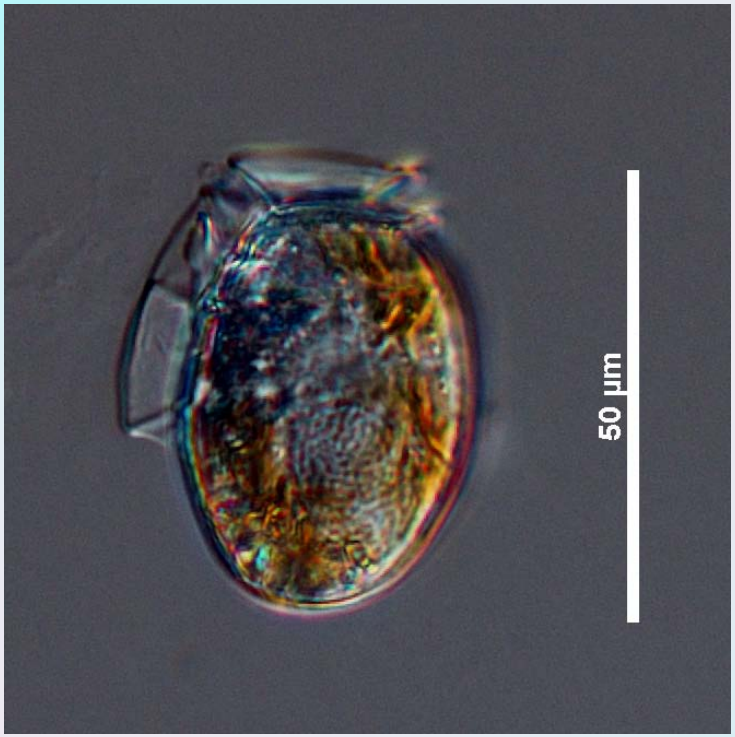


Images: Phyto'pedia

Dinoflagellates

- Some harmful
- Some toxic (PSP, DSP)
- Some nutritious

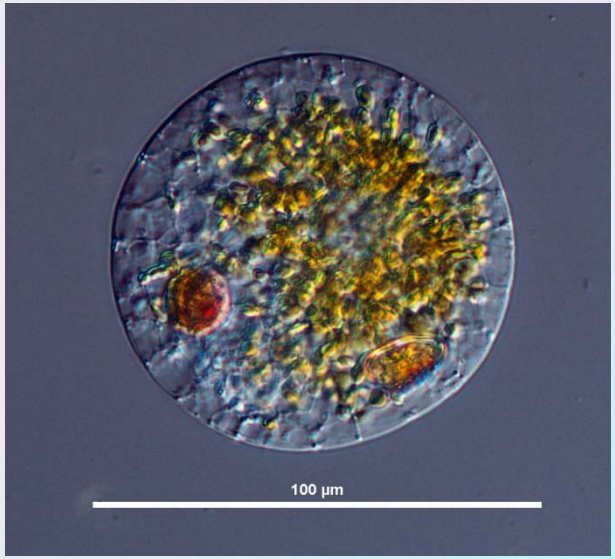


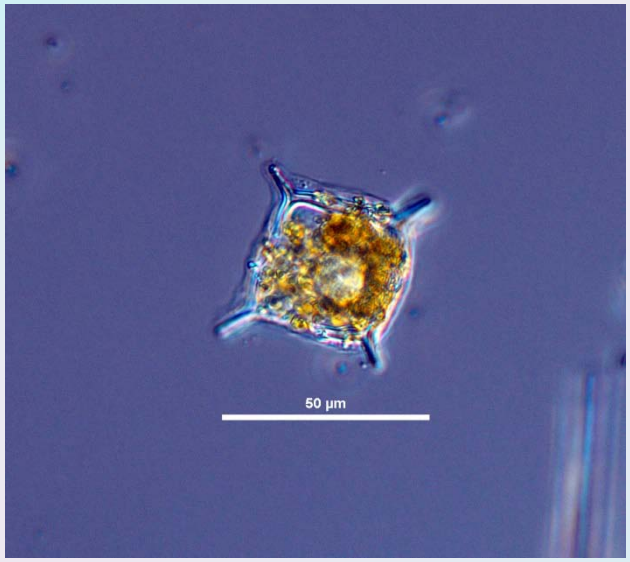


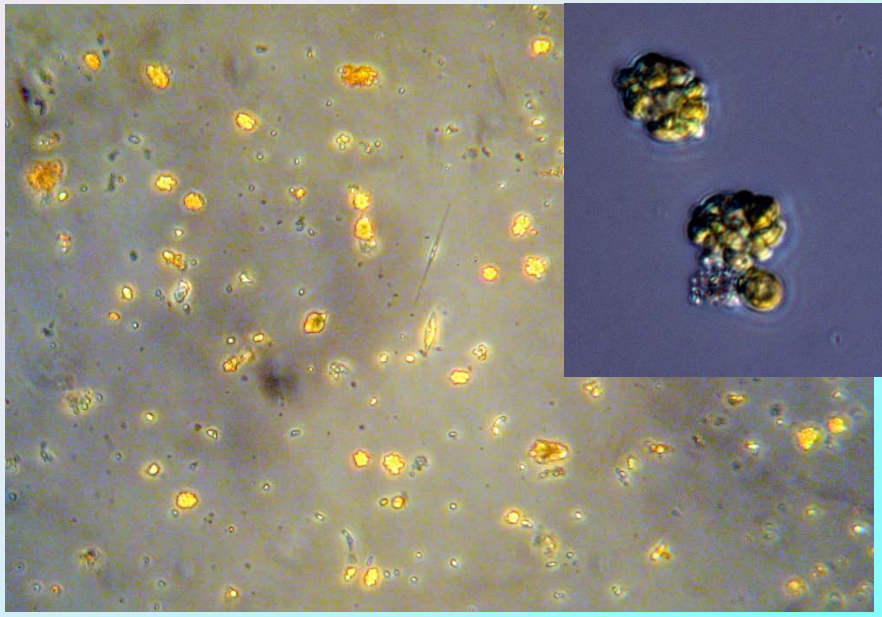
Images: Phyto'pedia

Other groups

- No cumulative toxins
- Mortalities (*Heterosigma*)
- Some can change quality (red oysters)

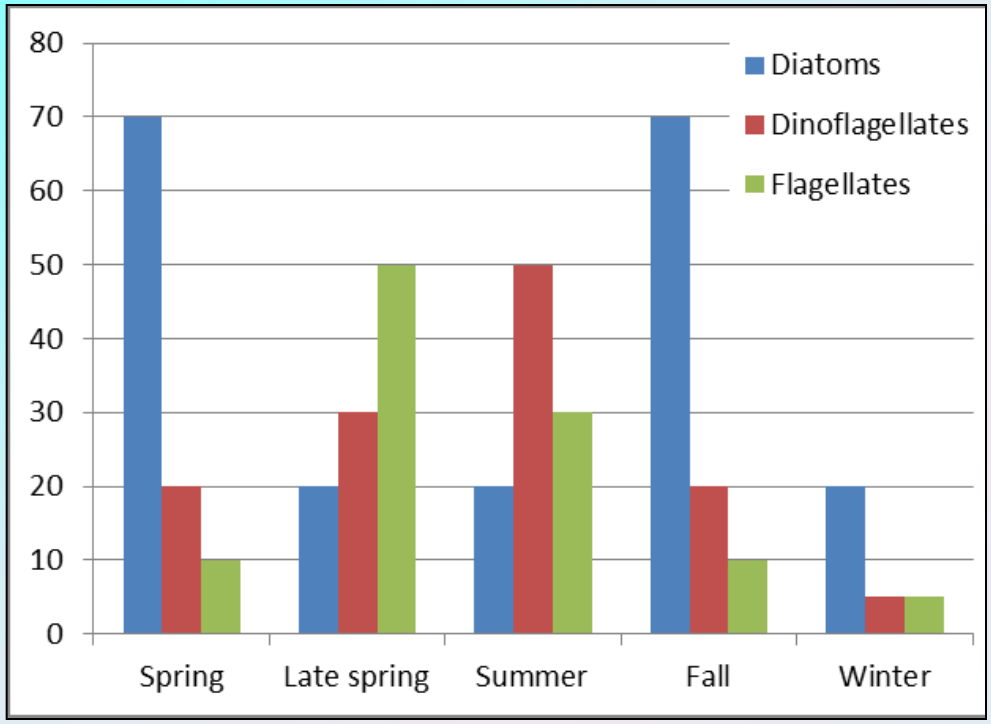




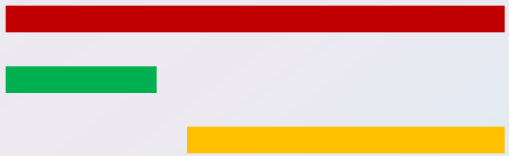


Images: Phyto'pedia

Year cycle of the phytoplankton



- Populations and species vary throughout the year
- Similar pattern every year



Alexandrium (PSP)
Heterosigma
Dinophysis (DSP)

Algal effects on shellfish

- Nutritive, main source of food

- Toxicity
  - (PSP, ASP, DSP)
  - New threats

} Closures
Delayed harvest

Increased costs

- Mortalities
- Reduced growth

} Loss of seed
Product loss
Reduced yield

Increased costs

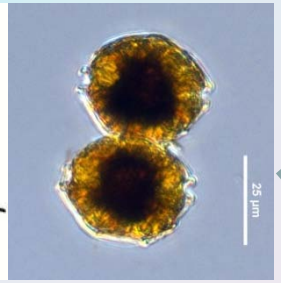
HAB monitoring

- Most systems based on toxin detection
- Phytoplankton monitoring:
  - Different degrees of technification and purposes
- West coast
  - Canada: HAMP (phytoplankton), CFIA (toxins)
  - AHAB, MOCHA, ORHAB
  - Several in Puget Sound

A 4-pronged plan

1. **Eyes on the ground**:
   volunteer-industry phytoplankton monitoring network



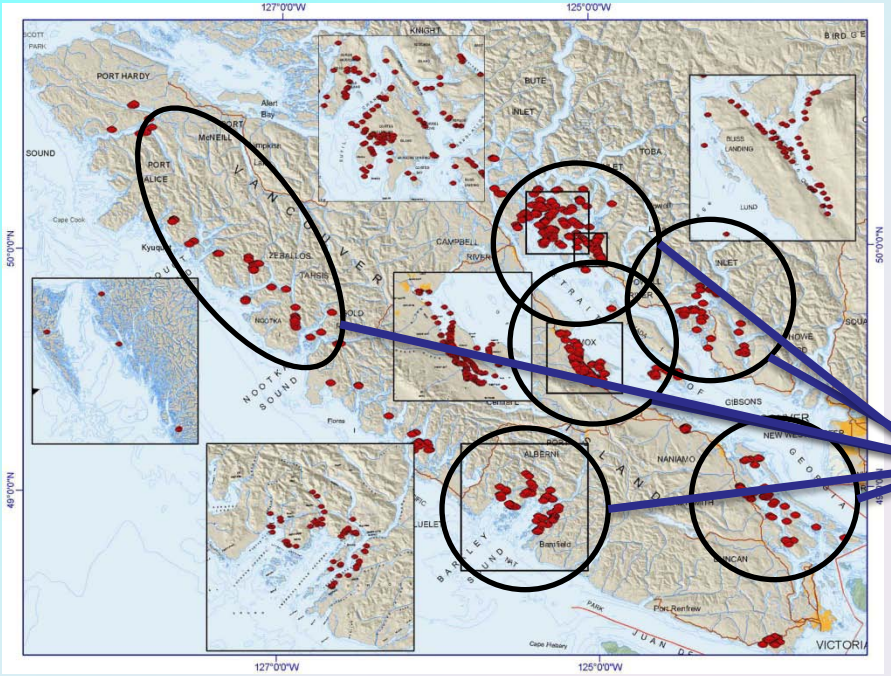


2. **Actionable information**:
   generate a path for the information so that it can become actionable in near/real time

3. **Enhanced response**:
   cascade of actions once the information is received

4. **Optimization through exchange**: foster local experts and exchanges with international sources of experience (USA, Chile, Spain, etc.)

Eyes on the ground



Map: BCSGA

- Create and train local “action groups”
- Support through training, identification tools and expert advice
- Connect these groups into a network through Internet-based tools

- Objective is to check the phytoplankton often and raise a “yellow flag” if HAB is detected

Actionable information

A coherent flow of information

- Create the links necessary from the monitoring network to government organizations responsible

A simple plan

- Institutions and general framework already in place (BCSGA, EC, CFIA, DFO)
- Need training and expert advice

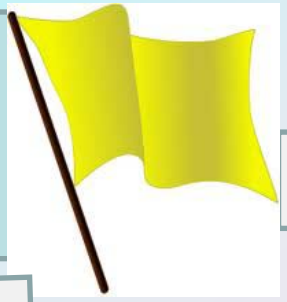
Enhanced response

A proportional response to potential threats

- What to do once a “yellow flag” is identified?
- How to respond to and confirm potential threats?

A proportional and informed response plan

Voluntary preventative closure

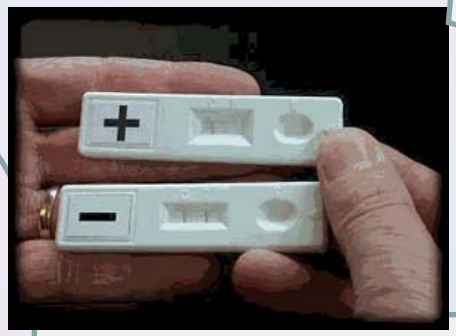


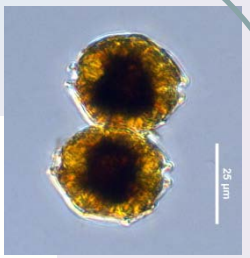
Information

Environment Canada

Detection

Rapid test





Confirmation

CFIA Quantitative testing

DFO closure

Optimization through exchange

Improvement of network, response and training

- Foster exchanges and workshops with local and international experts (USA, Chile, Spain)
- Increase collaboration in international forums (PICES, ISSHA)
- Formation of new local experts

HAB/phytoplankton monitoring

Costs

- Basic framework already in place
- Low cost
- Expertise already exists in BC

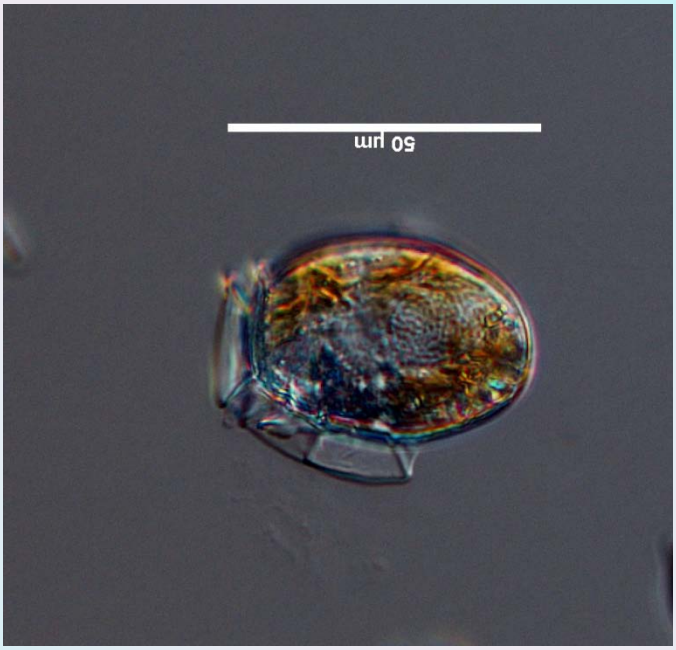
Benefits

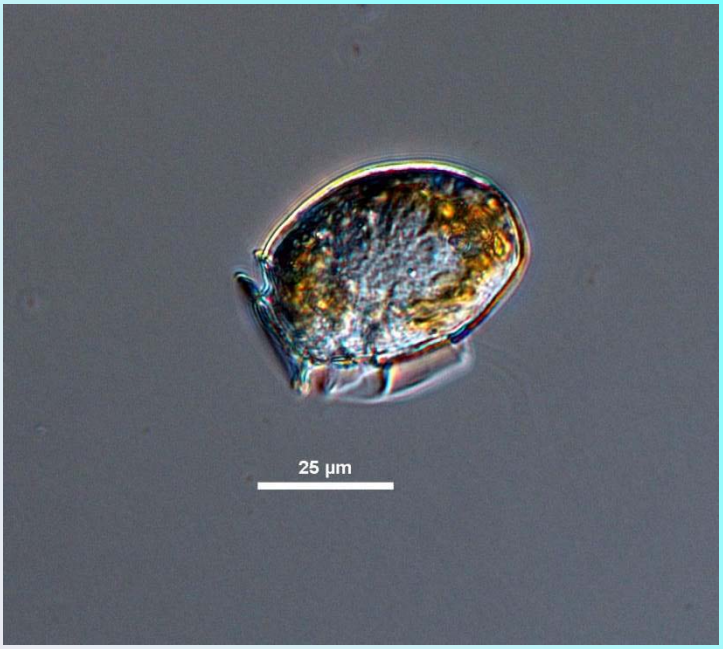
- Advance notice on toxic events (+ new threats)
- Adds flexibility and better coverage to toxin monitoring

- Phytoplankton and HAB seasonality
  - Plan for planting and harvest
  - Reduce seed mortality

“If you know your enemy and know yourself, you need not fear the result of a hundred battles”

Sun Tzu





Thank you