

Toxic algae hot spot found off B.C. coast

Last Updated: Wednesday, February 4, 2009 | 5:44 PM ET [Comments](#) 27 [Recommend](#) 33
CBC News

Researchers believe they have found the main source of a toxic algae that contaminates shellfish in the state of Washington.

The Juan de Fuca Eddy, off the west coast of Vancouver Island, is the origin of most toxic blooms that affect Washington State, said a paper published in the February issue of the journal *Limnology and Oceanography*.

Wind, currents shove algae to shore

Rather, it seems coastal algal blooms are caused by changes in winds and currents that move the algae from the eddy toward the shore, Trick said.

Washington State is affected rather than B.C. because the currents head south and because the nearest shoreline in B.C. is rocky, rather than sandy as it is in Washington State, he added.

Friday, August 11, 2006 - Page updated at 06:09 PM

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Record levels of toxins prompt shell fishing closures

By **Jennifer Sullivan**
Seattle Times staff reporter

Puget Sound beaches across King, Pierce and Snohomish counties are closed to shell fishing because state marine biologists say toxins are at lethal levels.

The last time a person died in Washington state from consuming poisonous shellfish was in 1942, said Frank Cox, a marine biotoxin coordinator for the state Department of Health. That person died from eating Strait of Juan De Fuca shellfish with 3,500 micrograms of paralytic shellfish poisoning. Earlier this week, marine biologists found shellfish with 3,600 micrograms of poisoning at the Edmonds Marina.

"What we have in central Puget Sound is record level paralytic shellfish poisonings," Cox said today from his office in Olympia. "Those are what I consider lethal doses."

Deadly plankton invasion takes toll on fish

By **Ross Anderson**
Special to The Seattle Times

As if Puget Sound salmon didn't have enough problems already, a deadly plankton "bloom" has killed thousands of fish around the Strait of Juan de Fuca, and has threatened to sweep down Puget Sound.

Scientists from Port Angeles to Seattle this week are nervously tracking a biological explosion of *Heterosigma*, a microscopic plankton that has multiplied to such numbers that last week they were easily visible from the air, long streaks of rust brown on the surface of the strait.

The outbreak eased a bit Monday, thanks to cooling weather and Sunday-night winds in the strait.

"But it isn't over until it's over," warned Jack Rensel, a scientist working on contract with state and federal officials to monitor the



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LOCAL

Last updated August 10, 2007 9:27 p.m. PT

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FDA advises against eating some Hood Canal oysters

P-I STAFF AND WIRE

The Food and Drug Administration Friday advised people not to eat raw oysters harvested from the southern tip of Hood Canal, citing bacterial illnesses that have sickened at least six people in Washington and California.

The state Department of Health closed the area to oyster harvesting because of reports of vibriosis illness, and has asked commercial harvesters and dealers who obtained oysters from this area to recall them.

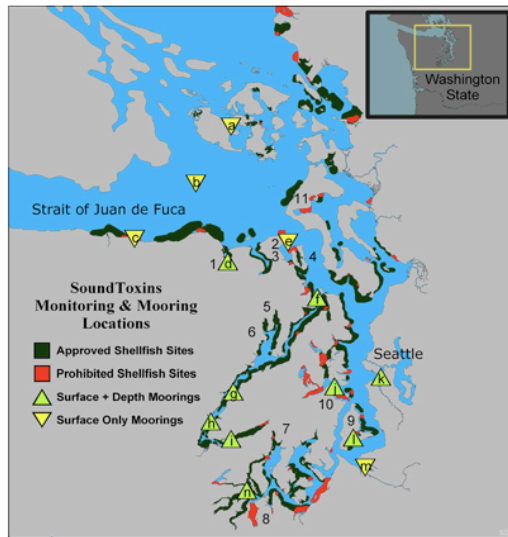
The vibrio parahaemolyticus bacteria can cause diarrhea, abdominal cramps, nausea, vomiting, headache, fever and chills. Those symptoms usually appear within 24 hours after eating the oysters.

About SoundToxins

SoundToxins, a diverse partnership of Washington state shellfish and finfish growers, environmental learning centers, Native tribes, and Puget Sound volunteers, is a monitoring program designed to provide early warning of harmful algal blooms and *Vibrio parahaemolyticus* events in order to minimize both human health risks and economic losses to Puget Sound fisheries.

Project Goals

The overall goal of this cooperative partnership is to establish a cost-effective monitoring program that will be led by state managers, tribal harvesters, and commercial fish and shellfish farmers. The SoundToxins program aims to provide sufficient warning of HAB and vibrio events to enable early or selective harvesting of seafood, thereby minimizing risks to human health and reducing economic losses to Puget Sound fisheries. The objectives of the SoundToxins program are: 1) to determine which environmental conditions promote the onset and flourishing of HABs and increased concentrations of *V. parahaemolyticus*; and 2) to determine which combination of environmental factors can be used for early warning of these events. To accomplish this, seawater samples are collected weekly by the participants at 11 different sites throughout Puget Sound and are analyzed for salinity, temperature, nutrients, chlorophyll, (paralytic shellfish toxins and domoic acid) phytoplankton species, and *V. parahaemolyticus*. Phytoplankton species diversity is described and the four target species specifically identified and enumerated are *Pseudo-nitzschia* species, *Alexandrium catenella*, *Dinophysis* species, and *Heterosigma akashiwo*.



Map of the Puget Sound Region
Washington State

Monitoring Locations	Agency
(1) Sequim Bay	Jamestown S'Klallam tribe
(2) Fort Worden	Port Townsend Marine Science Ctr. (PTMSC)
(3) Port Townsend	PTMSC
(4) Mystery Bay	PTMSC
(5) Dabob Bay	Taylor Shellfish
(6) Quilcene Bay	Coast Seafoods Company
(7) Allyn	Washington Sea Grant
(8) Budd Inlet	Evergreen State College
(9) Quartermaster Harbor	Vashon Island Resident
(10) Manchester	NWFSC
(11) Penn Cove	Penn Cove Mussels LLC.
Fish Farms	American Gold Seafood / Others

Mooring Locations	Agency	Parameters Measured
(a) Friday Harbor	NOAA	T
(b) Strait of Juan de Fuca	NOAA	T
(c) Port Angeles	NOAA	T
(d) Sequim Bay	NOAA/NWFSC	T, S
(e) Port Townsend	NOAA	T
(f) North Buoy	UW	T, S, O, PAR*
(g) Duckabush	UW	T, S, O, Chl, N*
(h) Hoodspout	UW	T, S, O, Chl, N, PAR*
(i) Twanoh	UW	T, S, O, Chl, N, V*
(j) Manchester	DOE	T, S, O, Chl
(l) Seattle	King County DNR	T, S, O, Chl, Turb, pH, PAR
	NOAA	T
(l) Quartermaster Harbor	King County DNR	T, S, O, Chl, Turb, pH, PAR
	UW Tacoma	T, S
(m) Tacoma	NOAA	T
(n) Squaxin	DOE	T, S, O, Chl

T=temperature, S=salinity, O=dissolved oxygen, PAR=light, N=nitrate, Chl=chlorophyll, Turb=turbidity, pH=water acidity, V=horizontal velocity; *profiling mooring=sensors move up and down through the water column

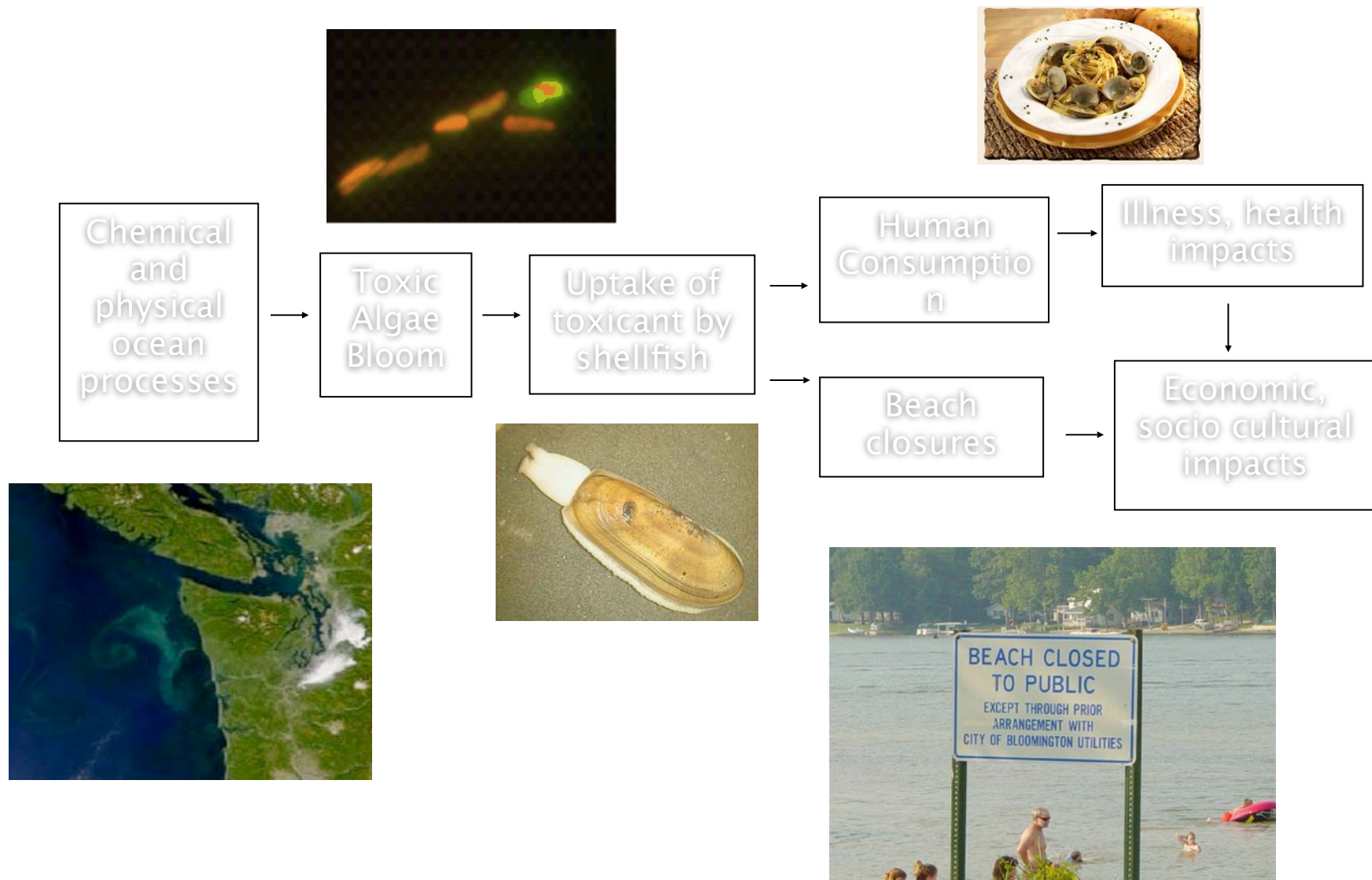
Funding

Funding for the SoundToxins Project is provided by the West Coast Center for Oceans and Human Health part of the NOAA Oceans and Human Health Initiative. The WCCOHH is part of the Northwest Fisheries Science Center, Seattle, WA.

Table 16.1 Phytoplankton Toxins

Toxin	Condition Produced	Phytoplankton Responsible	Characteristics
Brevetoxin	Neurotoxic shellfish poisoning (NSP)	<i>Karenia brevis</i> ; dinoflagellate	Affects nervous system; respiratory failure in fish and marine mammals; food poisoning symptoms in humans
Ciguatoxin	Ciguatera fish poisoning	<i>Gambierdiscus toxicus</i> ; dinoflagellate	Affects nervous system; human symptoms variable
Domoic acid	Amnesiac shellfish poisoning (ASP)	<i>Pseudo-nitzschia</i> ; diatom	Acts on vertebrate nervous system
Okadaic acid	Diarrhetic shellfish poisoning (DSP)	<i>Dinophysis</i> and <i>Prorocentrum</i> ; dinoflagellates	Affects metabolism, membrane transport, cell division
Exotoxins		<i>Pfiesteria piscicida</i> ; dinoflagellate	Mode of action unknown; produces mortality in fish, neurotoxic symptoms in humans
Saxitoxin	Paralytic shellfish poisoning (PSP)	<i>Alexandrium</i> , <i>Gonyaulax</i> , and <i>Gymnodinium</i> ; dinoflagellates	Causes paralysis and respiratory failure in humans

The Risk Chain - How do Harmful Algal Blooms Impact Public Health?





**Pacific Northwest Center for
Human Health and Ocean Sciences**
University of Washington



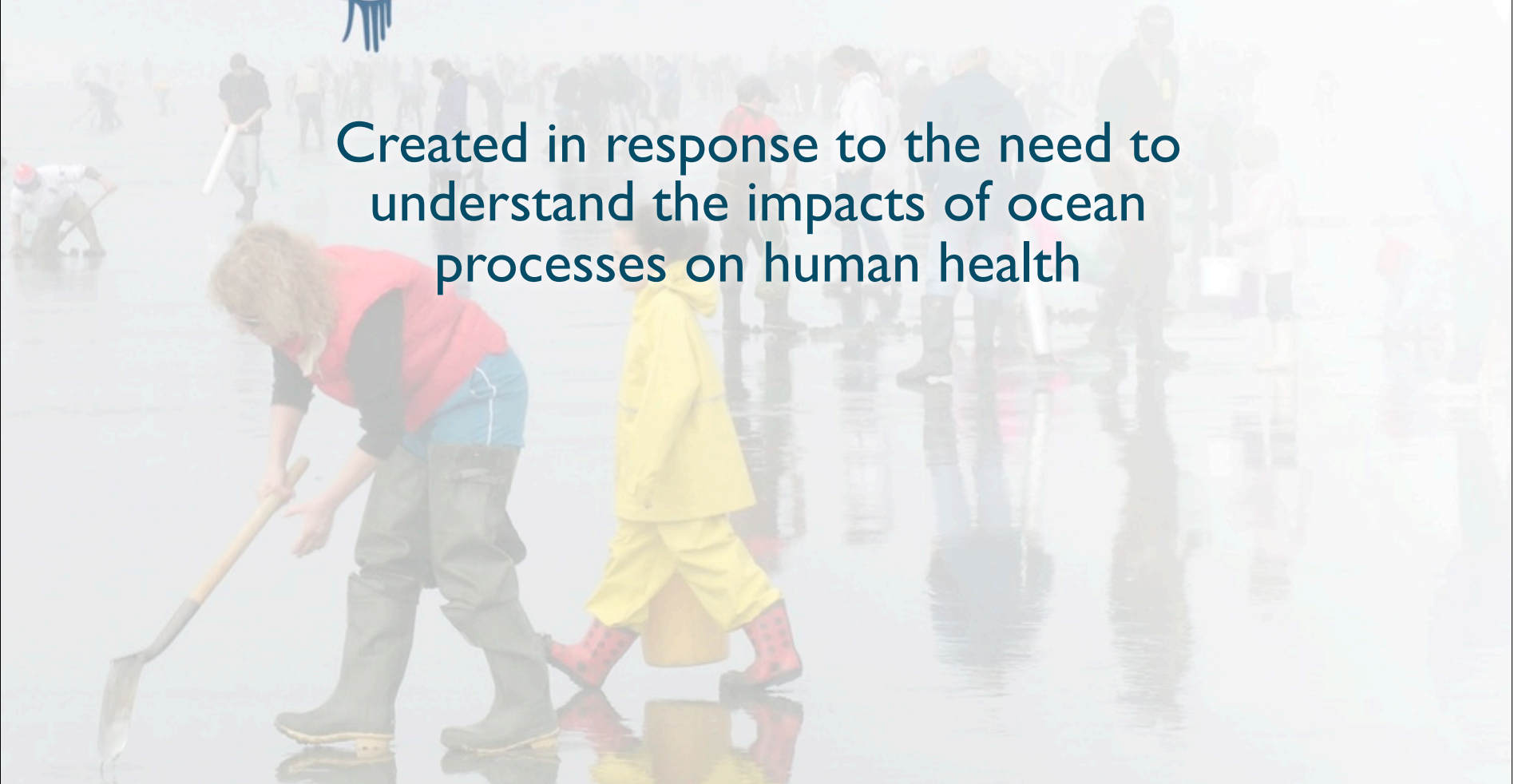
**Elaine Faustman
School of Public Health
&
Community Medicine**

**Ginger Armbrust
School of Oceanography**



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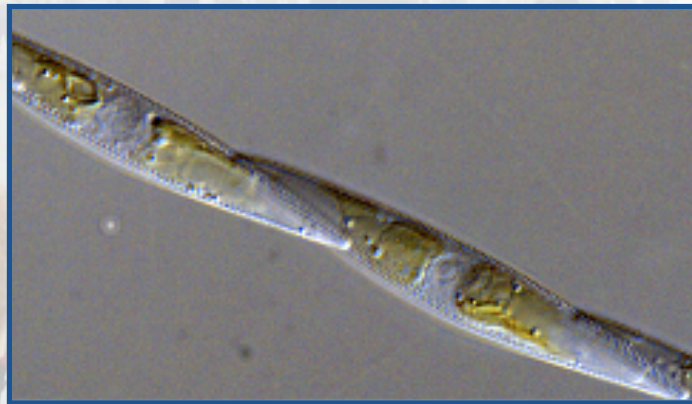
Created in response to the need to
understand the impacts of ocean
processes on human health



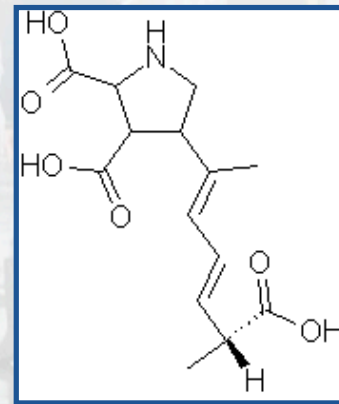


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Initial focus is toxic diatoms



Pseudo-nitzschia



Domoic Acid

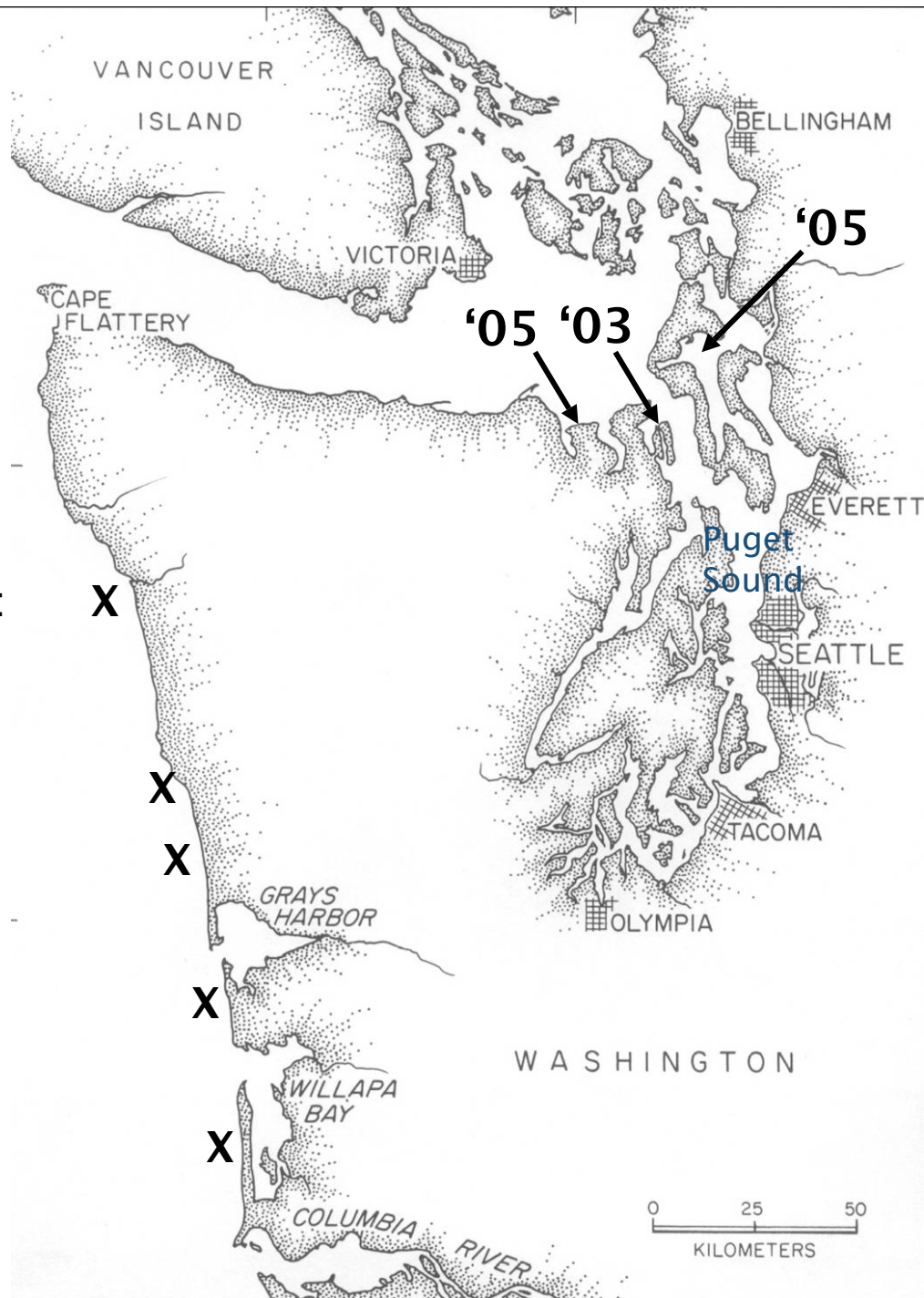
Consumption of shellfish contaminated with large amounts of
domoic acid can result in amnesic shellfish poisoning

<http://wdfw.wa.gov/fishcorn.htm>

Pacific Ocean -

Shellfish closures:

- 1991-92
- 1994-95
- 1989-99
- 2001
- 2002-03
- 3
- 2004
- 2005
- 2006



Domoic Acid Levels

240
200
160
120
80
40
0

Domoic Acid Levels (ppm)

Jan, 1999

2000

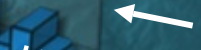
2001

2002

2003

2004

2005



Kalaloch

Mocrocks

Copalis

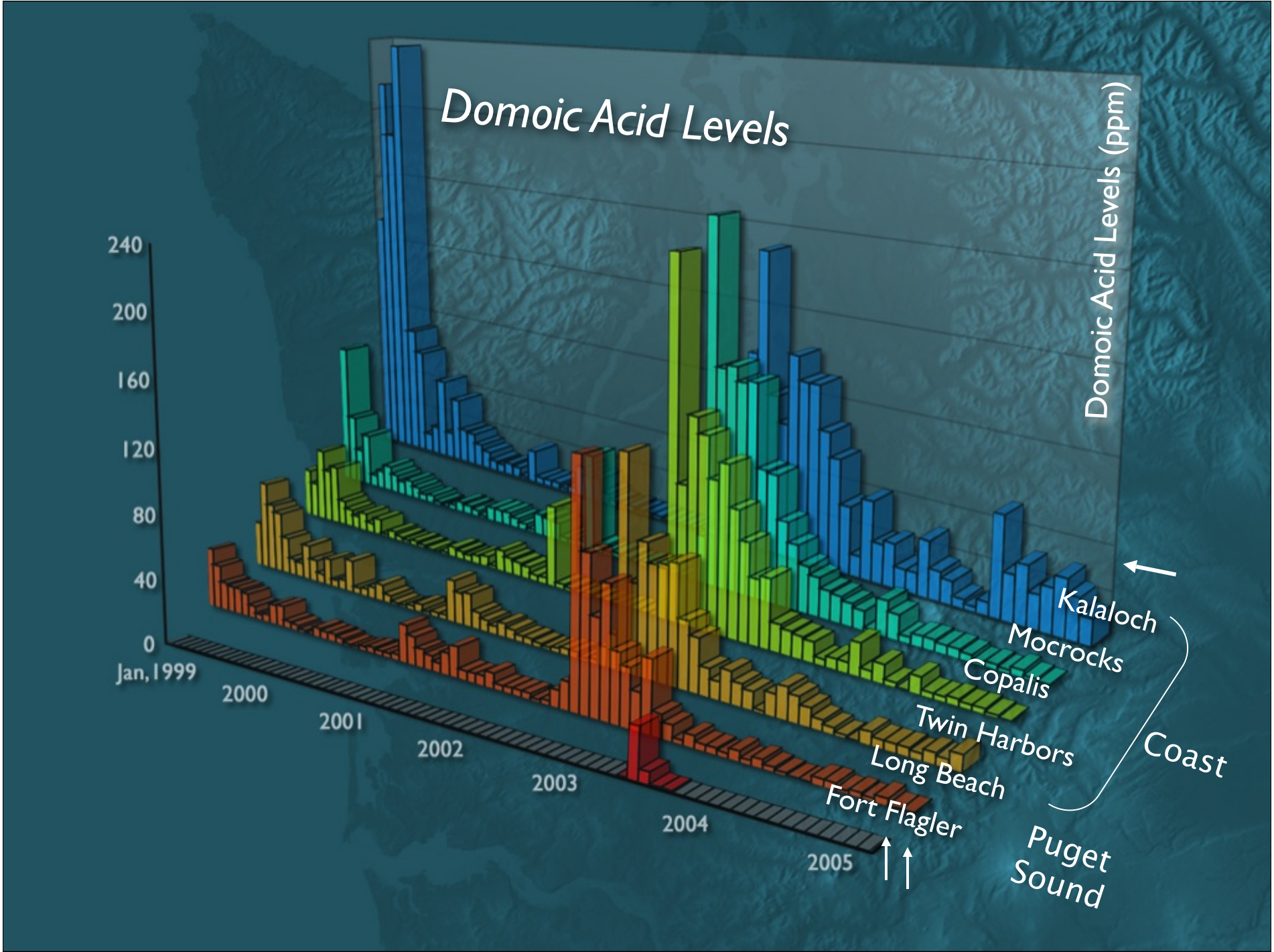
Twin Harbors

Long Beach

Fort Flagler

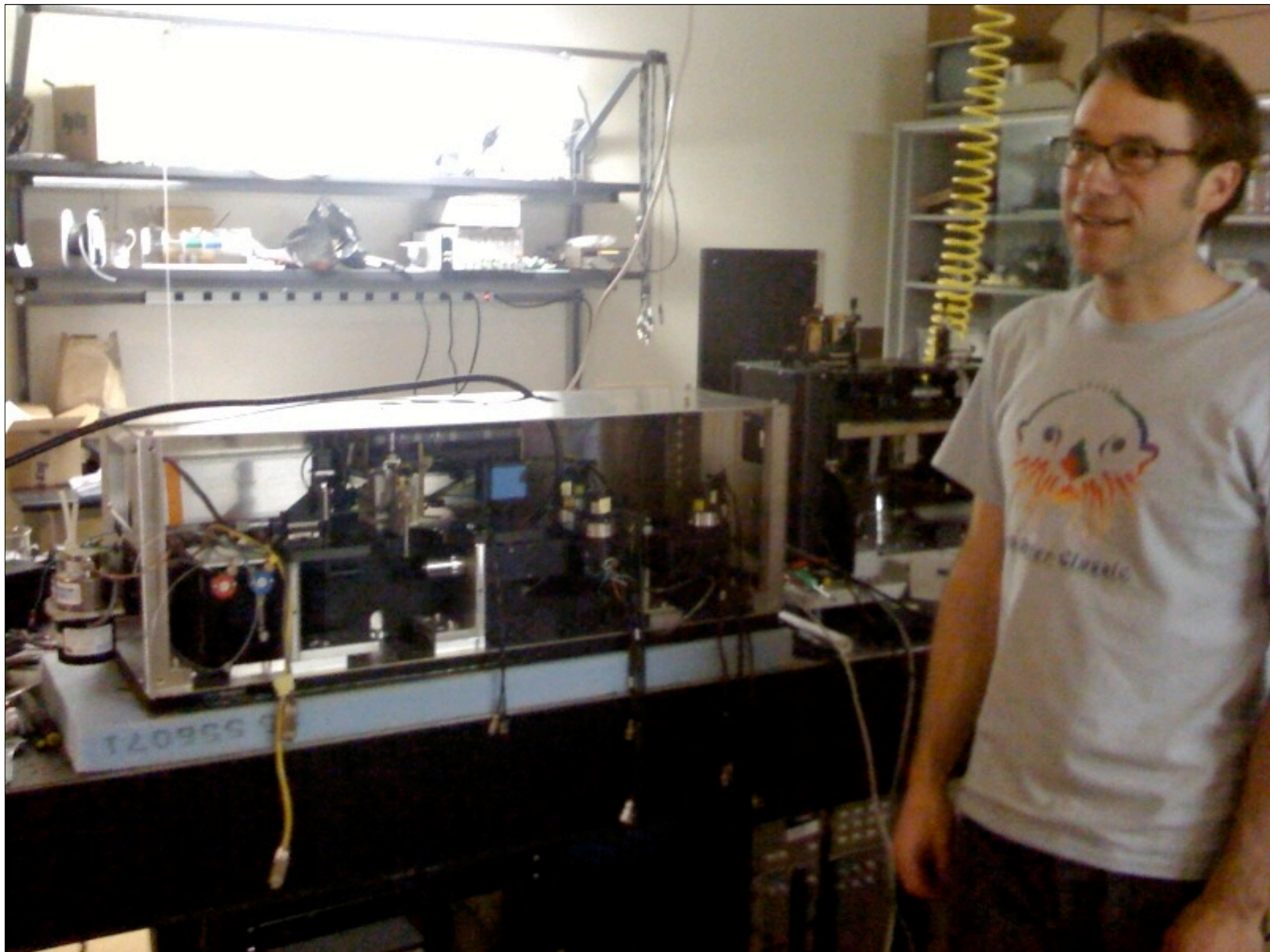
Coast

Puget Sound

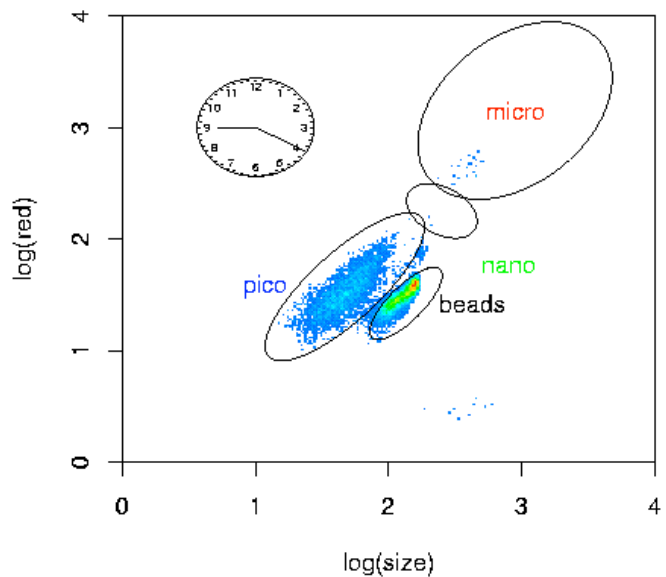


Developing sensitive methods to measure
domoic acid in real time...

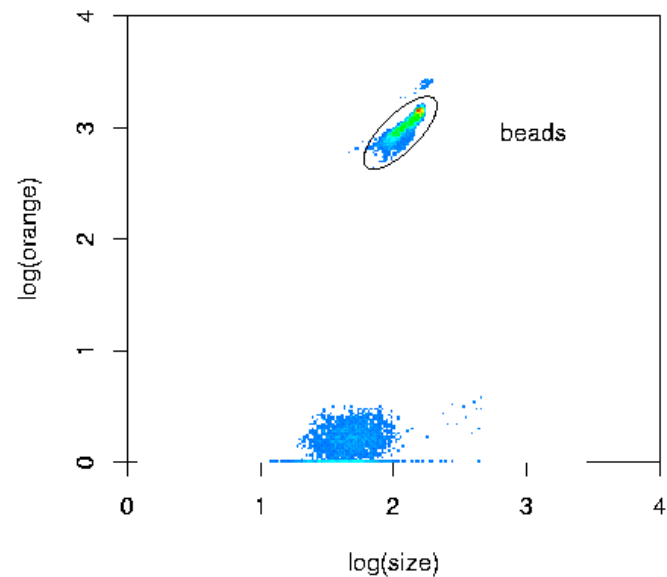




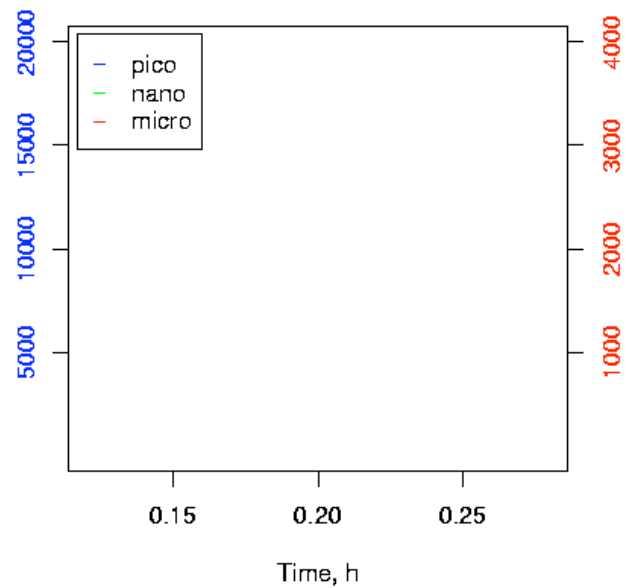
Size vs. Red Fluorescence



Size vs. Orange Fluorescence



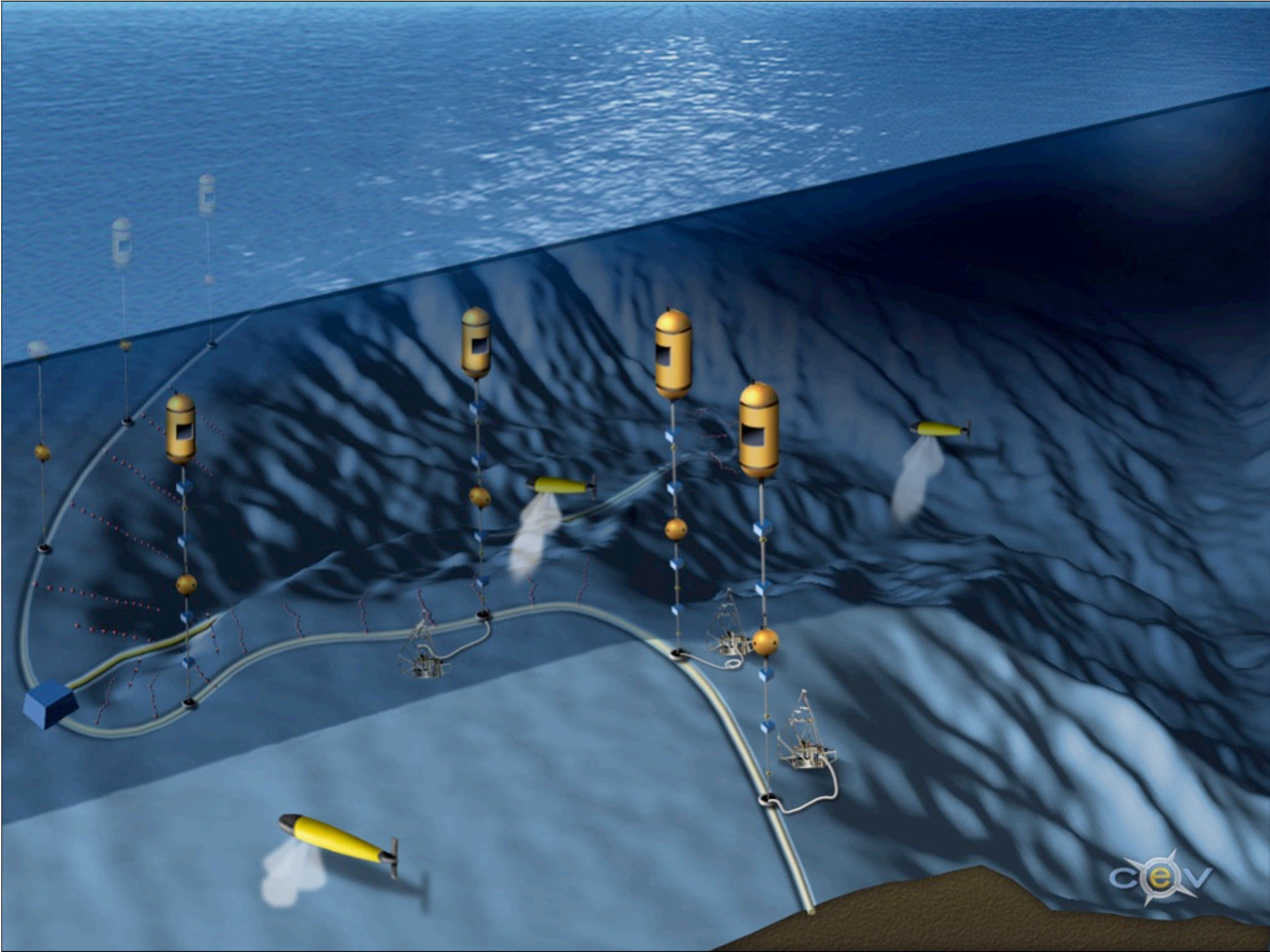
Plankton Concentration

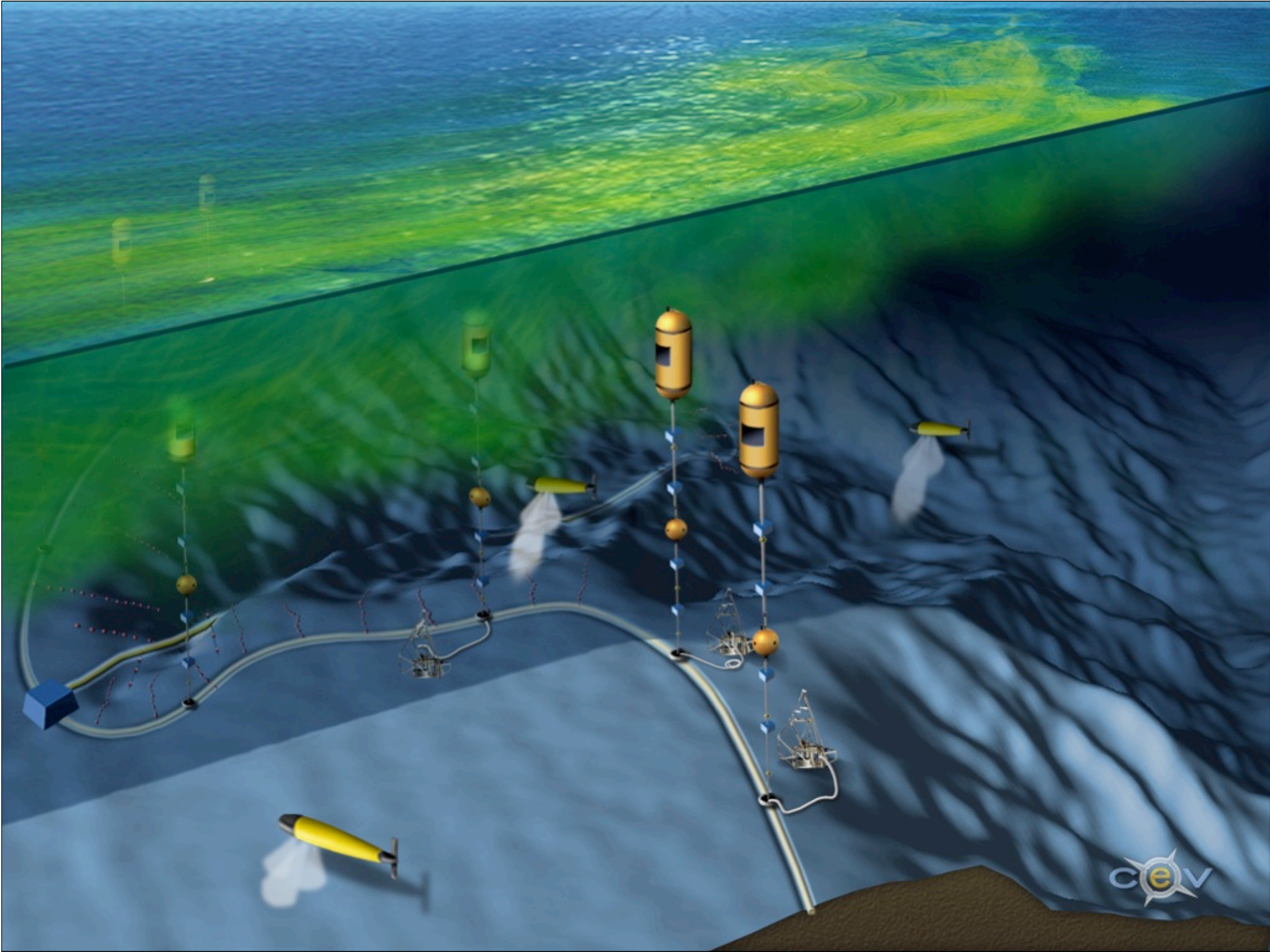


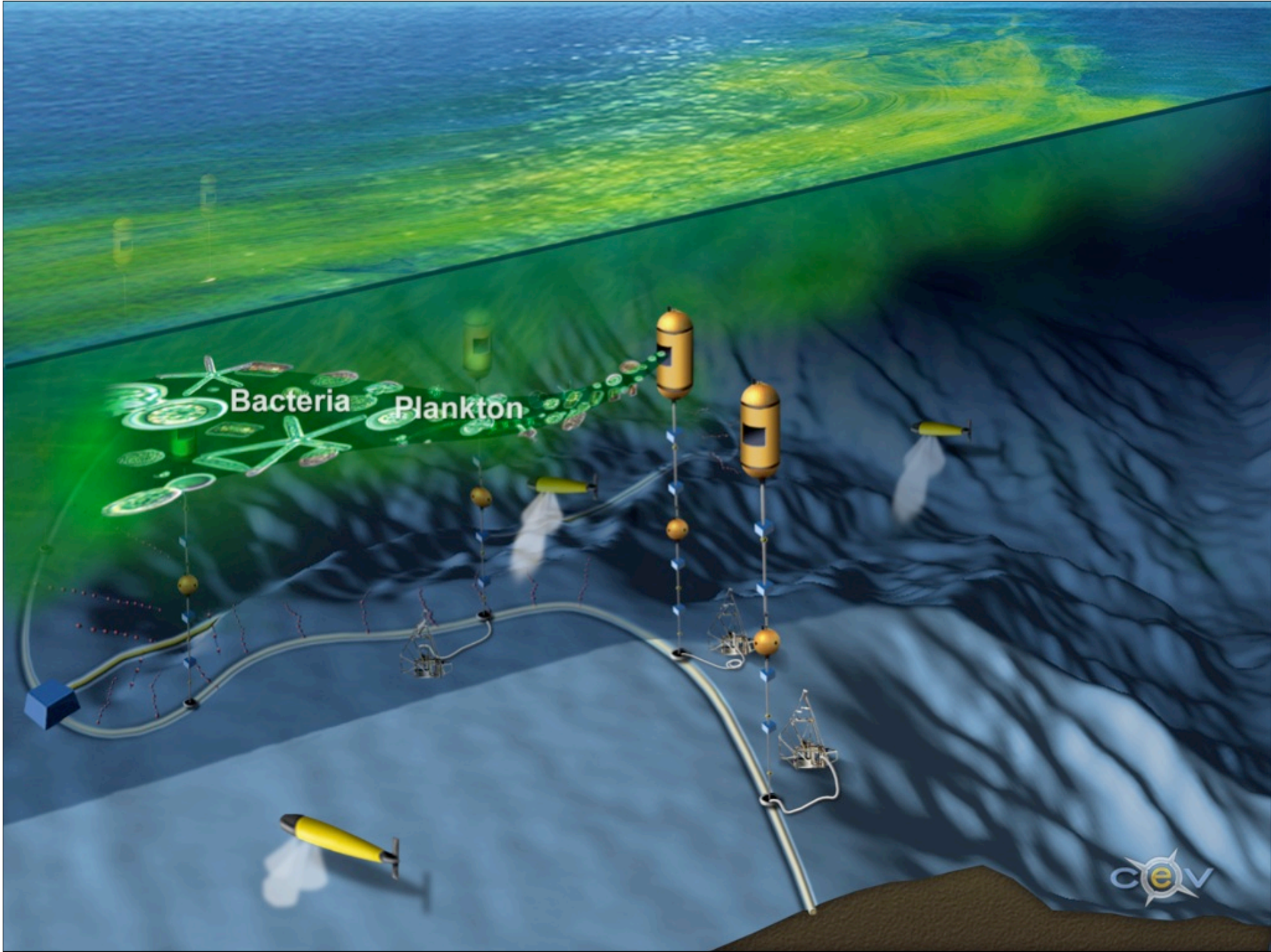


A Few Steps Into the Future...

Capturing Space and Time Underwater

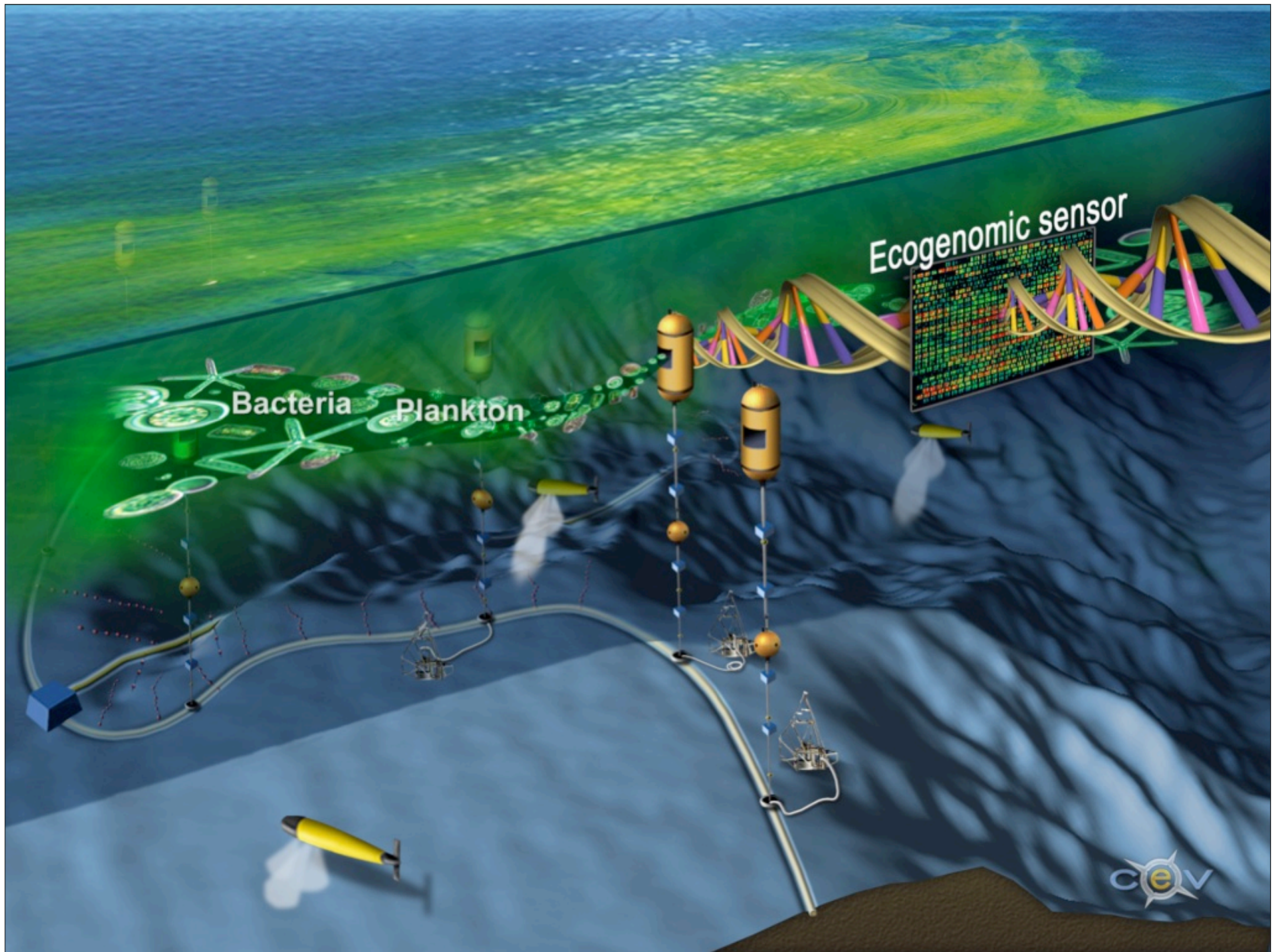


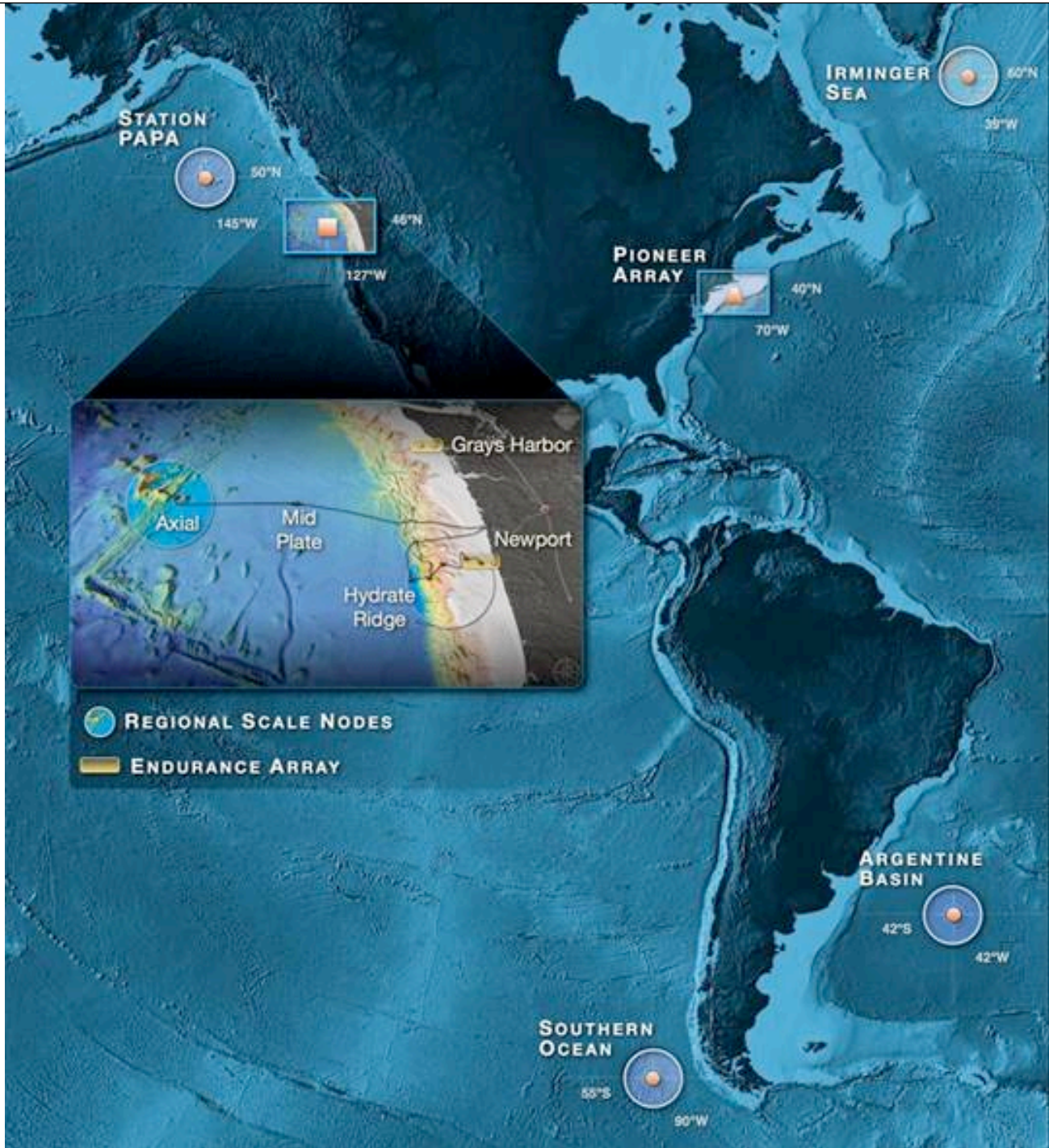




Bacteria
Plankton



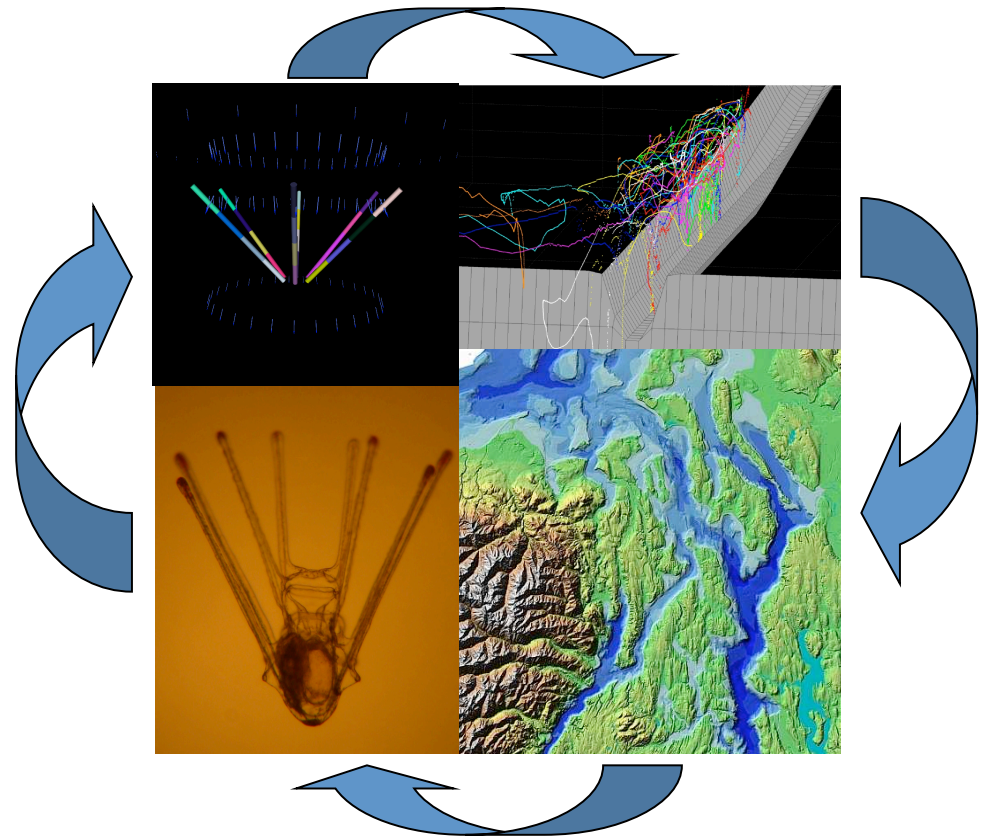




New fall quarter class

Ocean 497B Introduction to modeling in Oceanography

Explores roles of ocean models in understanding past, current and future conditions in marine environments. Focus on active learning use of models to ask and answer questions about biological and physical/chemical processes in marine environments. 3 credits



Prereq: Ocean 200 or
Lecture: T 2:30-4:00
Ocean/Fish/Biol 250

Computer lab sections: Th 10:30-12:00 or Th
2:30-4:00.