

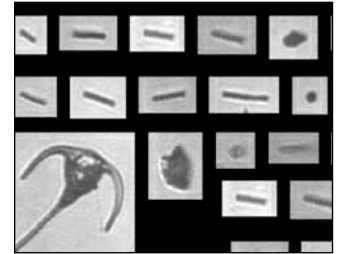
# Project Bulletin



## Continuous Monitoring of Estuarine Plankton

### Challenge

Dredging operations can impact local populations of plankton, a significant component of estuaries that affect the distribution of oxygen, nutrients and contaminants. Estuarine plankton are also the primary food for the larvae of many ecologically important finfish and shellfish. This project is developing an imaging system called FlowCAM, which continuously samples plankton and captures images of the sampled organisms. For this project, the FlowCAM will be used to monitor plankton before, during and after a dredging operation; other potential applications include monitoring harmful algal blooms and studying the movements of planktonic larvae.



### Science

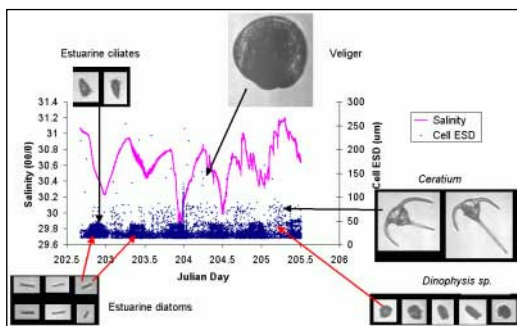
#### Design Concept

The FlowCAM automatically draws water through an intake tube (top unit in photo). Within the second (bottom) unit, the samples are passed by a laser beam and imaging system. Plankton cells have particular pigments that fluoresce under the laser—that is, they absorb light and then emit it at a longer wavelength. The FlowCAM detects, counts, and images cells and particles that fluoresce in this way.



#### Field Results

- As of March, 2002, researchers were still processing the data that would allow them to make conclusions about the effect of dredging on plankton circulation patterns.
- The data in the chart below are from July, 2000. Cell pictures from this same data set are superimposed to illustrate the populations. The salinity data shows the tidal variation. The particle size data (ESD = equivalent size diameter) shows a variation with the tides. During periods of low tide, the harbor is dominated by estuarine diatoms and ciliates. During high tide, the harbor is populated by dinoflagellates and some diatoms.



### Application

#### A Better Way to Monitor Harmful Algal Blooms

Conventional monitoring of harmful algal blooms (HABs) involves a weekly sampling routine using a towed net system. But HABs are far too variable in space and time for this to be a practical method. The continuous monitoring capabilities of the FlowCAM enable managers to determine when a HAB is occurring and how much toxic algae, over time, local shellfish have been exposed to.

#### Submersible and Mooring Deployable

The FlowCAM is now available in submersible and mooring deployable modes in addition to the dockside and benchtop modes used for this project.

#### Sampling Larger Organisms

With recently made changes, the FlowCAM can be used to sample organisms up to 4 mm in size (such as copepods and larval crustaceans), increased from the earlier maximum of 1 mm.

### Project Essentials

*Title:* Application of a Continuous Imaging Flow Cytometer for Monitoring Estuarine Microplankton

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