UNIVERSITY OF MARYLAND
CENTER FOR ENVIRONMENTAL SCIENCE
CHESAPEAKE BIOLOGICAL LABORATORY

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Spatially Intensive Shallow Water Quality Monitoring

Shallow water habitat and water quality evaluation has become a critical component of monitoring and restoration efforts in coastal ecosystems. High-resolution spatially intensive monitoring systems are novel methods to characterize shallow water ecosystems or rapidly classify hotspots, providing researchers and managers with powerful tools to spatially describe and analyze water quality. These systems represent a synthesis of new technologies that enables the researcher to combine discrete sample data produced by water quality sensors, and accurate spatial positioning utilizing GPS.

The University of Maryland Center for Environmental Science, Chesapeake Biological Laboratory (CBL) has improved the original Dataflow system, first developed by Madden and Day (1992). The sensor suite provides for detailed characterization of surface waters over a multi-hour research cruise. Dataflow possesses the flexibility to quickly characterize a tributary system, or focus on trouble spots within the estuary. The system can identify pockets of pronounced turbidity or algal blooms localized within an accuracy of ten meters. By logging discrete samples every four seconds, over 5000 data points can be collected during a single cruise. These data points are processed and used to produce a contour map of a particular parameter, such as the concentration of chlorophyll-*a* (which reveals the amount of phytoplankton), turbidity (water clarity, or concentration of suspended matter), or any number of water quality values scientists use to evaluate the health of a body of water.

Dataflow system.

Dataflow surveys are conducted from a small vessel carrying two field technicians who operate the vessel and perform sampling operations. Dataflow consists of a water circulation system sampled by a Yellow Springs, Inc. 6600 DataSonde, which records dissolved oxygen, temperature, conductivity, salinity, turbidity and fluorescence (from which is derived chlorophyll-*a* concentration). Position and depth are provided by a combination GPS and depth sounder, providing positional accuracy to within 1-3 meters. These values are compiled and logged automatically by a rugged computer. The vessel travels at approximately 20 knots, or 10 meters per second.

CBL Dataflow system aboard vessel.

The Ecosystem Ecology Group at CBL conducts research with the Dataflow system in order to refine sampling technique and analysis with the objective of cooperating with regional scientists and managers to utilize the system as an effective assessment tool for water quality issues.

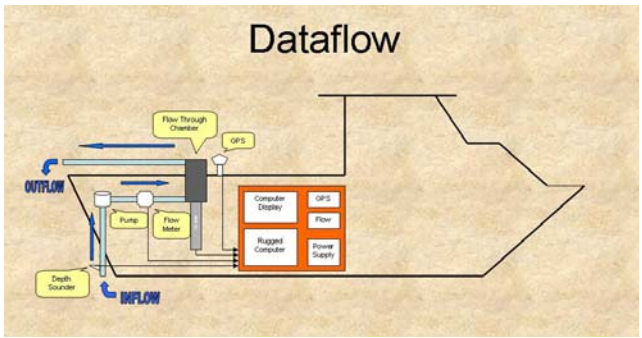

Diagram of typical system set up aboard vessel.

For further information, visit the Ecosystem Ecology Group website at:

www.gonzo.cbl.umces.edu