

## Water Monitoring Buoys: A tool for studying Harmful Algal Blooms

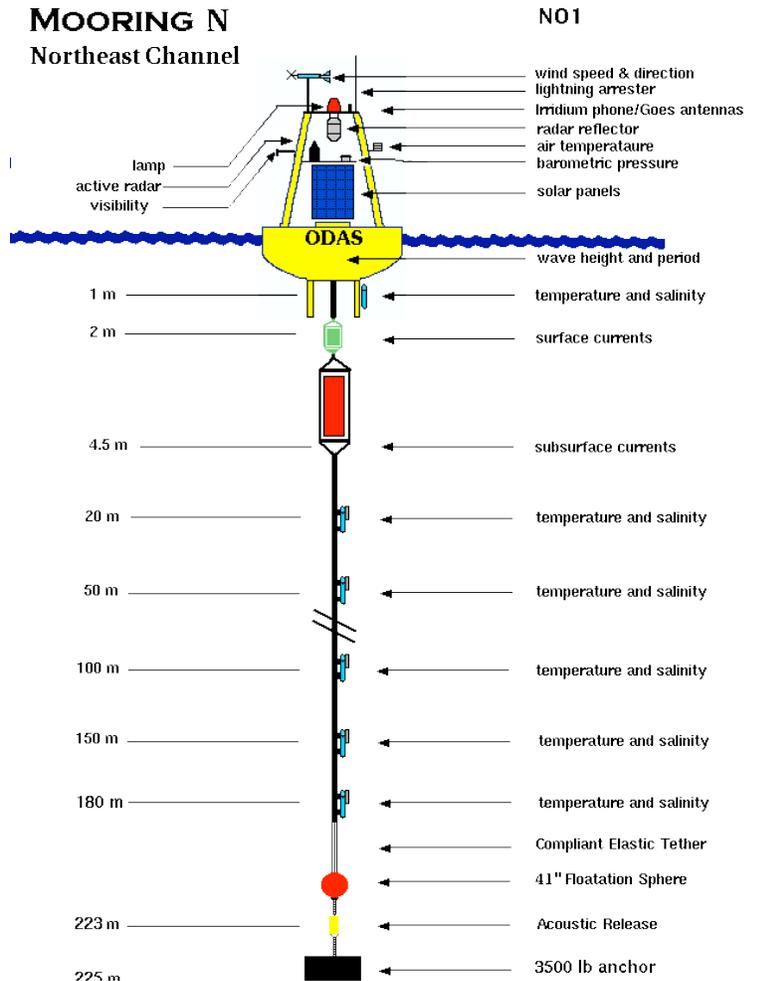
Generally, a water-monitoring buoy is composed of two major parts, one above the surface and one below. The above portion floats on the surface, takes measurements and transmits collected data and information. Below the surface, there is a chain that leads to an anchor on the floor of the ocean basin. In addition, there are sensors located along the chain, which allow measurements to be taken throughout the depth of the water column.

A water monitoring buoy station typically consists of several components: including a buoy platform, data logger, solar power, telemetry equipment, mooring hardware, temperature string, sondes, and sensors. By optimizing the form and features of a buoy monitoring platform, an ideal buoy can be created to match individual needs, applications and desired research criteria.

Many air and water parameters can be collected by data buoys including water temperature, wind speed, chlorophyll concentration, and wind direction. These parameters can tell us important information about what the physical conditions are like when blooms occur, which can increase our understanding of phytoplankton blooms and harmful algae blooms (HAB's).

Water-monitoring buoy-based profiling equipment utilized for research and monitoring is designed to be easy to use, providing reliability and capable of accurate performance. Additionally, water-monitoring buoys are lightweight for mobility and are designed for stability to withstand both storms and high winds.

By optimizing the form and features of a buoy water-monitoring platform, an ideal buoy can be created to match individual needs, applications and desired research criteria. Additionally, buoys operate independently utilizing either solar power or battery power and can utilize telemetry options for remote data access and sensor control, communicating with servers and online systems.



**A diagram of a data buoy in the Gulf of Maine**

Water-monitoring buoys are designed to be flexible, thus they are fully customizable with platforms designed to ensure adaptability to meet desired research and water monitoring priorities. As such, water-monitoring buoys can house from one to hundreds of sensors, which may be required for specific research and water monitoring needs.

Through use of a water-monitoring buoy-based profiling system, water sampling can occur frequently providing consistent, high quality, streaming data 24 hours a day, 7 days a week. This continuous stream of data provides the ability to conduct adaptive sampling or understand water conditions in real-time or near real-time.

Since water-monitoring buoys provide real time data access; data can be used to quickly understand what is going on within a water supply and quick responses to changes in environmental conditions can be implemented. Further, data collected by a water-monitoring buoy (or water-monitoring buoy system) can be shared with the public, creating greater awareness of water quality conditions, temperature and/or water quality issues.

Buoy Diagram: GOMOOS (see first page)

(<http://www.gomoos.org/environmentalprediction/gomoosdata.html>) (April 3, 2011)

“FerryBox” ([http://www.noc.soton.ac.uk/ops/ferrybox\\_index.php](http://www.noc.soton.ac.uk/ops/ferrybox_index.php)) illustrates what can be done with individual monitoring devices and some ingenuity:

water temperature  
salinity  
chlorophyll fluorescence  
turbidity  
dissolved partial pressure of oxygen  
dissolved partial pressure of carbon dioxide

Commercially available monitors (wireless and wired versions) used by aqua-culturists, sewerage treatment facilities, and water-quality monitoring agencies:

<http://www.bbe-moldaenke.de/>

[http://www.panner.com/assets/pdf/Signet4150\[1\].pdf](http://www.panner.com/assets/pdf/Signet4150[1].pdf)

<http://www.panner.com/assets/pdf/Signet8750.pdf>

[http://www.panner.com/assets/files/ECDTriton\\_DO8DisO.pdf](http://www.panner.com/assets/files/ECDTriton_DO8DisO.pdf)

[http://www.marinedepot.com/American\\_Marine\\_Pinpoint\\_Salinity\\_Monitor\\_Single\\_Item\\_Monitors\\_Controllers\\_for\\_Saltwater\\_Aquariums-Pinpoint\\_Monitors-AM1115-FITEMOID-1-vi.html](http://www.marinedepot.com/American_Marine_Pinpoint_Salinity_Monitor_Single_Item_Monitors_Controllers_for_Saltwater_Aquariums-Pinpoint_Monitors-AM1115-FITEMOID-1-vi.html)

Authors: Patricia De Santis, Rob Sheridan, Vanessa Maples

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