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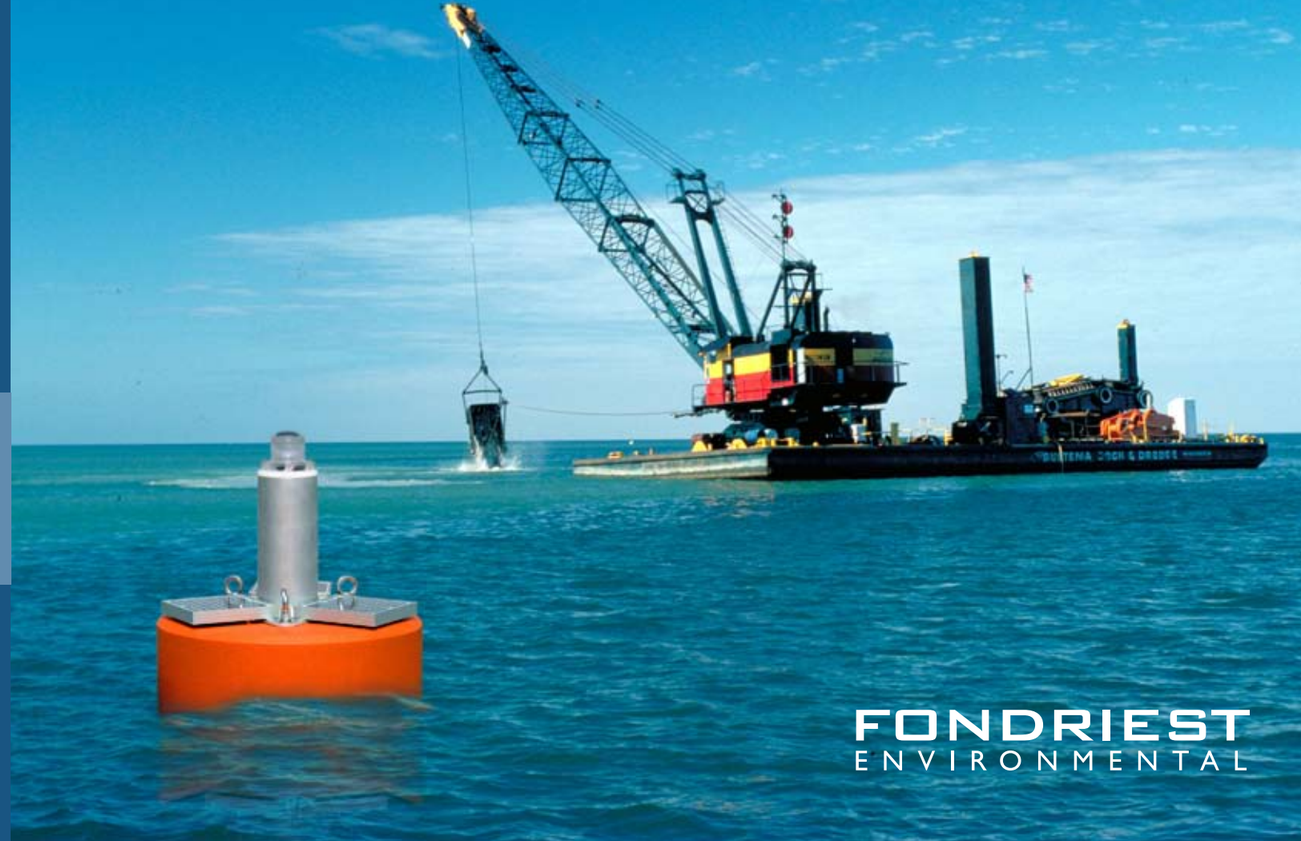
MONITORING TURBIDITY

At Dredging Sites

A GUIDE FOR CONFIGURING A HIGH-PERFORMANCE TURBIDITY MONITORING SOLUTION



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Located in the Lower Great Lakes and Ohio River Valley region, Fondriest Environmental sells and services environmental monitoring products from industry leading suppliers such as YSI, Hach, Thermo Scientific, In-Situ, Turner Designs, SonTek, Vaisala, RM Young, NexSens, and many more...

The applications engineers and scientists at Fondriest Environmental specialize in designing and implementing real-time monitoring systems with data transmission via cellular, radio, landline phone, and satellite telemetry, as well as sharing data via the internet.

It is the company's goal to supply equipment that provides high-quality data and years of service. Unlike many suppliers who carry every brand with every option, Fondriest seeks out vendors and products that meet stringent performance and quality standards. The company searches for advanced technologies that extend deployments and provide new methods of detection. The application engineers and scientists deploy many of the same products that they offer their customers.

Over the years, Fondriest Environmental has greatly expanded its product offering to provide environmental professionals with not only the finest measurement instrumentation, but also with a wide variety of equipment and accessories used extensively in day-to-day field work.

Fondriest's commitment to customers and their projects ensure continued product support, resulting in long-lasting, value-added business relationships.

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when your
research
demands
quality data

WHY DREDGE MONITORING MATTERS

If executed properly, dredging can yield positive environmental or navigational results without harming water quality conditions. Dredging operations should aim to remove sediment as efficiently as possible while diminishing short-term environmental impacts, most notably the re-suspension of potentially contaminated sediments.

Effective monitoring of the amount of re-suspended sediments for the duration of dredging operations is crucial to ensuring the water remains sufficiently healthy for both wildlife and humans. These suspended sediments, which are dislodged and dispersed into the water column, may travel downstream. Additionally, sediment that is contaminated can release toxins into the water and air. For this reason, the U.S. Army Corps of Engineers (USACE) and Environmental Protection Agency (EPA) offer extensive guidelines for estimating the environmental consequences of a dredge as well as emphasizing the need to monitor these effects as the dredging operation occurs in order to keep them under control. These monitoring efforts allow project managers to respond if re-suspended sediment levels exceed pre-established parameters by slowing down or altering the dredging.

WHAT'S INSIDE

Fondriest Environmental application engineers are available to assist in configuring an ideal solution for your project needs. They can also help with training and technical support. To reach them, please call (888) 426.2151 or email customercare@fondriest.com.

Fondriest offers both extensive field experience and a wide array of deployment hardware to facilitate seamless implementation of turbidity monitoring systems. Moreover, if existing solutions are not suitable for a new project, Fondriest engineers can design custom platforms, sensors, and adaptations to suit a growing list of unique applications.

TYPICAL MONITORING REQUIREMENTS

Overview of USACE Guidelines

For contaminated sediment remediation projects, the U.S. Army Corps of Engineers' Engineer Research and Development Center generated a comprehensive set of guidelines, devised cooperatively with the EPA. Many of the strategies are also applicable to dredges of uncontaminated sediment. Ultimately, the specific environmental limits for a dredge depend on the location and regulatory agencies within the state, but the EPA has defined a hierarchy of objectives for remedial operations, included in the technical guidelines. These objectives aim not only to minimize re-suspension, release, and residuals, but also to achieve an economically efficient remediation, requiring a fine balance between these competing interests. The EPA, however, acknowledges that some short-term sacrifice is required for long-term benefits of a dredge.

These guidelines stress the importance of implementing a monitoring strategy that provides rapid feedback so dredge operators can respond to high re-suspension levels before they become problematic. Standards for sediment re-suspension — more specifically, levels for water quality and released contaminants — may be a part of dredging regulations established by regulatory agencies or in consultation with stakeholders. Points of compliance (locations where suspension levels are measured) can either be "floating," in that they move with the dredge (i.e., a certain distance downstream of the dredge location) or fixed, such as at bridges, municipal water intakes, other structures, or at "geographical choke points," according to the USACE guidelines.

The USACE recommends drafting a comprehensive written monitoring plan that includes the equipment and techniques to use, protocols for sampling, where to place sampling devices, and detail about how to interpret the monitoring data. Furthermore, the guidelines suggest creating a management plan that describes specific actions to take based on the results of the monitoring. Possible management actions ought to be structured in a tiered fashion, depending on the monitoring results, and may include increasing monitoring to assess impacts, implementing operational controls (i.e., stopping or slowing down dredge work), altering debris management, or changing equipment.

The USACE technical guidelines advise incorporating real-time feedback on re-suspension into the monitoring plan to make early identification of problems possible. The most rapid management responses are achievable with this real-time data.

To see the complete USACE guidelines, visit:
http://www.epa.gov/superfund/accomp/news/dredging_guidance.htm

US Army Corps of Engineers®

TURBIDITY MEASUREMENTS

A Real-Time Solution

While measuring total suspended solids (TSS) directly is the ideal method to evaluate sediment re-suspension caused by dredging, it is not feasible for real-time applications. TSS can presently only be evaluated by collecting water samples and performing laboratory tests, which involve separating the sediment from the water and weighing it. This procedure is too time-consuming for dredge monitoring, considering quick feedback regarding re-suspension is crucial to allow timely control measures. This is particularly true in cases when the dredged sediment contains contaminants that pose an added risk to wildlife and people. Thus, turbidity, a measurement of water cloudiness, is typically used to provide real-time data that represents approximate levels of re-suspension and can indicate the likelihood of released toxins.

Measuring Turbidity

Turbidity is commonly reported in nephelometric turbidity units (NTU). An instrument called a nephelometer, also named a turbidimeter, is the most common device used present-day to measure turbidity. It does so by shining a light beam through the water and then measuring how much light is scattered to the side at a 90-degree angle.

Particle density in the water is a function of how much light is scattered. This is in part a qualitative test, however, as the properties of the particles — shape, color, and distribution — can affect the measurement of turbidity. This means that two samples of water with the same level of suspended solids but different particle composition could potentially yield varying turbidity readings.

Although nephelometers are by far the most commonly used means for measuring turbidity levels in field deployments, these measurements are also possible with backscatter sensors and transmissometers. A sensor based on the backscatter technique measures turbidity as a function of how much light bounces back to a sensing diode adjacent to the light emitter. A transmissometer measures how much light emitted though an area of water strikes a light sensor on the opposite end. Turbidity is then measured by the degree of light attenuation caused by particles in the water. Transmissometers are typically more cumbersome and are most useful in waters with extremely low turbidity levels.

The following turbidity monitoring guidelines will describe solutions that incorporate nephelometers as the basis for real-time feedback estimating the levels of re-suspended solid levels, as it is generally the most appropriate option.

TURBIDITY MONITORING SOLUTIONS

Introduction

NexSens buoy-based platforms and data loggers have been refined over the years to accommodate the specific needs of portable dredge monitoring systems. The floating platform consists of a cross-linked polyethylene foam hull with a tough polymer skin coating. A round center housing accommodates a NexSens SDL500 submersible data logger. Three 5-watt solar power packs are designed to mount to the top of the buoy to provide continuous power to the data logger and communications module.

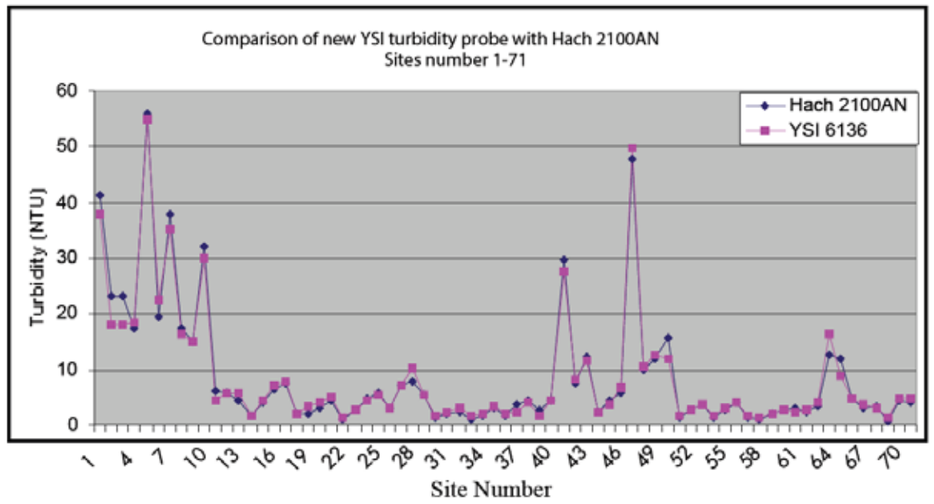
Top and bottom mounted stainless steel eyes accommodate moorings and lifting rigs for quick and easy deployment. The buoy is moored to the bottom via anchors, chain, and shackles. Fondriest application engineers can offer recommendations for deployment based on site conditions to ensure the systems will remain in location.

Turbidity Sensors

Methods

There are various methods to measure turbidity levels, two of the most prominent being EPA method No. 180.1 and the International Organization for Standardization (ISO) 7027 method.

The EPA's method is for a nephelometer that uses visible white light to shine through water. While this is highly accurate, it is not practical for field deployment because the light diode requires a great deal of power. Such a power demand would strain solar-charged systems. The ISO 7027 method, on the other hand, requires radiation in the near-infrared (830-890 nm) region of the spectrum, demanding much less power. Because of these practical considerations, the EPA has offered interim approval of the ISO 7027 method in field monitoring situations.



Comparison of turbidity measurements made with the YSI 6136 Turbidity Sensor (ISO 7027) and Hach 2100AN (EPA 180.1) at 70 different riverine and lacustrine sites exhibiting widely varying (lower) turbidity ranges.

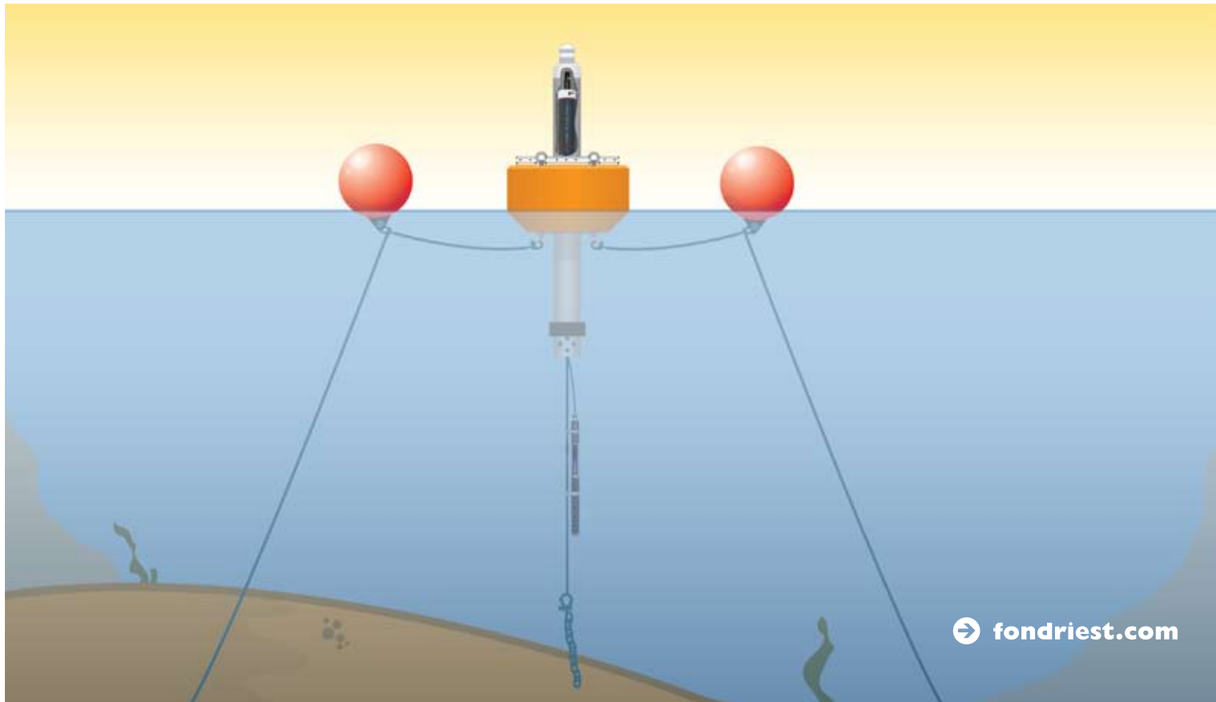
Self-Cleaning Sensors

The most common problem for *in-situ* measurement of any kind, especially for extended deployments, is fouling. Either biological (active) or non-biological (passive) fouling can occur. Active fouling refers to the growth of plants and animals over the optics of a measuring instrument, whereas passive fouling results from substances such as silt, clay, and organic residue accumulating on sensor lenses. In dredge monitoring applications, re-suspended sediments are often the chief cause of fouling. This can clearly have a substantial effect on turbidity readings, as fouling material can block the passage of light from the source beam to the light detector. In the interest of long-term deployments, particularly those in high-fouling waters, many *in-situ* turbidimeters now possess mechanical wiping devices that sweep fouling agents from the optical surfaces prior to measurement.

The model 6136 turbidity sensor from YSI has become the preferred sensor for many turbidity-monitoring projects. Before taking a reading, a mechanical wiper cleans the sensing optics to ensure the measurement is not affected by fouling sediment debris. The YSI 6136 sensor measures turbidity using the ISO 7027 method. Extended deployments with this sensor, a component of YSI's multi-parameter water quality monitoring sondes, have exhibited stable and accurate results for long deployment periods.

Above: YSI model 6136 turbidity sensor with self-cleaning wipers.

Below: The MB-300 deployed with a turbidity monitoring configuration.



Data Loggng
Submersible Data Logger

The NexSens SDL500 submersible data logger possesses the field ruggedness required for turbidity-monitoring applications. It can withstand extreme wave action, drops, and floods. It consists of the data logger and communications module housed in a fully-submersible, five-inch-diameter round enclosure. It can be outfitted with either a spread-spectrum radio or cellular modem and antenna for real-time communication to shore. It offers five sensor ports for connection to industry-standard digital and analog turbidity sensors. Each sensor port offers a UW receptacle with double O-ring seals for waterproof sensor connections.

A NexSens turbidity-monitoring buoy can accommodate the data logger as well as three 5-watt solar power packs to provide continuous power to the data logger and communications module. Alternatively, the SDL500 can be placed into a perforated PVC pipe, which is an option if mounting the system along a seawall.

Cellular or Radio Telemetry

Both cellular and radio telemetry options permit real-time updates regarding water quality during a dredging operation.

If equipped with a license-free spread-spectrum radio, the submersible data logger is able to communicate with a shore-side NexSens radio base station as far as five miles line-of-sight from the monitoring site. The base station serves as a central hub for one or more remote data loggers and can connect directly to a base computer or relay data to a remote computer.

Cellular telemetry requires the additional cost of a cellular data plan, but it offers greater geographic flexibility. With this method, data transmissions from almost anywhere in the U.S. are possible. A cellular monitoring station does not need to be in proximity to a shore-side base station; instead, its data is accessible, with appropriate credentials, over the Internet. The SDL500's cellular modem can use data plans from many U.S. providers, including AT&T, Verizon, and Sprint Nextel.

NexSens SDL500 submersible data logger with cellular telemetry.

Planning the Deployment
Selecting the Location

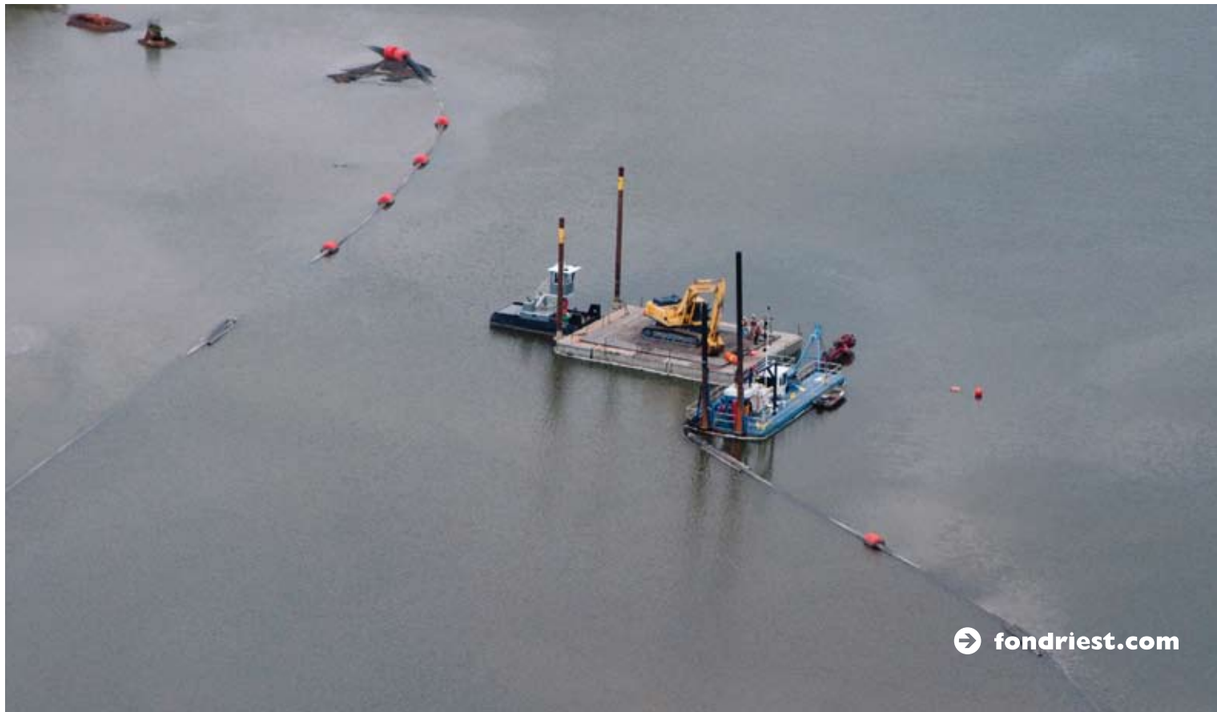
Buoy deployment requires great precaution, and personnel safety is always the chief priority. It is essential to use proper equipment (work boat, lifting rig, etc.). The buoy systems are heavy, and individuals can quickly become entangled with mooring lines and anchors. Personnel must wear proper safety and flotation gear at all times while working on or near the water. Furthermore, proper tests and pre-assembly are typically performed before deployment to ensure safety and efficiency.

The location of turbidity monitor(s) depends largely on site conditions where the dredging will take place. If seawalls are located near the dredging operations, turbidity monitoring sensors can sometimes be mounted in a perforated PVC pipe along the seawall.

Oftentimes, site conditions make it difficult or impossible to mount the monitoring equipment along the shore. When this is the case, buoy-based systems offer the most cost-effective solution. NexSens MB-300 and MB-500 data buoys are solar-powered and offer options for radio or cellular telemetry.

The number of monitoring locations depends on several factors; commonly, three buoy-based systems are used. An off-site, background monitor is deployed upstream from the dredging operations or at a location largely unaffected by the dredging. This serves as the control for suitable turbidity levels in the water.

Downstream from the dredge operations (or at locations directly affected by dredging), two monitors are strategically deployed to examine levels of suspended sediment as compared to the background monitor. Regulations may require turbidity levels to be measured at multiple depths in the same location, and NexSens turbidity monitoring buoys can easily accommodate this need.



Planning the Deployment

Pre-Deployment

NexSens data buoys are fully assembled on shore prior to deployment. This includes attaching the tower, solar panels, and, in some cases, additional ballast weights. Furthermore, the complete monitoring system (sensors, data logger, and telemetry) is tested before putting the buoy on water. The SDL500 data logger is attached to all sensors, and iChart software confirms the data logger and sensors are communicating properly. This gives users the chance to familiarize themselves with the system prior to deployment.

Depending on application needs, sensors can suspend from the buoy along a mooring line in order to make water column measurements, or they can be housed directly inside the buoy's counterweight shaft, providing greater protection. If sensors will be suspended, the mooring line, buoy attachment chain, and bow shackle that will suspend sensors are assembled prior to deployment. To prevent cable chafing, a cable bumper (called a T-Bumper) is used to separate the sensor cable from the sides of the buoy counterweight.

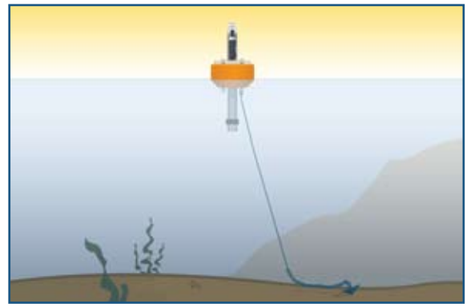
Buoy Mooring

There are two typical configurations for NexSens data buoy applications: single-point or two-point moorings.

Single-Point Moorings

Single-point moorings are used in extremely calm waters or when monitoring sensors are deployed within the buoy counterweight. The sensors are thus protected and less vulnerable to damage caused by subsurface debris, high currents, and entanglement from anchor lines.

In a single-point configuration, a stainless steel mooring line connects the buoy directly to a bottom chain and anchor. The anchor, bottom chain, and mooring line are assembled and attached to the buoy prior to deploying the system.

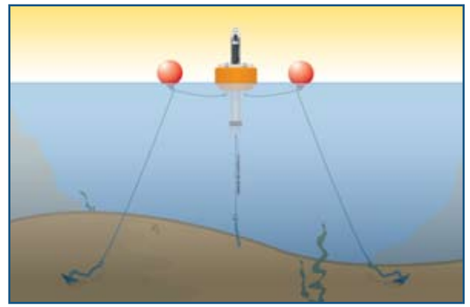


Single-point mooring deployment

Two-Point Moorings

Data buoys with two-point mooring are commonly used when monitoring sensors are deployed in the water column below the buoy. The mooring lines are pulled taut away from the data buoy, freeing the water column for a suspended sensor line.

In most two-point configurations, mooring lines connect the data buoy to small marine marker buoys. These marker buoys are shackled to another mooring line that runs to the seafloor and connects via a bottom chain to an anchor.



Two-point mooring deployment

Managing Data

Once the turbidity monitoring systems are set up, they will log data at a user-defined interval (minimum one minute). The user also sets the interval at which data is transmitted via radio or cellular telemetry. A typical monitoring system logs turbidity data every 10 minutes and transmits it every 30 minutes. This is a realistic logging frequency, as the power limitations of a solar-powered system restrict how often it can take readings.

Data Acquisition Software

The computer at the receiving end of these transmissions requires software to acquire, process, analyze, and possibly publish water quality data. NexSens iChart software is a user-friendly package that can fulfill these needs, serving as the centralized interface and database for all incoming data. All data and sensor configuration settings are stored in a single iChart database. The software is designed with an open architecture and offers a straightforward interface, making it easy for individuals at any level of technical expertise to configure and customize a turbidity monitoring and data collection project.

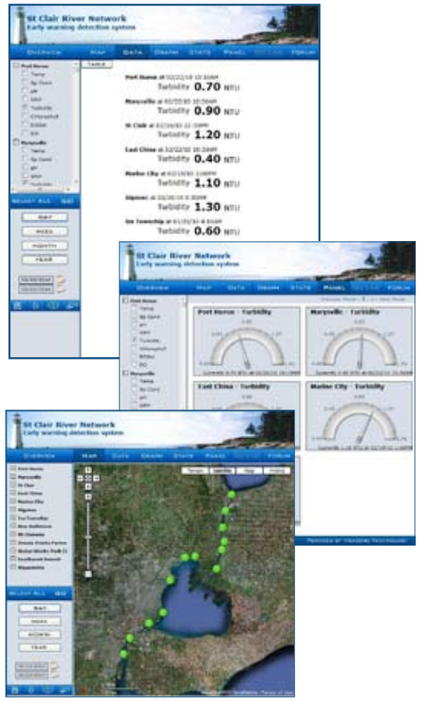
The software offers a unique historical report creation tool that can generate customized reports with data from all sensors in an iChart database. When creating a report, users can include specific information about the monitoring site, location, sensors, and project. After creation, reports can be converted to PDF, exported to Microsoft Excel, sent to interested parties via e-mail, uploaded to a web server, and more. The report template can also be saved and automatically generated, further automating the reporting process.

Real-Time Online Datacenter

iChart can export data directly into WQData, a secure web datacenter providing an online interface for viewing environmental data. It offers 24/7 instant access to project data using any web browser.

Project datacenter sites can be password-protected or publicly accessible. Using WQData, visitors can view dynamic project area maps overlaid with weather data, recent and historical data, time series graphs, statistical summaries, and project-specific information.

An administrator login provides an intuitive interface for setting up the project, modifying data views, and adding relevant project information. Administrators can select from a library of predefined themes, enter site descriptions, set up data filters, and graph scales and other data attributes. Also included with WQData is the NexSens embeddable Web-Data Applet. This HTML code can be added to any web page to present visitors with a quick snapshot of project data that also links back to the complete project datacenter.



NexSens WQData software displaying area maps, historical data, and current readings for a project site.

Alarm Notifications

Automated alarm notifications from iChart allow dredge operators to receive immediate alerts when turbidity levels are too high. NexSens turbidity monitoring systems can alert persons via SMS text messaging or email of parameters exceeding pre-defined limits.

Additionally, NexSens data loggers can temporarily change their functionality as a response to exceeded parameter limits. For example, the data logger can change sample and log intervals to take more readings during a period of high turbidity.

To determine the parameter limits, background turbidity data is typically obtained prior to dredging using spot-sampling equipment. Once the limits have been determined, the data is then entered into the iChart software. When the turbidity levels exceed this pre-defined range during operations, iChart will automatically issue the alert via text message or email to the appropriate project manager or dredge operator.

With this system in place, dredge operators can be notified immediately of high turbidity levels and slow down or alter the dredging operation until levels fall back within range. Additionally, the historical data can be tracked and correlated to dredge operations so that the consulting firm can improve upon future dredging operations.

iChart will automatically issue the alert via text message or email.

Quality Assurance

It's important to verify periodically that dredge-monitoring sites are providing accurate turbidity data. The best way to achieve this is by checking turbidity in the same area using a separate, portable monitoring system.

An ideal choice for portable quality checks is to use a YSI 6-series multi-parameter sonde with turbidity sensor and attach it to a YSI 650 MDS Multi-Parameter Display System. The sonde can also house additional sensors if data for other parameters, such as pH, dissolved oxygen, or conductivity, is required.

Partnered with a 6-series sonde, the YSI 650 can display real-time readings and log this data to internal memory. The sonde can be lowered into the water column to a depth that matches the in-place sensors and be held there with the field cable that attaches it to the YSI 650. The data from this portable system can then be compared to the in-place monitoring system and checked for discrepancies.

The YSI system, however, uses the ISO 7027 method, which is not the EPA's preferred method. It is also possible to verify turbidity levels using the EPA-approved 180.1 method using the HACH 2100Q. A drawback to this option is that the Hach 2100Q is not a submersible unit. The handheld device requires a water sample to be retrieved and inserted into the meter. This is especially a hindrance when quality checking monitoring systems that measure turbidity at multiple depths along the water column.

YSI 600OMS Quick Sample System

Hach 2100Q Portable Turbidity Meter

System Maintenance

Regardless of the turbidity sensor used, periodic maintenance and calibration is required. Maintenance intervals are largely dependent on site conditions and other variables; common maintenance intervals are weekly or bi-weekly.

It is common to have a spare sensor on hand both to swap sensors in the field during calibration and to reduce downtime resulting from unforeseen sensor failure, which could cause critical and costly interruptions to safe dredging operations.

Turbidity sensors usually require a two-point calibration — one at 0 NTU and another at a higher NTU value (often 100 NTU). The 0 NTU value can be obtained using de-ionized water. The high range NTU is obtained using a Formazin calibration standard or other approved standard. Sensors can achieve even greater accuracy using a three-point calibration (i.e., 0 NTU, 100 NTU, and 1000 NTU). Regardless of the number of points used, it is important to always include 0 NTU as the first point. For best results, use only freshly prepared or purchased turbidity standard, or as degradation of standards can occur over time. It's also important to use a calibration standard approved by the sensor manufacturer in order to achieve the most reliable results.

If using the YSI model 6136 turbidity sensor, greater details regarding calibration are available in the YSI 6-series sonde users manual in Turbidity section of the "Principles of Operation" (chapter 5.13), as well as Appendix E.

The manual PDF is available online at:
http://www.fondriest.com/pdf/ysi_6-series_manual.pdf.

SHORT-TERM PROJECTS
Rental vs. Purchase

While it often makes sense to purchase systems outright, many short-term dredging projects make it cost-prohibitive. Fondriest Environmental offers real-time turbidity monitoring systems with weekly and monthly rental rates to meet project requirements. Fondriest can lease all the necessary monitoring equipment as well as field supplies needed to set up and use a turbidity monitoring system.

Fondriest Environmental application engineers are available to assist in configuring an ideal solution for your project needs. They can also help with training and technical support. To reach them, please call (888) 426.2151 or email customercare@fondriest.com.

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APPLICATION:
Turbidity Alert System — Ashtabula River Dredging

Project Overview

The Ashtabula River is located in northeast Ohio and flows into Lake Erie's central basin at the city of Ashtabula. From the 1940s to the late 1970s, the area surrounding the mouth of the river experienced significant development from various industries. Throughout this period, unregulated discharges into the river and mismanagement of hazardous waste from local industries prompted the International Joint Commission to label the river an "Area of Concern" (1).

In 2006, a large US consulting firm was contracted to dredge contaminated sediment out of the river. The firm chose NexSens buoy-based cellular data logging systems to monitor this process and ensure the contaminated sediment levels do not exceed specified ranges.

System Description

Surrounding the dredging operation, three NexSens data buoys were strategically located to monitor the suspended solids generated from dredges. The rugged buoy platforms are constructed of an inner core of cross-linked polyethylene foam with a tough polymer skin coating. The topside instrument mast houses the cellular data logger, solar panel, antenna, and navigational beacon. Top and bottom mounted stainless steel eye-nuts accommodate moorings and lifting rigs for quick and easy deployments.

YSI 600 OMS (Optical Monitoring System) sondes with optical turbidity probes were chosen to sense turbid water. The YSI 6136 turbidity probe features a self-cleaning wiper to provide accurate turbidity measurement in fresh, brackish, and sea water. Before taking a reading, the mechanical wiper cleans the sensing optics to ensure that the measurement is not affected by fouling sediment debris. All YSI 6-Series instruments facilitate direct connection to NexSens data loggers via MS-8 connector on the bottom of the NEMA 4X enclosure.

Farther upstream, a remote stream-gaging system was installed to monitor changes in river water level. This system consisted of a YSI 600LS vented level sonde connected to a NexSens 3100-iSIC cellular data logging system.
During dredging operations, all data from the NexSens systems transmit in real-time to a PC running NexSens iChart software. iChart serves as the centralized database for all incoming data. In addition, it features an "Alarm Notification" feature to notify project members quickly if turbidity levels exceed a specified range.

The iChart software automatically generates a NexSens WQData web datacenter, which provides an online interface for viewing data. The datacenter allows project members to experience project information and data, as well as facilitate direct communication using the online forum.

With this system in place, dredge operators can be notified immediately of high turbidity levels and slow down or alter the dredging operation until levels fall back within range. Additionally, the historical data can be tracked and correlated to dredge operations so that the consulting firm can improve upon future dredging operations.

(1) Source: "Great Lakes Area of Concerns (AoCs): Ashtabula." U.S. EPA. URL: http://www.epa.gov/glnpo/aoc/ashtabula.html

Reviewing project plans for buoy deployment

SYSTEM CONFIGURATION TOOL

Fondriest application engineers will assist with tailoring buoy configuration and equipment choices on a site-by-site basis to ensure reliability, safety, and proper data management. The questionnaire below can help you get started. Once completed, this form can be faxed to **(937) 426.1125** or, if completed digitally, emailed to **customercare@fondriest.com**.

Contact Information

Name: _____

Organization: _____

Telephone: _____

Email: _____

Site Location

The location of a monitoring system can affect what buoy configuration best suits the conditions. Please select in what type of water body the system will reside.

☐ Lake ☐ River ☐ Coastal ☐ Other

Site Conditions

Describe the site conditions in a paragraph or two. Please include details regarding the levels of wind, waves, and boat traffic experienced in the area.

_____

_____

_____

_____

_____

_____

_____

Approximate Depth

The mooring hardware and cable lengths used for a deployment depends on the distance to the sea floor. An application engineer can develop the best mooring plan to accommodate the approximate water depth.

☐ <5ft ☐ Between 5 and 25 ft. ☐ Between 25 and 50 ft.

☐ Between 50 and 100 ft. ☐ >100 ft.

Water Column Measurements

Measuring turbidity at a single mid-level depth is often sufficient for dredge monitoring. In some cases, however, regulatory agencies may require multiple depth readings to achieve greater accuracy.

☐ Single Depth ☐ Multiple Depths

Telemetry

License-free spread-spectrum radio telemetry allows communication with a shore-side NexSens radio base station as far as five miles line-of-sight from the monitoring site. Cellular telemetry allows greater geographic flexibility and is able to transmit from almost anywhere in the U.S., but it includes the cost of a cellular data plan.

☐ Cellular ☐ Radio ☐ None

Quality Assurance

A multi-parameter sonde with turbidity sensor connected to a handheld display is an ideal way to verify the accuracy of a turbidity monitoring system and uses the ISO 7027 method. Alternatively, there are portable turbidimeters that can measure using the EPA-approved 180.1 method.

☐ Multi-parameter sonde & handheld display (ISO 7027 Method) ☐ Portable turbidimeter (EPA 180.1 Method)

Data Management

While turbidity monitoring systems can function with iChart software alone, WQData is a seamless extension and enhancement of the software. It is a secure web datacenter providing an online interface for viewing environmental data. It offers 24/7 instant access to project data using any web browser.

☐ iChart ☐ iChart & WQData

Project Length (Rental vs. Purchase)

Although it often makes sense to purchase systems outright, many short-term dredging projects make it cost-prohibitive. NexSens Technology offers real-time turbidity monitoring systems with weekly and monthly rental rates to accommodate these operations. An application engineer can make recommendations on what choice is most cost-effective.

☐ 1-3 Months ☐ 3-6 Months ☐ 6-12 Months ☐ 1 year