

# Calculating Nephelometric Turbidity Units of Increased Suspended Solids in Water by Creating a Cost-effective Turbidity Buoy System Using an Attenuation Light Collection System

Maher, Samuel (School: Arthur Hill High School)

Turbidity is an underestimated issue when analyzing water quality. Turbidity, the amount of sedimentation in water, is calculated in the units of NTU(Nephelometric Turbidity Units) . Turbidity is harmful to aquatic ecosystems due to the amount of sunlight different depths of water receive. When higher turbid water is present, light cannot penetrate layers of water is needs to, which causes a decrease in dissolved oxygen and ultraviolet sterilization. This year's project was to create a turbidity buoy system using an attenuation light collection system with a cost-efficiency orientation. The attenuation light collection system was created using a photosensor and LED that scans 180 degrees from each other for decreasing amounts of light seeping through the water. The photosensor acts as a resistor that changes the amount of resistance based upon how much radiation from light is striking the photo conductive layer. This gives raw output of how much radiation is detected, compared to other sensors that use photo iodides to convert light to frequency. The meter also contains GPS coordinate tracking, wireless communication via SMS, Inductive Charging, motor control abilities, and a charging docking station created specifically for the buoy. The meter was 97.8% accurate with water samples 0-300NTU. The claims are supported by 10,000 total readings of the multiple solutions. The portion of the meter and the light-collection system cost's \$12 and the other features included cost \$65. Handheld meters on the market right now cost \$800-\$4,000 proving the product has a place on the market as an innovative product.