FISH 503 Advanced Limnology (University of Idaho, Moscow Campus)

Oxygen Module

Module Goals: This module aims to familiarize participants with all aspects of oxygen and its measurements in the aquatic environment using a variety of techniques including the pros and cons of each. Common mistakes and issues surrounding oxygen measurements will be discussed. The theory will be reinforced by a strong hands-on laboratory component in which the different measurement techniques will be used.

General Description

Oxygen as an element, valence states, chemical reactivity, dissolution constant, effects on in-lake processes, solubility and factors affecting solubility. Standard gas laws, use of standard method to calculate and measure each of the aforementioned factors, including AHPA Standard Methods for the Examination of Water and Wastewater, as well as EPA standard methods. Theory of operation of chemical, polarographic and recently developed light sensor methods and the pros and cons of each. Issues surrounding the calibration of each method-type, standard QA/QC procedures in a sampling program. Chemical contamination of sensors that will affect various oxygen measurements. Requirement of oxygen by biota as an electron acceptor, oxygen in chemical reactions in lakes, oxygen in sediments and influence on REDOX potential.

The laboratory component will include hands-on experience with Winkler titrations, examination of various analog, digital and LDO meters, their actual calibration and function in different environments, and a comparison of reliability, stability and accuracy of each in similar a controlled environment. Participants will use and develop spreadsheets to aid in calculating saturation concentrations for calibrations at different elevations and atmospheric pressures.