

FCE LTER Water Quality Protocols

Surface Water

Water quality samples are collected using ISCO autosamplers at all wetland sites. The autosamplers contain 24 1L bottles. Water is sampled by programming the autosamplers to take composite samples once every 3 days. These samples are a composite of four 250mL subsamples drawn every 18 hours (a sampling scheme that captures a dawn, noon, dusk, and midnight sample in every three day composite). The samples are collected every 3-4 weeks and analyzed for total phosphorus (TP), total nitrogen (TN), and salinity. When sites are visited to collect these samples, we also collect a grab sample that is immediately put on ice. A portion of these grab samples is filtered through a Whatman GF/F filter immediately upon return to the lab, and the filtered samples are analyzed for inorganic nutrients such as NO₂⁻, NO₃⁻, NH₄⁺, SRP, and DOC. The unfiltered fraction of these grab samples is analyzed for TP, TN, and TOC. We use these monthly grab samples to generate relationships between TP and SRP, and between TN and NO₂⁻ + NO₃⁻ + NH₄⁺. Dissolved nutrients are measured using standard rapid flow analyzer (RFA) techniques. TP is analyzed with a modified Solorzano and Sharp (1980) technique. TN is measured with an ANTEK 9000N TN analyzer, TOC and DOC are quantified on a Shimadzu TOC Analyzer, and salinity is measured with an YSI conductivity meter. In addition to the regular water quality monitoring, we use the rain level actuators at all freshwater sites to trigger water sampling after rain events exceed a given threshold of duration and/or intensity. As currently programmed, when the threshold of = 2.5 cm of rain per hour is passed, the autosampler at that site collects a 500mL sample 30 minutes after the threshold has been reached. Rain event samples are collected, treated, and analyzed as all other water quality samples.

Surface water temperature and salinity values are measured using an Orion (model 142) conductivity and temperature recording meter. Upon arrival at a site, the recording probe is placed approximately 0.5 m below the surface of the water. Time is allowed for values to stabilize before recording the data. Surface temperature is recorded in degrees Celsius and salinity is recorded in parts per thousand. Secchi values are used to describe water clarity at a given point in time. Upon arrival at a site, and if water clarity is such that the bottom cannot be seen, a standard limnology/oceanography secchi disk (alternating black and white pattern) is lowered into the water until the point that it is no longer visible. That length is then measured in centimeters and recorded. If the bottom is visible (which often it is), secchi values will be recorded as the depth of that particular site in centimeters. Turbidity assesses the amount of particulate matter in the water column. Upon arrival at a site two standard plastic scintillation vials are filled with seawater. These replicate water samples are then analyzed using a DRT-15CE Turbidimeter (HF Scientific, Inc.). Before placing in the Turbidimeter, samples are shaken, then a value is taken after a ten second stabilization period. The replicate sample readings are averaged together and the numeric value obtained is reported to the nearest tenth in NTUs.

Pore Water

Porewater samples are taken with a porewater sipper in the middle of each subplot. These samples are analyzed on sulfide concentration using a voltage meter, and on orthophosphate,

ammonium, nitrite and nitrate using either a spectrophotometer, a Lachat auto analyzer or an OI analytical auto analyzer. Apha standard methods (1992) are used to derive the nutrient concentrations.

APHA. 1992. Standard methods for the examination of water and wastewater. 18 th ed. American Public Health Association, Washington, DC.

Solarzano, L., and J. H. Sharp. 1980. Determination of total dissolved P and particulate P in natural waters. *Limnol. Oceanogr.* 25: 754-758.