

ITNI Method: Evaluating Nitrogen Deposition to Coastal Sage Scrub Communities

Dr. James O. Sickman: james.sickman@ucr.edu

GSR Amanda Cobbs-Russell: acobb001@ucr.edu

Environmental Sciences Department

The Integrated Total Nitrogen Input (ITNI) method is a technique for evaluating nitrogen deposition by utilizing plants as collection interfaces. The ITNI method employs a plant-liquid-soil system (PLS system) in which a plant is grown in nitrogen-free sand and labeled with ^{15}N tracer while growing in a greenhouse. Upon deployment into the environment, the ^{15}N tracer in the plant tissues is diluted as a result of atmospheric nitrogen deposition input via gaseous, leaf and root uptake. At the end of the sampling period, all components of the plant and system are harvested and analyzed on a mass spectrometer to determine the degree of dilution of the tracer. The ^{15}N values obtained will be incorporated into a mass balance equation that accounts for the total deposition occurring on the PLS system surfaces and yields the total nitrogen uptake from the atmosphere. In this study, we will employ Coastal Sage Scrub species, a declining native California plant assemblage, to determine total nitrogen deposition occurring in the Inland Empire of Southern California. Traditional nitrogen deposition collection devices such as throughfall and ion exchange resins will be co-located with the ITNI PLS system to assess the accuracy of those traditional collectors. In addition, previously calculated ecosystem critical loads of nitrogen deposition will be evaluated relative to the ITNI deposition rates and CSS species specific nitrogen deposition rates will be determined.