^{15}N additions for evaluating nitrogen biogeochemical cycles in aquatic systems - four case studies

B. D. EYRE*, D. ERLER, and J. OAKES.

Centre for Coastal Biogeochemistry, Southern Cross University, PO Box 157, Lismore NSW 2480
(*correspondence: bradley.eyre@scu.edu.au)

^{15}N tracer studies are a powerful tool for evaluating nitrogen biogeochemical cycles. Deliberate additions of ^{15}N overcome some of the the limitations of natural abundance stable isotope studies such as overlapping source signals, variable and/or uncertain fractionation factors and spatial and temporal variation. This presentation will compare and contrast the nitrogen assimilation, trophic transfer, transformation, and/or flux pathways within four different aquatic systems that we have studied using ^{15}N tracers. Most of the ^{15}N added to a mangrove forest during a whole-ecosystem stable isotope addition was retained after 14 days (70%), with the remaining ^{15}N exported as PON, NH_4^+, NO_3^- and N_2 (decreasing order of importance). A similar amount of ^{15}N was retained in a constructed wetland during a whole-ecosystem stable isotope addition after 15 days (80%), but more of the remaining ^{15}N was lost via N_2 effluxes. In contrast, only 27% of the ^{15}N that was assimilated by MPB in subtidal sands was retained after 33 days, with 16.5% effluxed as NO_3^-, 20.8% effluxed as NH_4^+, and 20.7% effluxed as N_2 and 15.1% was missing.