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Stable isotopes releases of nitrogen ($^{15}NH_4CL$) were conducted in 9 streams as part of the LINX project and independently in the Procter & Gamble Experimental Streams and several other natural streams. The goal of LINX is to compare nitrogen processing in a range of streams and investigate the factors that govern nitrogen processing. The P&G experimental stream facility is used to test the effects of chemicals on stream ecosystems. Typically, experimental streams are evaluated at the population or community level with little examination of ecosystem functions such as nutrient processing. This project was designed to determine how processing of nitrogen in the P&G experimental streams compares to processing of nitrogen in natural streams throughout the US and other regions . Preliminary evaluations of nitrogen uptake show that the uptake rate of ammonium for the experimental streams (0.019 m^{-1}) is similar to uptake rates in natural streams of similar flow and fits the regresssion of uptake length and discharge for the LINX streams. The relationship between the ESF and natural streams for other processes (e.g., transfer of nitrogen) is less transparent. However, values from the experimental streams fall within the range of values for the natural streams.

(308) CONTROLS ON STREAM METABOLISM DETERMINED BY AN INTERBIOME COMPARISON STUDY. P.J. Mulholland[1], C.S. Fellows[2], J.L. Tank[3], S.K. Hamilton[4], E. Martí[5], L.R. Ashkenas[6], W.B. Bowden[7], W.K. Dodds[8], W.H. McDowell[9], J.L. Meyer[10], B.J. Peterson[11], and J.R. Webster[12]. [1]Environmental Sciences Division, Oak Ridge National Laboratory, P.O. Box 2008, Oak Ridge, TN, 37831, [2]Department of Biology, University of New Mexico, Albuquerque, NM, 87131, [3]Department of Natural Resources and Environmental Sciences, University of Illinois, N-411 Turner Hall, Urbana, IL, 61801, [4]Kellogg Biological Station, Michigan State University, 3700 E Gull Lake Dr, Hickory Corners, MI, 49060, [5]Department of Zoology, Arizona State University, Tempe, AZ 85287, [6]Department of Fisheries and Wildlife, Oregon State University, Corvallis, OR, 97331, [7]Landcare Research, P.O. Box 69, Lincoln 8152, New Zealand, [8]Division of Biology, Kansas State University, 232 Ackert Hall, Manhattan, KS, 66506, [9]Department of Natural Resources, James Hall, University of New Hampshire, Durham, NH, 03824, [10]Institute of Ecology, University of Georgia, Athens, GA, 30602, [11]Ecosystems Center, Marine Biological Laboratory, Woods Hole, MA, 02543, [12]Department of Biology, Virginia Tech., Blacksburg, VA, 24061 mulhollandpj@ornl.gov

Rates of stream metabolism were determined for 9 North American streams using the upstream-downstream diurnal oxygen change technique. This study was part of the Lotic Intersite Nitrogen Experiment (LINX), and included forested streams from the tropics (Puerto Rico) to the north temperate zone (New Hampshire, Oregon) and one grassland stream (Kansas). Measurements in each stream were made on one date under baseflow and clear to partly cloudy weather during one season, and related to various ecosystem characteristics. Gross primary production rates (GPP) ranged from 0.1 gO_2 $m^{-2}d^{-1}$ in Quebrada Bisley, Puerto Rico and Upper Ball Creek, NC, in autumn to 15 gO_2 $m^{-2}d^{-1}$ in Sycamore Creek, AZ, in spring. Light was the primary determinant of GPP (r^2=0.64, P=0.018), and together light and streamwater phosphorus concentration explained 85% of the variance in GPP. Ecosystem respiration rates (R) ranged from 1.9 gO_2 $m^{-2}d^{-1}$ in Walker Branch, TN, in spring to 9.6 gO_2 $m^{-2}d^{-1}$ in Mack Creek, OR, in summer. Stream phosphorus concentration was the primary determinant of R (r^2=0.62, P=0.021), although transient storage zone size was a marginally-significant predictor (r^2=0.45, P=0.067). Based on these results, terrestrial biome and season appear to have a stronger effect on GPP than on R.

(309) NITROGEN PROCESSING AND RETENTION IN STREAMS (NPARS): PRELIMINARY RESULTS. S.A. Thomas[1], H.M. Valett[1], J.R. Webster[1], P.J. Mulholland[2], and C.N. Dahm[3]. [1]Department of Biology, Virginia Tech, Blacksburg, Virginia, USA, 24060, [2]Division of Environmental Sciences, Oak Ridge National Laboratory, Oak Ridge, Tennessee, USA, 37831, [3]Department of Biology, University of New Mexico, Albuquerque, New Mexico, USA, 87131 sathomas@vt.edu

Mechanisms responsible for nutrient retention may differ in magnitude and importance among catchments that vary in vegetation and climate. Here we report the initial results of a research program addressing how differences in terrestrial-aquatic interactions, stream metabolism, and groundwater-surface water exchange influence nitrate retention. Research locations ranging from mesic forests (North Carolina, Tennessee) to semi-arid conditions (New Mexico) each include two streams differing in transient storage. For each stream, we quantified nitrate retention using coinjections of chloride and Na15NO3. Transient storage (As/A) differed less between paired streams in Tennessee (0.2 and 0.5) than in North Carolina (0.5 and 2.0) and New Mexico (0.1 and 3.0). Reach metabolism was dominated by hetertrophic activity at all mesic forest sites (P/R ranging from 0.01 - 0.08), whereas moderate autotrophic activity was measured in New Mexico (P/R ranging from 0.29 - 0.81). Preliminary results indicate that 15NO3 retention increases with As/A and total energy flow (gross photosynthesis plus respiration). By coupling data from isotopic injections to our metabolic and hydrologic studies, we present a conceptual model of nitrogen movement in streams to describe how hydrologic, biotic and chemical factors vary locally (i.e. between paired streams) and regionally (i.e. among sites) as factors influencing retention.

(310) NITROGEN CYCLE OF A FIRST ORDER PEATY TUNDRA STREAM. M.K. Fox[1], B.J. Peterson[1], W.B. Bowden[2], A.E. Hershey[3], K. Slavik[1], and C. Pruden[2]. [1]The Ecosystems Center, Marine Biological Laboratory, Woods Hole, Massachusetts 02543 USA, [2]Landcare Research, P.O.Box 69, Lincoln 8152 New Zealand, [3]Department of Biology, University of North Carolina-Greensboro, Greensboro, North Carolina 27402 USA "marykayfox<MKFOX@MBL.EDU

48th ANNUAL MEETING - Keystone Resort, Colorado

NABS 2000

May 28-June 1, 2000

Members of the North American Benthological Society and other interested persons are invited to the 48th Annual Society Meeting to held in Keystone Resort, Colorado, USA.

The NABS' annual meeting has established a reputation, not only for its camaraderie, but also for the high quality of its program and presentations.

In keeping with this tradition, the NABS 2000 Program Committee has assembled a record number of presentations for your science pleasure! So, get ready to pack your bags and head out to the high country!

♦ Taxonomy Faire

Given the success of the **Taxonomy Fair** in Duluth, led by **Dave Penrose**, the Technical Information Committee is sponsoring another Faire at Keystone during the poster session on Wednesday afternoon, May 31st. The "Faire" format consists of taxonomy stations, each manned by a recognized expert of a taxonomic group. Participants are free to bring their own specimens to these expert stations and are able to gain personal access to the gurus of aquatic invertebrate taxonomy. Bring your vials and slides!

♦ SPECIAL WORKSHOP ON NATIVE AMERICAN ISSUES

The NABS Human Resources Committee will be hosting a workshop Sunday, May 28th, at the 2000 Keystone meeting will feature issues related to water quality and monitoring on tribal lands. Please visit the NABS website or contact Judy Li for more information.