JOURNAL OF LIMNOLOGY

DOI: 10.4081/jlimnol.2017.1588

SUPPLEMENTARY MATERIAL

Bridging between litterbags and whole-ecosystem experiments: a new approach for studying lake sediments

Andrew J. TANENTZAP,[1*] Erik J. SZKOKAN-EMILSON,[1] Cyndy M. DESJARDINS,[1] Chloe ORLAND,[1] Kurt YAKIMOVICH,[2] Randy DIRSZOWSKY,[2] Nadia MYKYTCZUK,[2] Nathan BASILIKO,[2] John GUNN[2]

[1]Ecosystems and Global Change Group, Department of Plant Sciences, University of Cambridge, Downing Street, Cambridge CB2 3EA, UK

[2]Laurentian University, 935 Ramsey Lake Road, Sudbury P3E 2C6, Ontario, Canada

[*]**Corresponding Author**: ajt65@cam.ac.uk

Details of lake sediment survey

We surveyed littoral sediments (0.25-0.75 m water depth) below eight separate sub-catchments with single streams draining into Daisy Lake, Sudbury, Ontario (46°27′N, 80°52′W; lake area=36 ha; maximum depth=14 m). We used Daisy Lake instead of Lake Laurentian for this survey because its watershed offered a nearly 20-fold gradient in organic matter inputs across sub-catchments due to differences in surrounding forest cover (Tanentzap *et al.,* 2014). Sites in the southwest of the lake, such as D and H described in Tanentzap *et al.,* (2014), were dominated by similar species to Lake Laurentian, particularly *Betula papyrifera*, *Populus tremuloides*, and *Pinus resinosa*. Cover of these species progressively decreased and land cover

became dominated by exposed rock in more north-easterly sites, such as K and A6 (Tanentzap *et al.,* 2014). Therefore, we could sample a wide range of sediment conditions within the same watershed and exposed to similar overlying waters by working at Daisy Lake because of variation in surrounding forests.

We collected six short (~10 cm) cores (5 cm diameter) from each littoral site in Daisy Lake using either a Wildco hand corer fitted with CAB liners or else PVC tubes driven into the sediments with percussion (in the case of stiff or stony substrates). The cores were collected at approximate distances of 2, 4, and 6 m from shore on each of two longitudinal transects, moving to an adjacent position off the transect where necessary to avoid boulders and other structures. Core materials were extruded in the lab in 1 cm increments. Three of the cores from each site were analysed for organic matter (OM) content as loss-on-ignition (500°C for two hours) after removing the >1 mm particle fraction. Particle size fractions were determined for 1 to 3 of the remaining cores in each site by passing sub-samples through 2 mm, 1 mm and 0.063 mm sieves after soaking in distilled water for 24 hours.

Sediment composition varied among sites, but there was no clear vertical structuring of OM or particle sizes within cores (Fig. S1). OM content ranged from 1 to 58%, with greater variation among sites than within cores, *e.g.* A6 *vs* D (Fig. S1). Particle size also varied, *e.g.* <0.063 mm size fraction ranged between 4 and 95%, with notably high levels of smaller fractions at sites with little vegetation cover (*e.g.* I and K).

REFERENCES

Tanentzap AJ, Szkokan-Emilson EJ, Kielstra BW, Arts MT, Yan ND, Gunn JM, 2014. Forests fuel fish growth in freshwater deltas. Nat. Comm. 5:4077.

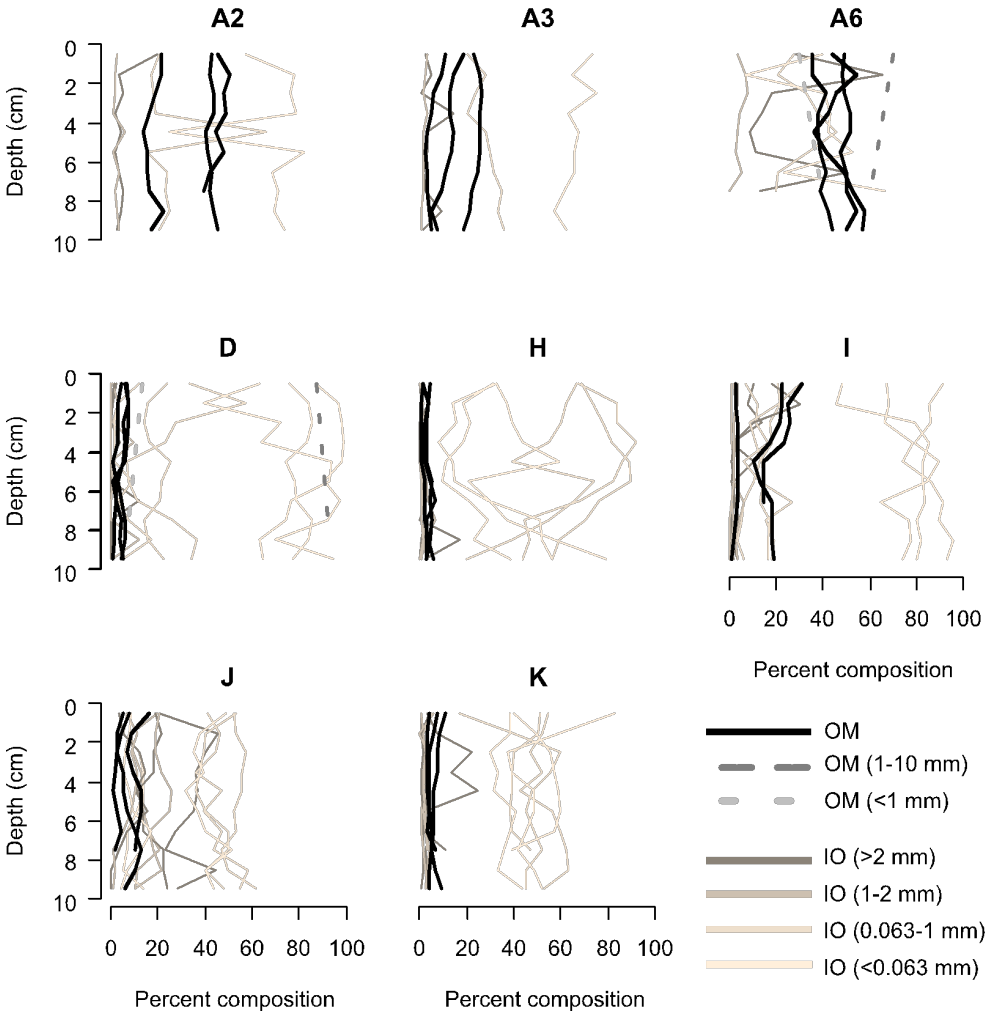

Fig. S1. Sediment characteristics across 8 littoral sites in Daisy Lake. Site locations (A2, A3, A6, D, H, I, J, K) are mapped in Tanentzap *et al.* (2014). Percent composition of organic matter (OM, all sizes) and inorganic (IO) particles in each of four size classes (>2, 1-2, 0.063-1, and <0.063 mm diameter) were plotted at the mid-point of each 1 cm depth interval. For OM measurements, n = 3 cores per site. For IO particle sizes, n = 3 cores in sites D, H, I, J, and K, and n = 1 core per site for all others. We also measured the percent of OM itself that was comprised of particles in 1-10 and <1 mm diameter sizes classes observed in n = 2 cores at two separate depth intervals.