**Notes on the role of streams in ecosystem carbon cycling**

* Discuss the common misconception of streams as “pipes” that simply carry water vs. the reality of streams as biological systems that interact with surrounding landscapes.
* Definition and importance of headwater streams: emphasize that small streams are critically important in a landscape-level perspective on nutrient cycling.
* Ask students to recall biotic processes in the carbon cycle and discuss with a partner how the magnitude of these processes might differ in shaded vs. sunlit streams (answer: higher rate of photosynthesis, and consequently higher primary production, would be expected in sunlit streams due to greater light availability). Ask students to brainstorm other ways that carbon might move between aquatic and terrestrial systems (possible answers: dead leaves/terrestrial organic material falling or being washed into streams, stream organic material deposited on land [e.g., during floods], aquatic predators feeding on terrestrial prey or vice versa, emergence [e.g., adult amphibians, adult aquatic insects], methane emissions, etc.).
* Discuss stream CO2 supersaturation and ask students how this might contribute to landscape-level carbon budgets.
* Introduce the La Selva STREAMS project (<http://streamslaselva.net/>) and the objectives and methodology of the Marzolf et al. (2022) paper.

Citation: *Marzolf, N. S., Small, G. E., Oviedo-Vargas, D., Ganong, C. N., Duff, J. H., Ramírez, A., ... & Ardón, M. (2022). Partitioning inorganic carbon fluxes from paired O2–CO2 gas measurements in a Neotropical headwater stream, Costa Rica.*Biogeochemistry*, 160(2), 259-273.*

* Show Figure 1 for introduction to the study site, then ask students to consider and interpret Figures 2-4 and 7. Ask students how CO2 concentrations reported in streamwater and wellwater compare with atmospheric CO2 concentration. For upper-division classes, consider asking students to read the entire paper prior to a class discussion.
* Summarize the importance of streams in landscape-scale carbon budgets and carbon fluxes between aquatic and terrestrial systems.