During our two field seasons, we surveyed the Taylor Valley and parts of the Victoria Valley (year 1: 12 sites with transects wet to dry; 11 individual sites, 177 samples per parameter) and the Garwood Valley and sites nearby it (Nostoc Flats and Miers Valley)(year 2: 9 transect sites from wet to dry; 6 individual sites, 135 samples per parameter) with regards to our main scientific questions. For the survey part of the project in the Garwood/Marshall/Miers areas and the Taylor Valley that included collections for the full suite of nutrients (Carpenter lab), DNA/RNA (Cary lab), and rate measurements of nitrogen fixation, carbon fixation, bacterial productivity and sulfate reduction (Capone lab).

We also undertook experiments on the effects of light on the balance of nitrogen fixation between heterotrophs and autotrophs each year. We carried out one shading experiment in the Taylor Valley in year 1, and in the Garwood Valley in year 2. There were 6 treatments of shading levels (4%, 10%, 15%, 25%, 49%, and 100% (control)). For both series, zero time (Strickland samples were taken for each rate measurement followed by a second sampling after one week.

Data generated by the Carpenter laboratory presented in the Environmental Data spreadsheet include porewater and stream water pH, conductivity chlorophyll, bacterial abundance McDaniel & Capone 1995), inorganic nutrients, and DOC. Standard methods were used for chlorophyll and nutrient analyses Strickland & Parsons 1972; Parsons et al. 1984). Porewaters were obtained by syringe sipper from the 5- 8cm depth horizon.

Data generated by the Capone lab presented in the Rate Measurements spreadsheet include:

Bacterial productivity by Thymidine (^{3}H-Tdr) uptake in the upper 1 cm of mat or soil for both field seasons. Incubations were from 30min- 2h. Units: mol Thy/(cm^3*h). Assays run in triplicate. (Bauer & Capone 1985, Fuhrman & Azam, 1982).

Sulfate reduction samples by uptake of $^{35}SO_4$, generally over 18h incubations. Units: (1/(cc *d)). Samples were from the top 2 cm of the mat or soil. Assays run in triplicate. (Fossing & Jorgensen, 1988).

Stable isotope tracer uptake samples for both years. $^{15}N_2$ & $^{13}CO_2$ uptake in 24h incubations of the upper 1 cm. In year 2, 3 sites were additionally sampled for nitrate and ammonium uptake. Units: nmol N/(g * d). Assays run in triplicate. (Montoya et al. 1996).

Nitrogen fixation (acetylene reduction) data. Time courses for 6-8h using the top 1 cm. Units: nmol N/(cm^3 * d). Assays run in triplicate. (Capone 1993, Capone & Montoya 2001).

These are all discrete rate measurements.

We also collected soil particulate matter samples at each site for POC, PON, δ^{13}C and δ^{15}N analysis.

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