**Supplementary Material**

S1: Mixing model calculation applied to Quinn et al. (2018) data where %MDN is the percentage of MDN in a given sample, TEM is the terrestrial end member (δ15N value representing 0% MDN), MEM is the marine end member (δ15N value representing 100% MDN) which is typically 12.65‰ for sockeye salmon. SAM values were the mean enhanced (10.7‰) and mean depleted (7.65‰) values; TEM was the mean control value from white spruce >50m from Hansen Creek edge (-1.74‰) from Quinn et al. (2018). MEM were the maximum and average δ15N of NH4+ observed in this study.

%MDN = ((SAM – TEM)/(MEM – TEM)) x 100

S2: The candidate model set tested for each response variable using AIC analysis. \* denotes models used for all response variables, additional models were used for net mineralization and net nitrification where substrate represents organic nitrogen concentration and NH4+ concentration, respectively. For δ15N data, GW was not tested as a covariate and total mass of N was tested instead. The four tested hypotheses are 1) bank effect, 2) distance effect, 3) bank and distance effect (salmon effect), and 4) no effect of bank and distance. Response variables include: δ15N and δ13C of bulk soil, δ15N of NH4+, [NH4+]and [NO3-], net mineralization and net nitrification, [Norg], gravimetric water content (GW), and C:N.

|  |  |
| --- | --- |
| **Candidate Model Set** | **Hypothesis** |
| \*Response Variable = bank + ε | 1 |
| \*Response Variable = bank + GW + ε | 1 |
| \*Response Variable = ln(distance) + GW + ε | 1 |
| \*Response Variable = ln(distance) + ε | 1 |
| \*Response Variable = bank + ln(distance) + bank:ln(distance) + ln(distance)2:bank + GW + ε | 2 |
| \*Response Variable = bank + ln(distance) + bank:ln(distance) + ε | 1 |
| \*Response Variable = bank + ln(distance) + bank:ln(distance) + GW + ε | 1 |
| \*Response Variable = bank + ln(distance) + bank:ln(distance) + ln(distance)2:bank + ε | 2 |
| \*Response Variable = bank + ln(distance) + bank+ ε | 1 |
| \*Response Variable = bank + ln(distance) + bank + GW+ ε | 1 |
| \*Response Variable = GW + ε | 3 |
| Response Variable = bank + substrate + ε | 1 |
| Response Variable = ln(distance) + substrate + ε | 1 |
| Response Variable = bank + GW + substrate + ε | 1 |
| Response Variable = bank + ln(distance) + bank:ln(distance) + GW + substrate + ε | 2 |
| Response Variable = bank + ln(distacne) + bank:ln(distance) + substrate + ε | 1 |
| Response Variable = bank + ln(distance) + bank:ln(distance) + GW + substrate + ε | 2 |
| Response Variable = bank + ln(distance) + bank:ln(distance) + ln(distance)2:bank + GW+ substrate + ε | 2 |
| Response Variable = bank + ln(distance) + bank:ln(distance) + ln(distance)2:bank + substrate + ε | 2 |
| Response Variable = bank + ln(distance) + GW+ substrate + ε | 1 |
| Response Variable = bank + ln(distance) + substrate + ε | 1 |
| Response Variable = substrate + ε | 3 |
| Response Variable = GW + substrate + ε | 3 |

S3: Summary statistics mean (standard deviation) of each response variable

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Distance | **1 m** | | **3 m** | | **6 m** | | **10 m** | | **20 m** | |
| Bank | **Enhanced** | **Depleted** | **Enhanced** | **Depleted** | **Enhanced** | **Depleted** | **Enhanced** | **Depleted** | **Enhanced** | **Depleted** |
| Bulk δ15N (‰) | 7.4(2.3) | 7.2(1.9) | 9.2(1.0) | 7.8(2.2) | 8.5(1.9) | 6.9(1.2) | 8.2(1.5) | 7.3(1.6) | 6.5(1.0) | 6.6(1.2) |
| Bulk δ13C (‰) | -27.1(0.6) | -27.2(0.4) | -26.9(0.5) | -27.1(0.6) | -26.6(0.5) | -26.7(0.3) | -26.5(0.5) | -26.6(0.3) | -26.4(0.5) | -26.4(0.4) |
| δ15N of NH4+ (‰) | 10.1(1.8) | 8.7(2.8) | 16.2(10.7) | 8.5(2.5) | 13.3(10.5) | 6.3(2.8) | 8.4(2.5) | 5.8(2.9) | 6.1(2.3) | 6.5(3.3) |
| [NH4+] (μg N g-1) | 47.5 (91.6) | 22.3(16.4) | 62.9(101.5) | 10.6(9.4) | 52.5(82.8) | 11.0(12.7) | 12.3(13.1) | 11.5(8.2) | 8.6(4.4) | 13.2(11.6) |
| [NO3-] (μg N g-1) | 6.0(5.4) | 3.4(4.4) | 10.8(13.5) | 4.3(4.7) | 7.6(8.0) | 3.3(2.8) | 2.4(2.3) | 4.0(4.2) | 2.8(2.8) | 1.7(1.2) |
| Net Mineralization (μg N g-1 d-1) | 2.8(2.0) | 1.8(1.2) | 4.4(5.2) | 1.1(1.0) | 2.1(3.6) | 3.0(3.6) | 1.2(1.1) | 1.4(1.0) | 1.1(1.5) | 2.3(1.9) |
| Net Nitrification (μg N g-1 d-1) | 1.7(1.6) | 1.2(1.4) | 3.4(4.5) | 0.8(1.2) | 2.8(2.9) | 1.7(1.9) | 1.0(0.9) | 1.4(0.8) | 0.6(0.7) | 1.6(1.9) |
| [NOrg] (mg N g-1) | 22.0(4.7) | 19.11(5.8) | 18.0(8.2) | 19.7(7.6) | 17.7(6.6) | 19.5(8.5) | 13.0(6.3) | 18.4(8.9) | 9.5(3.3) | 13.9(5.5) |
| GW | 2.6(1.1) | 3.2(1.6) | 2.4(1.5) | 2.2(1.1) | 2.2(1.5) | 2.8(2.2) | 1.5(0.9) | 2.6(1.8) | 1.4(0.6) | 1.9(0.8) |
| C:N | 11.9(1.4) | 11.2(1.1) | 11.7(1.6) | 10.9(1.5) | 12.8(2.2) | 12.1(2.7) | 14.2(1.7) | 12.1(1.9) | 17.0(2.0) | 14.1(3.0) |
| % Nitrification | 54.8(44.7) | 67.9(43.8) | 75.4(35.5) | 49.3(39.7) | 75.7(36.2) | 53.1(39.0) | 65.9(36.4) | 87.9(15.8) | 50.6(33.5) | 56.2(39.2) |
| % C | 30.0(5.5) | 25.5(8.8) | 26.4(10.1) | 24.7(9.7) | 25.7(8.2) | 27.5(13.3) | 21.3(8.8) | 25.2(11.7) | 19.0(6.7) | 21.2(6.7) |

S4: Predicted verse observed values and predicted verse residuals for the model with the most support (Table 1, Figure 2) for each the response variables

