# Supplementary Material - Bioenergetics Manuscript

Map

Description automatically generated

## Figure 1

Papineau Lake (45.815120° N, 74.770875° W) split by basin (colour) with acoustic telemetry receivers as plotted as round points. Triangles indicate receivers where temperature loggers were moored to the receiver line at depths of 2, 4, 6, 10, and 18 or 20 m. Additional, a triangle denotes the one receiver in each basin that were used for acoustic telemetry range testing.

## Table 1.

Multiple comparisons table with a Tukey’s adjustment for the genialized linear mixed effect or linear models estimated for daily temperature (°C), standard and activity metabolism (mg O2 kg-1 h-1), and scope-for-activity (mg O2 kg-1 h-1). Alpha was set to 0.05 with significance indicated by bold p values.

| Metric | Basin | Contrast | Ratio | Standard Error | df | t-statistic | p |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Temperature (°C) | east | Spring - Summer | 0.5 | 0.007 | 16729 | -52.84 | **≤ 0.001** |
| Temperature (°C) | east | Spring - Fall | 0.5 | 0.007 | 16729 | -47.34 | **≤ 0.001** |
| Temperature (°C) | east | Spring - Winter | 1.6 | 0.023 | 16729 | 35.96 | **≤ 0.001** |
| Temperature (°C) | east | Summer - Winter | 3.3 | 0.045 | 16729 | 88.76 | **≤ 0.001** |
| Temperature (°C) | east | Fall - Winter | 3.1 | 0.041 | 16729 | 84.99 | **≤ 0.001** |
| Temperature (°C) | east | Summer - Fall | 1.1 | 0.014 | 16729 | 6.00 | **≤ 0.001** |
| Temperature (°C) | east | Spring - North Spring | 0.9 | 0.054 | 16729 | -0.93 | 0.999 |
| Temperature (°C) | east | Spring - West Spring | 0.9 | 0.043 | 16729 | -1.39 | 0.965 |
| Temperature (°C) | east | Summer - North Summer | 1.1 | 0.065 | 16729 | 2.16 | 0.579 |
| Temperature (°C) | east | Summer - West Summer | 1.0 | 0.044 | 16729 | -0.84 | 1.000 |
| Temperature (°C) | east | Fall - North Fall | 1.1 | 0.060 | 16729 | 1.08 | 0.995 |
| Temperature (°C) | east | Fall - West Fall | 1.0 | 0.045 | 16729 | -0.07 | 1.000 |
| Temperature (°C) | east | Winter - North Winter | 0.7 | 0.041 | 16729 | -5.75 | **≤ 0.001** |
| Temperature (°C) | east | Winter - West Winter | 0.9 | 0.042 | 16729 | -1.85 | 0.789 |
| Temperature (°C) | west | Spring - Summer | 0.5 | 0.006 | 16729 | -56.34 | **≤ 0.001** |
| Temperature (°C) | west | Summer - Winter | 3.2 | 0.040 | 16729 | 93.20 | **≤ 0.001** |
| Temperature (°C) | west | Spring - Fall | 0.6 | 0.007 | 16729 | -46.88 | **≤ 0.001** |
| Temperature (°C) | west | Summer - Fall | 1.1 | 0.013 | 16729 | 9.70 | **≤ 0.001** |
| Temperature (°C) | west | Spring - Winter | 1.6 | 0.021 | 16729 | 36.90 | **≤ 0.001** |
| Temperature (°C) | west | Fall - Winter | 2.8 | 0.035 | 16729 | 85.43 | **≤ 0.001** |
| Temperature (°C) | west | Spring - North Spring | 1.0 | 0.055 | 16729 | 0.21 | 1.000 |
| Temperature (°C) | west | Summer - North Summer | 1.2 | 0.065 | 16729 | 2.95 | 0.124 |
| Temperature (°C) | west | Fall - North Fall | 1.1 | 0.058 | 16729 | 1.19 | 0.990 |
| Temperature (°C) | west | Winter - North Winter | 0.8 | 0.043 | 16729 | -4.41 | **≤ 0.001** |
| Temperature (°C) | north | Spring - Fall | 0.6 | 0.010 | 16729 | -30.33 | **≤ 0.001** |
| Temperature (°C) | north | Spring - Winter | 1.2 | 0.021 | 16729 | 12.80 | **≤ 0.001** |
| Temperature (°C) | north | Summer - Winter | 2.1 | 0.038 | 16729 | 42.23 | **≤ 0.001** |
| Temperature (°C) | north | Spring - Summer | 0.6 | 0.010 | 16729 | -30.11 | **≤ 0.001** |
| Temperature (°C) | north | Fall - Winter | 2.1 | 0.035 | 16729 | 43.74 | **≤ 0.001** |
| Temperature (°C) | north | Summer - Fall | 1.0 | 0.018 | 16729 | 0.93 | 0.999 |
| SMR (mg O2 kg-1 h-1) | east | Fall - Winter | 1.4 | 0.007 | 16570 | 65.99 | **≤ 0.001** |
| SMR (mg O2 kg-1 h-1) | east | Fall - Spring | 1.2 | 0.006 | 16570 | 44.41 | **≤ 0.001** |
| SMR (mg O2 kg-1 h-1) | east | Winter - Spring | 0.9 | 0.004 | 16570 | -20.57 | **≤ 0.001** |
| SMR (mg O2 kg-1 h-1) | east | Winter - Summer | 0.7 | 0.003 | 16570 | -74.33 | **≤ 0.001** |
| SMR (mg O2 kg-1 h-1) | east | Spring - Summer | 0.8 | 0.004 | 16570 | -53.93 | **≤ 0.001** |
| SMR (mg O2 kg-1 h-1) | east | Fall - Summer | 1.0 | 0.005 | 16570 | -10.30 | **≤ 0.001** |
| SMR (mg O2 kg-1 h-1) | east | Spring - North Spring | 1.0 | 0.085 | 16570 | 0.16 | 1.000 |
| SMR (mg O2 kg-1 h-1) | east | Spring - West Spring | 1.0 | 0.070 | 16570 | 0.25 | 1.000 |
| SMR (mg O2 kg-1 h-1) | east | Summer - North Summer | 1.1 | 0.090 | 16570 | 0.78 | 1.000 |
| SMR (mg O2 kg-1 h-1) | east | Summer - West Summer | 1.0 | 0.070 | 16570 | 0.26 | 1.000 |
| SMR (mg O2 kg-1 h-1) | east | Fall - North Fall | 1.0 | 0.087 | 16570 | 0.41 | 1.000 |
| SMR (mg O2 kg-1 h-1) | east | Fall - West Fall | 1.0 | 0.071 | 16570 | 0.39 | 1.000 |
| SMR (mg O2 kg-1 h-1) | east | Winter - North Winter | 1.0 | 0.081 | 16570 | -0.42 | 1.000 |
| SMR (mg O2 kg-1 h-1) | east | Winter - West Winter | 1.0 | 0.070 | 16570 | 0.22 | 1.000 |
| SMR (mg O2 kg-1 h-1) | west | Winter - Spring | 0.9 | 0.004 | 16570 | -21.54 | **≤ 0.001** |
| SMR (mg O2 kg-1 h-1) | west | Winter - Summer | 0.7 | 0.003 | 16570 | -81.73 | **≤ 0.001** |
| SMR (mg O2 kg-1 h-1) | west | Fall - Winter | 1.4 | 0.006 | 16570 | 69.08 | **≤ 0.001** |
| SMR (mg O2 kg-1 h-1) | west | Fall - Spring | 1.2 | 0.005 | 16570 | 46.67 | **≤ 0.001** |
| SMR (mg O2 kg-1 h-1) | west | Fall - Summer | 0.9 | 0.004 | 16570 | -13.90 | **≤ 0.001** |
| SMR (mg O2 kg-1 h-1) | west | Spring - Summer | 0.8 | 0.003 | 16570 | -60.25 | **≤ 0.001** |
| SMR (mg O2 kg-1 h-1) | west | Spring - North Spring | 1.0 | 0.078 | 16570 | -0.04 | 1.000 |
| SMR (mg O2 kg-1 h-1) | west | Summer - North Summer | 1.0 | 0.082 | 16570 | 0.61 | 1.000 |
| SMR (mg O2 kg-1 h-1) | west | Fall - North Fall | 1.0 | 0.079 | 16570 | 0.10 | 1.000 |
| SMR (mg O2 kg-1 h-1) | west | Winter - North Winter | 1.0 | 0.074 | 16570 | -0.65 | 1.000 |
| SMR (mg O2 kg-1 h-1) | north | Fall - Winter | 1.3 | 0.008 | 16570 | 40.48 | **≤ 0.001** |
| SMR (mg O2 kg-1 h-1) | north | Fall - Spring | 1.2 | 0.008 | 16570 | 31.59 | **≤ 0.001** |
| SMR (mg O2 kg-1 h-1) | north | Winter - Summer | 0.8 | 0.005 | 16570 | -41.11 | **≤ 0.001** |
| SMR (mg O2 kg-1 h-1) | north | Spring - Summer | 0.8 | 0.005 | 16570 | -33.27 | **≤ 0.001** |
| SMR (mg O2 kg-1 h-1) | north | Winter - Spring | 0.9 | 0.006 | 16570 | -8.39 | **≤ 0.001** |
| SMR (mg O2 kg-1 h-1) | north | Fall - Summer | 1.0 | 0.006 | 16570 | -2.95 | 0.123 |
| AMR (mg O2 kg-1 h-1) | east | Spring - Summer | -13.8 | 0.967 | 3157 | -14.31 | **≤ 0.001** |
| AMR (mg O2 kg-1 h-1) | east | Spring - Fall | -12.7 | 0.959 | 3157 | -13.27 | **≤ 0.001** |
| AMR (mg O2 kg-1 h-1) | east | Summer - Winter | 19.0 | 0.985 | 3157 | 19.29 | **≤ 0.001** |
| AMR (mg O2 kg-1 h-1) | east | Fall - Winter | 17.9 | 0.970 | 3157 | 18.42 | **≤ 0.001** |
| AMR (mg O2 kg-1 h-1) | east | Spring - Winter | 5.2 | 0.939 | 3157 | 5.49 | **≤ 0.001** |
| AMR (mg O2 kg-1 h-1) | east | Summer - Fall | 1.1 | 0.995 | 3157 | 1.13 | 0.993 |
| AMR (mg O2 kg-1 h-1) | east | Spring - North Spring | -7.0 | 9.744 | 3157 | -0.71 | 1.000 |
| AMR (mg O2 kg-1 h-1) | east | Spring - West Spring | 0.7 | 9.179 | 3157 | 0.07 | 1.000 |
| AMR (mg O2 kg-1 h-1) | east | Summer - North Summer | -5.7 | 9.679 | 3157 | -0.59 | 1.000 |
| AMR (mg O2 kg-1 h-1) | east | Summer - West Summer | 1.2 | 9.035 | 3157 | 0.14 | 1.000 |
| AMR (mg O2 kg-1 h-1) | east | Fall - North Fall | 4.7 | 9.709 | 3157 | 0.49 | 1.000 |
| AMR (mg O2 kg-1 h-1) | east | Fall - West Fall | -5.5 | 9.087 | 3157 | -0.61 | 1.000 |
| AMR (mg O2 kg-1 h-1) | east | Winter - North Winter | -2.0 | 9.789 | 3157 | -0.20 | 1.000 |
| AMR (mg O2 kg-1 h-1) | east | Winter - West Winter | 6.9 | 9.200 | 3157 | 0.75 | 1.000 |
| AMR (mg O2 kg-1 h-1) | west | Spring - Summer | -13.3 | 1.856 | 3157 | -7.15 | **≤ 0.001** |
| AMR (mg O2 kg-1 h-1) | west | Spring - Fall | -18.9 | 1.860 | 3157 | -10.18 | **≤ 0.001** |
| AMR (mg O2 kg-1 h-1) | west | Summer - Winter | 24.7 | 1.943 | 3157 | 12.70 | **≤ 0.001** |
| AMR (mg O2 kg-1 h-1) | west | Fall - Winter | 30.3 | 1.945 | 3157 | 15.60 | **≤ 0.001** |
| AMR (mg O2 kg-1 h-1) | west | Spring - Winter | 11.4 | 2.062 | 3157 | 5.54 | **≤ 0.001** |
| AMR (mg O2 kg-1 h-1) | west | Summer - Fall | -5.7 | 1.308 | 3157 | -4.33 | **≤ 0.001** |
| AMR (mg O2 kg-1 h-1) | west | Spring - North West | -7.6 | 10.535 | 3157 | -0.72 | 1.000 |
| AMR (mg O2 kg-1 h-1) | west | Summer - North Summer | -6.9 | 10.360 | 3157 | -0.67 | 1.000 |
| AMR (mg O2 kg-1 h-1) | west | Fall - North Fall | 10.3 | 10.414 | 3157 | 0.99 | 0.998 |
| AMR (mg O2 kg-1 h-1) | west | Winter - North Winter | -8.9 | 10.590 | 3157 | -0.84 | 1.000 |
| AMR (mg O2 kg-1 h-1) | north | Spring - Summer | -12.56 | 1.744 | 3157 | -7.20 | **≤ 0.001** |
| AMR (mg O2 kg-1 h-1) | north | Summer - Fall | 11.54 | 1.311 | 3157 | 8.80 | **≤ 0.001** |
| AMR (mg O2 kg-1 h-1) | north | Summer - Winter | 22.71 | 1.848 | 3157 | 12.29 | **≤ 0.001** |
| AMR (mg O2 kg-1 h-1) | north | Fall - Winter | 11.17 | 1.872 | 3157 | 5.97 | **≤ 0.001** |
| AMR (mg O2 kg-1 h-1) | north | Spring - Winter | 10.16 | 2.019 | 3157 | 5.03 | **≤ 0.001** |
| AMR (mg O2 kg-1 h-1) | north | Spring - Fall | -1.02 | 1.792 | 3157 | -0.57 | 1.00 |
| SoA (mg O2 kg-1 h-1) | east | Fall - Winter | 17.65 | 1.630 | 1115 | 10.83 | **≤ 0.001** |
| SoA (mg O2 kg-1 h-1) | east | Spring - Fall | -13.02 | 1.605 | 1115 | -8.11 | **≤ 0.001** |
| SoA (mg O2 kg-1 h-1) | east | Spring - Summer | -12.01 | 1.583 | 1115 | -7.59 | **≤ 0.001** |
| SoA (mg O2 kg-1 h-1) | east | Summer - Winter | 16.64 | 1.609 | 1115 | 10.34 | **≤ 0.001** |
| SoA (mg O2 kg-1 h-1) | east | Fall - Summer | -1.01 | 1.609 | 1115 | -0.63 | 1.000 |
| SoA (mg O2 kg-1 h-1) | east | Spring - Winter | 4.63 | 1.605 | 1115 | 2.88 | 0.148 |
| SoA (mg O2 kg-1 h-1) | east | Spring - North Spring | 3.80 | 1.567 | 1115 | 2.43 | 0.388 |
| SoA (mg O2 kg-1 h-1) | east | Spring - West Spring | 7.88 | 1.571 | 1115 | 5.01 | **≤ 0.001** |
| SoA (mg O2 kg-1 h-1) | east | Summer - North Summer | -7.37 | 1.568 | 1115 | -4.70 | **≤ 0.001** |
| SoA (mg O2 kg-1 h-1) | east | Summer - West Summer | 1.52 | 1.592 | 1115 | 0.95 | 0.999 |
| SoA (mg O2 kg-1 h-1) | east | Fall - North Fall | 8.75 | 1.630 | 1115 | 5.37 | **≤ 0.001** |
| SoA (mg O2 kg-1 h-1) | east | Fall - West Fall | -1.25 | 1.630 | 1115 | -0.76 | 1.000 |
| SoA (mg O2 kg-1 h-1) | east | Winter - North Winter | 10.34 | 1.659 | 1115 | 6.23 | **≤ 0.001** |
| SoA (mg O2 kg-1 h-1) | east | Winter - West Winter | 14.89 | 1.635 | 1115 | 9.11 | **≤ 0.001** |
| SoA (mg O2 kg-1 h-1) | west | Spring - Summer | -18.37 | 1.579 | 1115 | -11.63 | **≤ 0.001** |
| SoA (mg O2 kg-1 h-1) | west | Spring - Fall | -22.15 | 1.597 | 1115 | -13.87 | **≤ 0.001** |
| SoA (mg O2 kg-1 h-1) | west | Fall - Winter | 33.79 | 1.635 | 1115 | 20.67 | **≤ 0.001** |
| SoA (mg O2 kg-1 h-1) | west | Summer - Winter | 30.01 | 1.618 | 1115 | 18.55 | **≤ 0.001** |
| SoA (mg O2 kg-1 h-1) | west | Spring - Winter | 11.64 | 1.602 | 1115 | 7.27 | **≤ 0.001** |
| SoA (mg O2 kg-1 h-1) | west | Summer - Fall | -3.77 | 1.613 | 1115 | -2.34 | 0.449 |
| SoA (mg O2 kg-1 h-1) | west | Spring - North Spring | -4.07 | 1.559 | 1115 | -2.61 | 0.274 |
| SoA (mg O2 kg-1 h-1) | west | Summer - North Summer | -8.89 | 1.572 | 1115 | -5.65 | **≤ 0.001** |
| SoA (mg O2 kg-1 h-1) | west | Fall - North Fall | 10.00 | 1.630 | 1115 | 6.13 | **≤ 0.001** |
| SoA (mg O2 kg-1 h-1) | west | Winter - North Winter | -4.55 | 1.663 | 1115 | -2.73 | 0.211 |
| SoA (mg O2 kg-1 h-1) | north | Spring - Winter | 11.17 | 1.622 | 1115 | 6.88 | **≤ 0.001** |
| SoA (mg O2 kg-1 h-1) | north | Spring - Fall | -8.08 | 1.593 | 1115 | -5.07 | **≤ 0.001** |
| SoA (mg O2 kg-1 h-1) | north | Fall - Winter | 19.24 | 1.659 | 1115 | 11.60 | **≤ 0.001** |
| SoA (mg O2 kg-1 h-1) | north | Spring - Summer | -23.19 | 1.551 | 1115 | -14.94 | **≤ 0.001** |
| SoA (mg O2 kg-1 h-1) | north | Summer - Fall | 15.11 | 1.590 | 1115 | 9.51 | **≤ 0.001** |
| SoA (mg O2 kg-1 h-1) | north | Summer - Winter | 34.35 | 1.619 | 1115 | 21.22 | **≤ 0.001** |