

Table 1: Mean and minimum NO_3^- concentrations during sampling dates in 1989. Nitrate does not become depleted over the sampling period from May to August. Thus, nitrogen isotope fractionation always occurred. June is not displayed because there was no nitrate analysis during this month at St. 2.

Date	Mean $[\text{NO}_3^-]$ (μM)	Minimum $[\text{NO}_3^-]$ (μM)
26-May	17.3	5.0
18-Jul	16.6	11.8
23-Aug	15.8	9.6

Figure 1: The principal sampling station for zooplankton tows in 1989. Station 2 was located about 36-km offshore of Grand Haven, Michigan. Exact coordinates were 43° N 86° 40' W.

Figure 2: Summer zooplankton food web relations in Lake Michigan in 1989. *Diaptomus* was about one, *Bythotrephes* was about 1.5 and *Limnocalanus* was about two trophic levels greater than the herbivore *Daphnia*.

Figure 3: Seasonal and historical food web relations between *Limnocalanus* and *Bythotrephes*. *Bythotrephes* became isotopically heavier and *Limnocalanus* became isotopically lighter from May through August. In May, *Limnocalanus* was about two trophic levels higher than *Bythotrephes*, but this magnitude decreased to one-half trophic level in August.

Figure 4: Vertical profiles of summer *Bythotrephes* and *Limnocalanus* populations in day and night, as well as temperature and chl *a* fluorescence as a function of water depth. *Limnocalanus* and *Bythotrephes* have very little spatial overlap, and thus do not encounter each other frequently in the water column. There is a clear thermocline present in August and a deep chlorophyll layer exists under the thermocline, indicating that *Limnocalanus* have access to a hypolimnetic phytoplankton prey base.

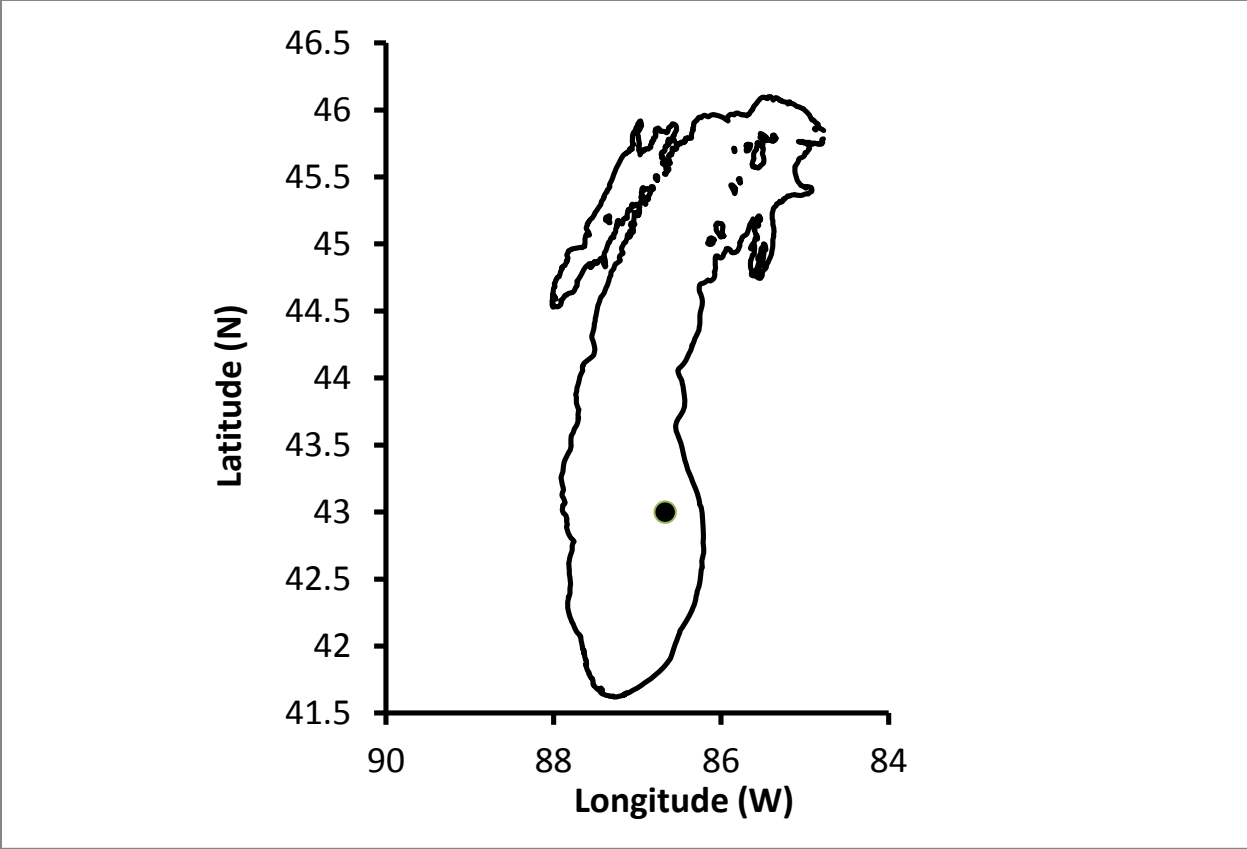


Figure 1

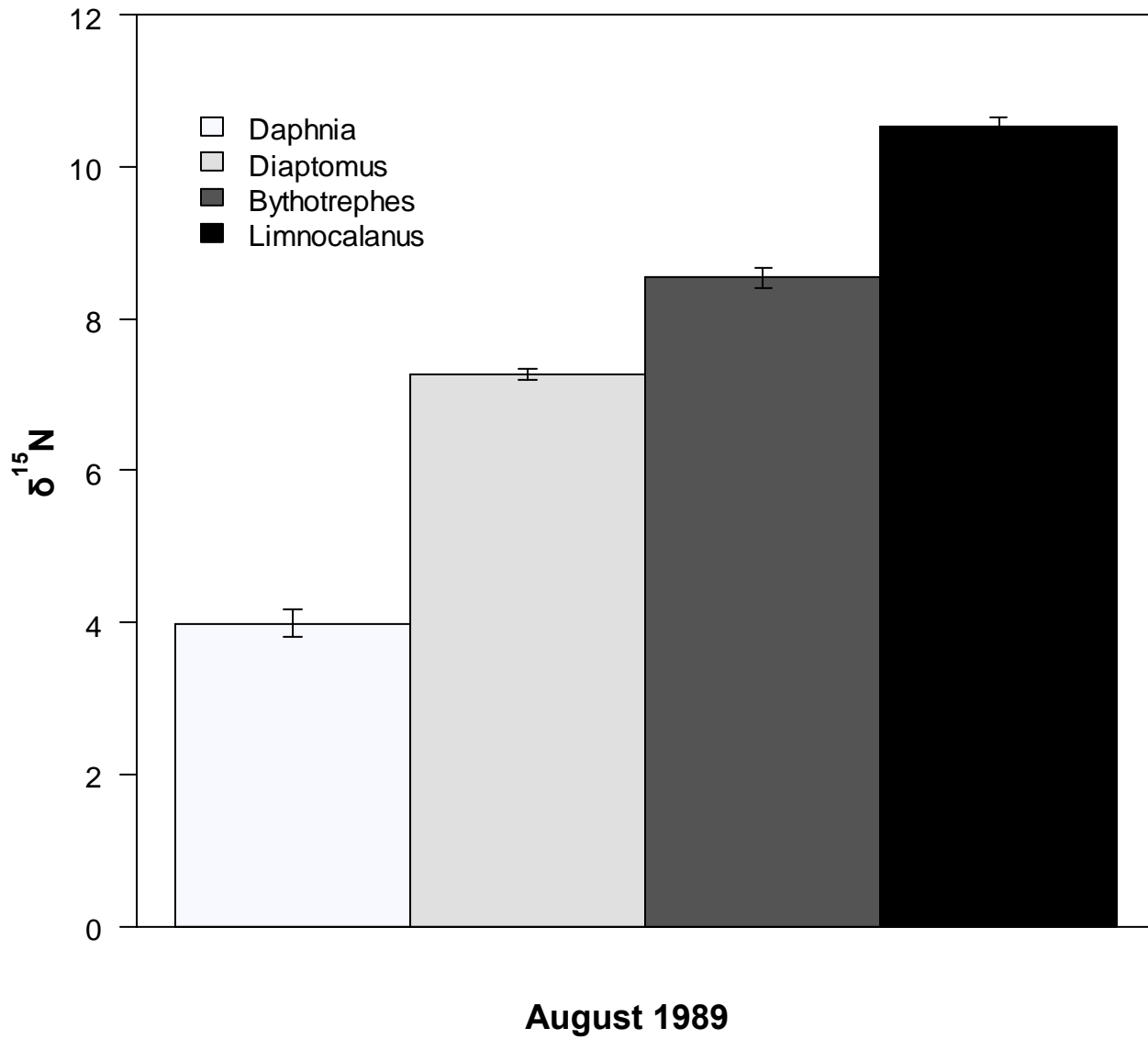


Figure 2

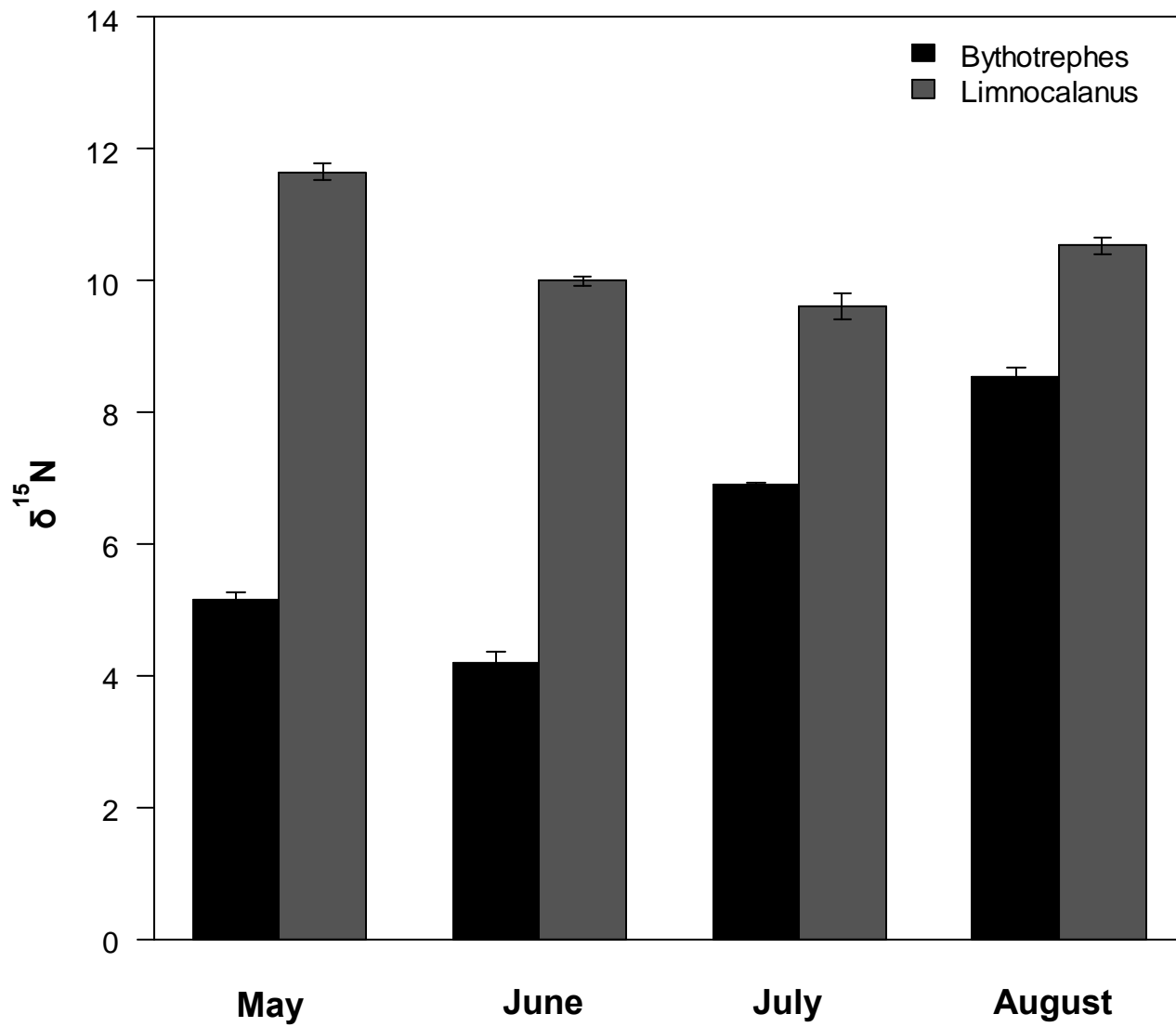


Figure 3

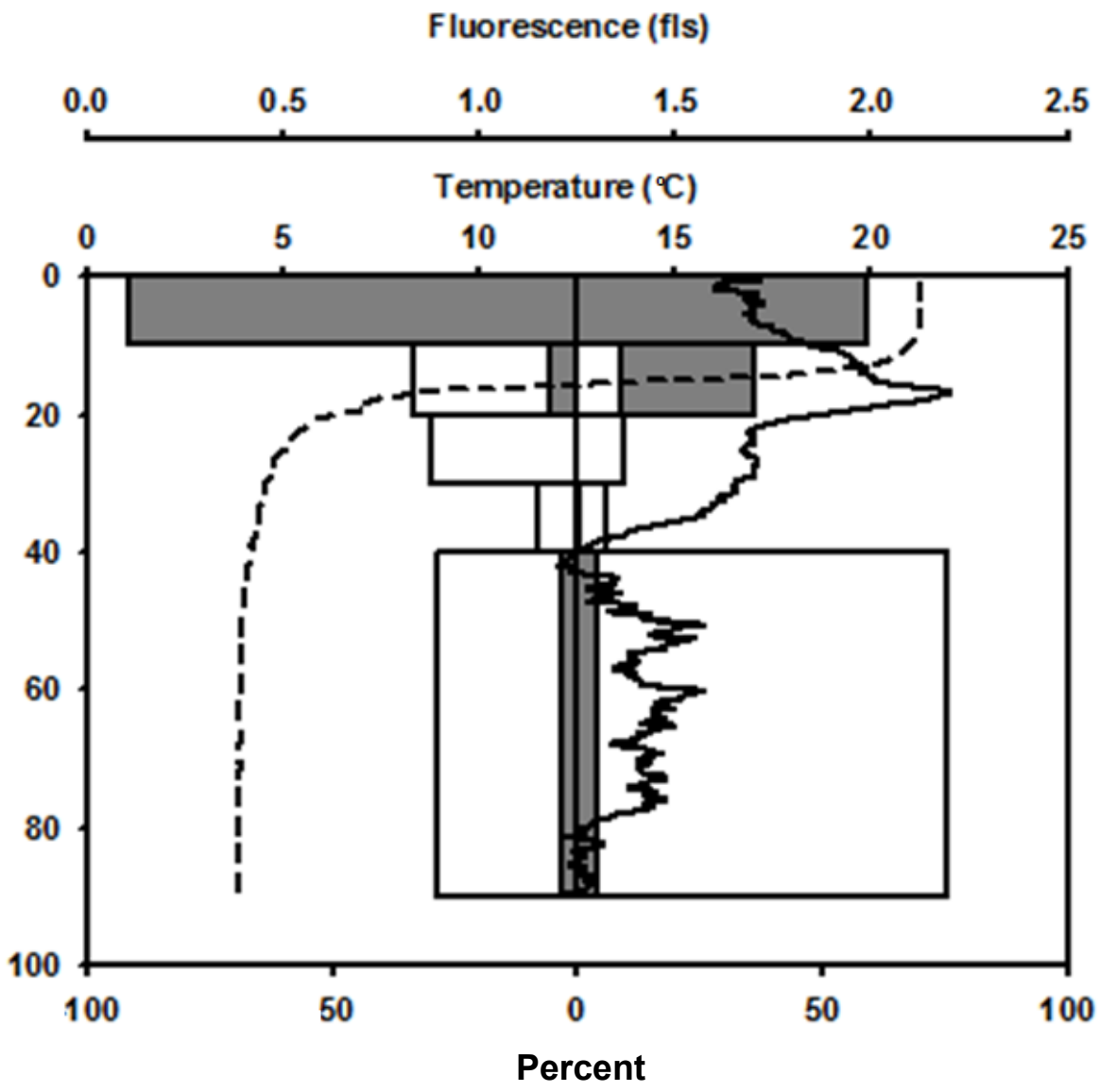


Figure 4