North Atlantic right whales (NARWs) have been observed congregating in the southern Gulf of St. Lawrence (sGSL), where they feed and socialize in summer, since 2015. Observations of prey concentrations at scales relevant to NARWs are scarce in this area, limiting direct assessment of foraging habitat suitability and its drivers. We quantified variation in the vertical distribution of *Calanus* (identified to genus) at 3-m resolution using a Video Plankton Recorder (VPR) and depth-integrated species-specific abundance using a plankton net (35 sampling events from 9 August to 1 September 2019). Depth-integrated abundance estimates from the two instruments were comparable, indicating measurements from the VPR were accurate. Maximum prey concentrations ranged from 1000-10000 ind m-3 (n = 12) in the Shediac Valley (SV) from 9 to 15 August, when NARWs were observed congregating in the area, and up to 2000 ind m-3 elsewhere (n = 13). In SV, maximum prey concentrations declined markedly between 9 to 15 August and 24 to 30 August (n = 10), when they ranged from 300 to 1000 ind m-3. The ratio of *Calanus hyperboreus: Calanus finmarchicus* in net samples was far greater in SV than in the Chaleur Trough, indicating elevated suitability of foraging conditions in SV, as *C. hyperboreus* are larger and more energy-rich than *C. finmarchicus*. Overall, the highest prey concentrations occurred between 70 and 90 m depth, ~10 to 15 m above the seafloor, and likely supported energy requirements of NARWs. We hypothesize that near bottom aggregations form when ontogenetic vertical migration of prey is blocked by the seafloor. Peak abundance above the seafloor may due to a bottom mixed layer or elevated near-bottom predation rate. Variations in magnitude of prey aggregations in SV indicate that NARW foraging habitat may be dynamic on the scale of weeks in the sGSL in summer.