Cyanobacteria dominate many highly productive Florida lakes. Algal proliferation often is attributed to eutrophication during the last century, but it is poorly documented because Florida’s water-quality monitoring programs became common only after 1980. We interpret paleolimnological data from the sediment cores of 6 productive lakes to determine when cyanobacterial proliferation first occurred, and whether it resulted from natural edaphic influence or from eutrophication caused by human activities. Major algal-pigment groups in sediments were analyzed using pigment-extraction and spectrophotometric techniques. Pigment profiles are compared with WACALIB-derived inferences for limnetic total-P, limnetic chlorophyll \(a\), and trophic-state index values based on sedimented diatoms, and with stable isotope \((\delta^{13}C \& \delta^{15}N)\) signatures of organic matter. Cyanobacterial and algal proliferation increased during recent decades in 5 of the 6 study lakes in response to eutrophication. Two lakes demonstrated some evidence of recovery following nutrient-mitigation programs that reduced sewage and other point-source inputs. Five lakes showed intermittent to moderate cyanobacteria presence in the bottom portion of their cores because of edaphic nutrient supply or early watershed disturbance. One highly productive lake showed no evidence of eutrophication and demonstrated that dense cyanobacterial populations can occur naturally. Relationships were particularly strong among sedimented pigment profiles and diatom-inferred limnetic water-quality profiles. Although cyanobacteria have long-standing presence in some naturally productive Florida lakes, our studies suggest that algal proliferation in many lakes is both recent and abrupt in response to eutrophication. Paleolimnological methods are informative about the timing and causes of cyanobacterial appearance in regions where long-term water-quality data are lacking.