

HISTORICAL DISTRIBUTION AND MODERN INVASIONS: *DIDYMOSPHENIA GEMINATA* IN THE ROCKY MOUNTAINS OF THE WESTERN US

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Nuisance blooms of the diatom *Didymosphenia geminata* occur in streams and rivers of the Rocky Mountains. However, questions remain concerning the degree to which blooms are natural events, or whether they are in response to recent environmental change and spread of invasive genotypes. Although *D. geminata* is known from lakes, the species is most often recorded in flowing waters where it reaches its greatest biomass. Determining the history of diatoms in streams and rivers, however, is more problematic than in lakes, as streams are high flow systems that typically do not leave a continuous sedimentary record that can be interpreted. In sites where streams and rivers flow into lakes, records of historical change in river systems may be archived in lake sediments. For example, the relative abundance of stream diatoms (*Hannaea arcus* and *Meridion circulare*) found in lake sediments was used to reconstruct historical river discharge in the high arctic. Because *D. geminata* reaches its greatest abundance in streams and rivers, the concentration of cells in lake sediments is directly related to the concentration of cells in stream inflows. We examined lake sediments to reconstruct the history of abundance of *D. geminata* in Beauty Lake, Montana over the past approximate 14,000 years. It is estimated that Beauty Lake was deglaciated at close to 14,000 ybp, yet our results show that the peak in concentration occurred nearly 10,000 ybp. This result is important because it demonstrates that 1) *D. geminata* formed large populations in a newly deglaciated site within a relatively short period of time, 2) the large populations were present absent human transport, and 3) maximum cell concentrations show a strong relationship to the period of warm, dry climate in the region. The historical record is informative for understanding the expansion of *D. geminata* from its presumed Siberian origin, the relationship to modern nuisance blooms and recommendations for appropriate management response.