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WATER QUALITY AND BENTHIC INVERTEBRATES WITHIN A PRAIRIE POTHOLE LAKE BASIN

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ABSTRACT

Oak Lake (Brookings County, SD) is a small, semi-permanent prairie pot-hole lake basin on the eastern ridge of the Prairie Des Coteau. This lake is managed to support immersion contact recreation, marginal warmwater fish life propagation and livestock and wildlife watering. In addition, the western shoreline of this basin is bordered by the Oak Lake Field Station, a teaching and research facility managed by South Dakota State University.

Water quality and biotic integrity of Oak Lake have been monitored bi-weekly during the ice-free season over the period 1994-2000. Samples were collected from three mid-basin points using standard methods of water analysis. Water transparency (Secchi depth) averaged 33.6 cm (range of 0.4 to 180 cm) and water temperatures averaged 17.1°C (range of 2.5° to 30.0°C) during the growing season. Total dissolved solids averaged 299 mg/L (range of 135 to 505 mg/L) and conductance averaged 461 uS/cm (range 207 to 778 uS/cm). Water column pH values averaged 8.6 (range of 7.4 to 9.3) while dissolved oxygen averaged 6.9 mg/L (range of 5.6 to 15.0 mg/L).

Water column corrected chlorophyll *a* averaged 68.6 ug/L (range of 0.0 to 167.3 ug/L). Carlson Trophic State Index values generated from chlorophyll and Secchi data averaged 76 (range of 52 to 142). The fecal coliform values averaged 26.8 per 100 ml (range 5 to 470). The mid-basin benthic invertebrate community was found to be dominated by larvae of the midge genus *Chironomus* sp. (Chironomidae: Diptera). On average, this midge comprised 63% of total invertebrate abundance in Eckman dredge bottom samples. Other frequently occurring, but less abundant invertebrate taxa included *Procladius* sp. (Chironomidae: Diptera) at 30%, *Brundiniella* sp. (Chironomidae: Diptera) at 2.5%, *Chaoborus americanus* (Chaoboridae: Diptera) at 1.5%, *Tanytus* sp. (Chironomidae: Diptera), *Bezzia/Palpomyia* sp. (Ceratopogonidae: Diptera) at 1.5%, *Hexagenia limbata* (Ephemeroidea: Ephemeroptera), *Rhynchosia* sp. (Curculionidae: Coleoptera) and *Palmaricorixa buenoi* (Corixidae: Hemiptera) at 0.05%.

Oak Lake monitoring efforts provide data to evaluate compliance with water quality standards and support university instruction and research efforts. Existing data confirm that Oak Lake is a hypereutrophic basin. However, measured parameters did not fall outside established water quality standards. These data are available on-line (<http://www.abs.sdstate.edu/bio/Oaklake/index.htm>) for use by educational groups and research teams.