TRACING THE HISTORY OF FOND DU LAC RESERVATION'S WILD RICE (ZIZANIA PALUSTRIS) LAKES THROUGH PHYTOLITHS

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**PHYTOLITHS:**
Phytoliths are microscopic plant remains formed through the deposition of soluble silica during a plant's lifetime. Silica is deposited in, around, and between plant cells. As the plant decays, the phytoliths remain behind. Phytoliths come in a variety of shapes with sizes ranging from 5 to 200 microns. Some phytoliths can be taxon specific/diagnostic to the level of family, genus or species.

**Methods:**
STEP 1: A hole is drilled through the ice to gain access to the lake bottom. A polycarbonate tube has an aluminum piston head inserted inside the tube at the bottom. On the outside of the piston a cable is attached and runs along the outside of the tube to reach the ice surface. The cable is secured into the ice surface with an ice screw. The tube was driven down into the lake bed via a series of drive rods attached to the aluminum head. The tube is pushed into the lake bottom. The sediment forces the piston upward, creating a vacuum that doesn’t allow the sediment to fall out of the tube. While bringing the tube to the surface a cap is quickly placed at the bottom. The piston head is now at the top of the tube and removed. The sediment core is stored at the University of Minnesota Limnological Research Center Core Facility in a walk-in cooler at 38 degrees Fahrenheit.

STEP 2: Identical size samples were recovered from sediment columns at 15 centimeter intervals. Oxidizers were used to remove the organic matter from the sediments. In this case, the sediments were very organic rich, and the oxidation process left biogenic and mineral silicates. This material was put through a 60 micron sieve, and then a 7 micron sieve, to isolate the size categories of most relevant silica bodies. This also served to reduce the number of diatoms present. After processing, the remaining silica was put in a water solution; 1 ml of microsphere spike was added to 4 ml of sample. Drops of the sample were pipetted onto microscope slides. Counting the phytoliths present and the microspheres allows calculation of the percentage of overall recovery.

**Results:**
We found that surface levels of the lakes had few phytoliths, in strong contrast to the pollen deposition. Lower in the cores the deposition of grass phytoliths mirrors that of pollen, and is thought to represent the abundance of wild rice. In each of the lakes, when rice is thought to decline diatoms representing open water increased. Taken together this data may represent an increase in water depth which may inhibit the growth of rice.

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