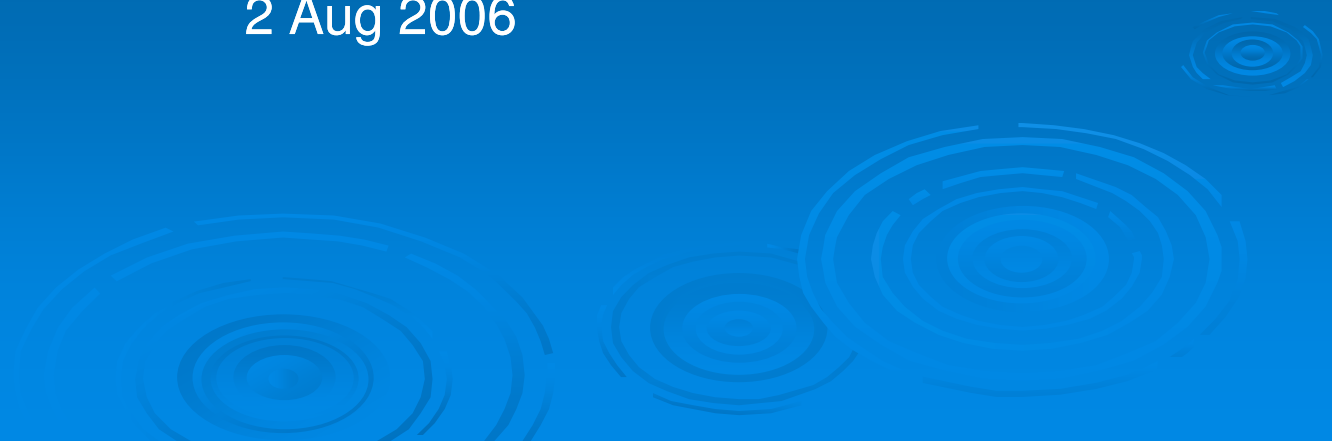


Heavy Metal Concentrations in Lacustrine Sediments of Developed and Undeveloped Watersheds, Williamsburg, VA

Holly Packard

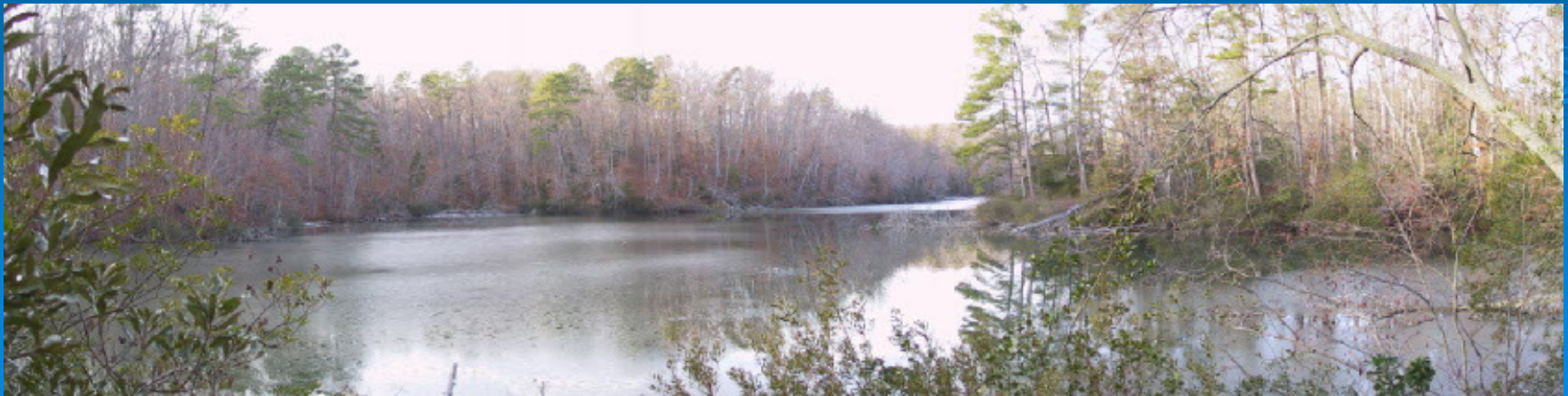
Matt Evans

2 Aug 2006



Outline

- Purpose
- Study Areas: Lake Matoaka and Jolly Pond
 - Geology overview
- Methods
 - Field work
 - Heavy Metals
 - C:N
- Preliminary results and interpretations
- Future work

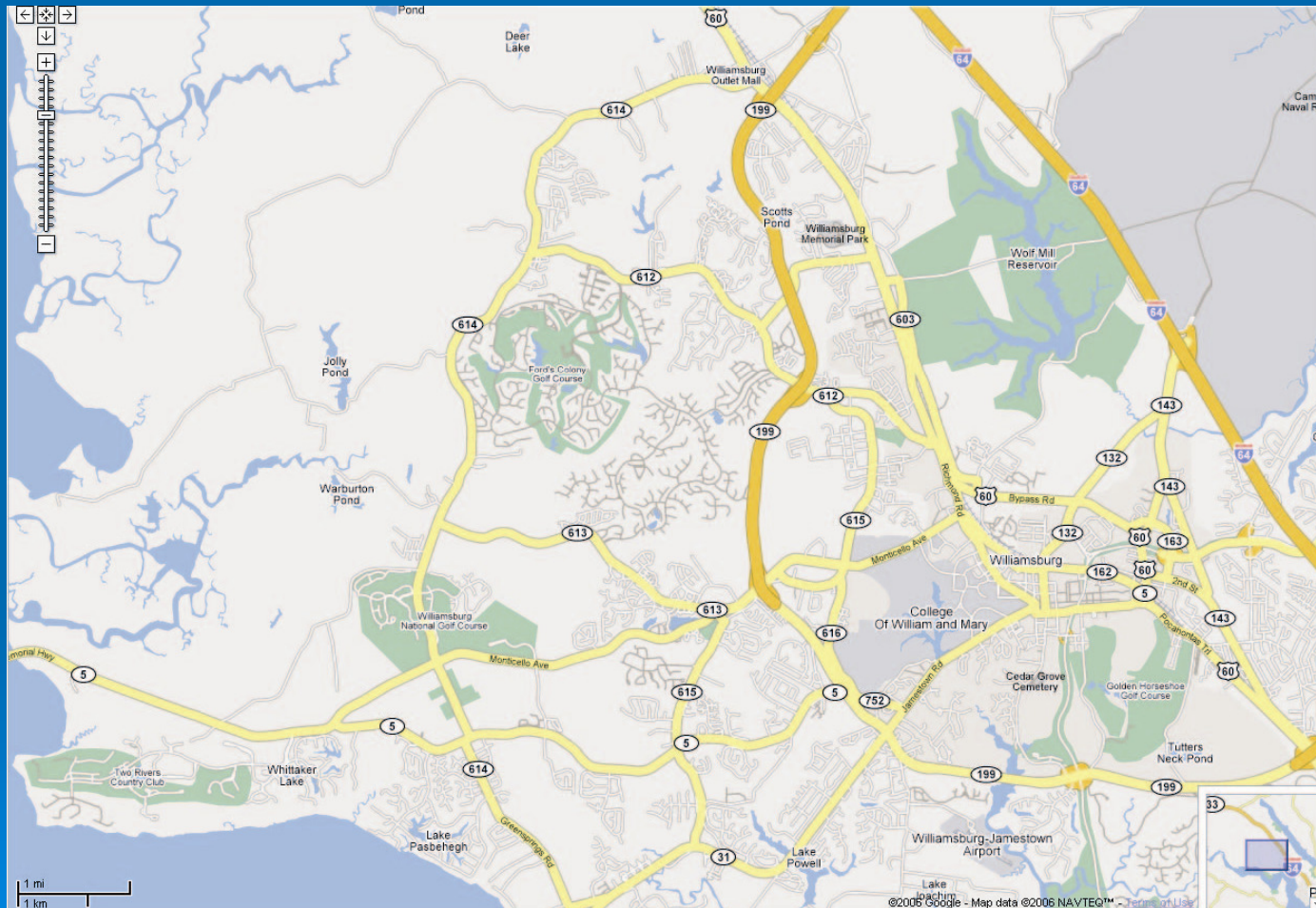


Purpose

- Determine whether increased development of a watershed causes increases in heavy metal concentrations
 - Extent of impact
- Examine changes in organic matter deposited with sediments through time



Study Areas: Lake Matoaka and Jolly Pond



Study Areas

Lake Matoaka



Jolly Pond

Study Area: Lake Matoaka



Matoaka, 1862

Library of Congress



Library of Congress

Rochambeau
map of
Matoaka,
1782

Matoaka, 1860



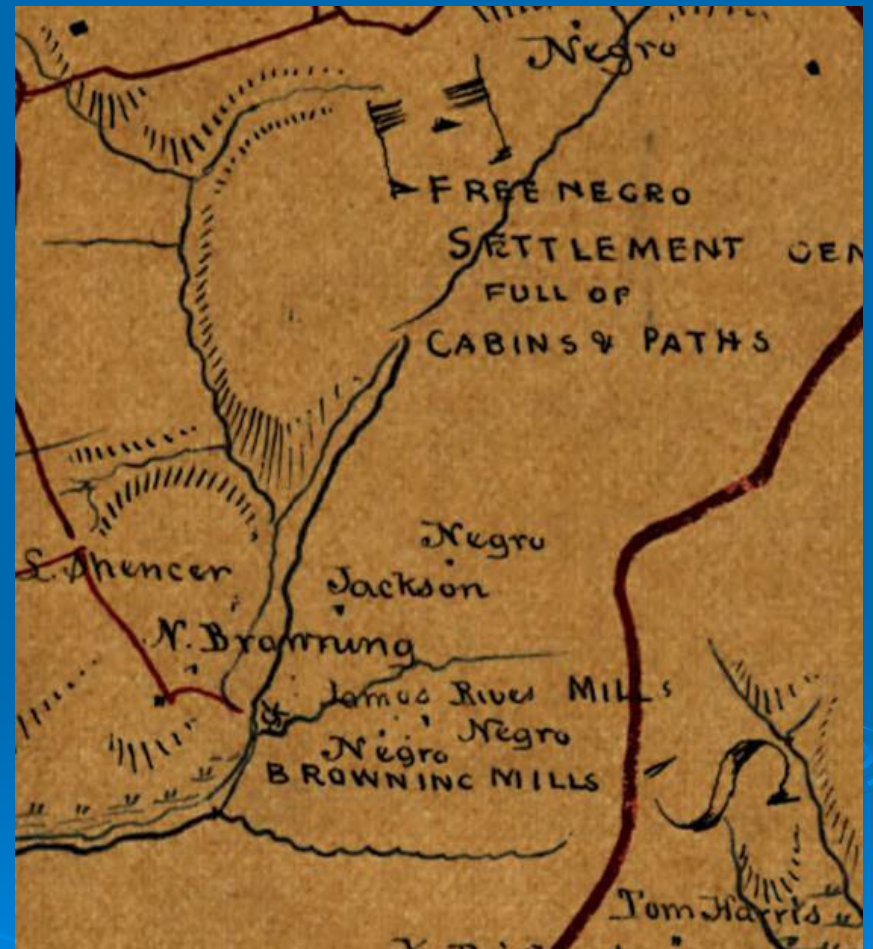
Library of Congress

Study Areas



Library of Congress

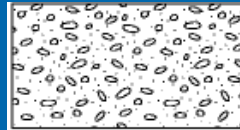
Map of Lake Matoaka, 1863



Library of Congress

Jolly Pond, 1860

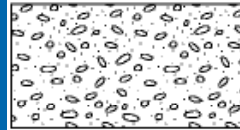
Geology of Coastal Plain



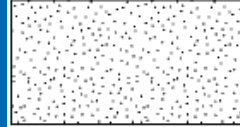
Alluvium, 20 ft. Chiefly organic silts and clays with some sand



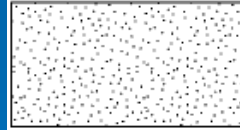
Norfolk Formation, 20 ft. Interbedded sands, clays, and organic silts.



Windsor Formation, 40 ft. Poorly sorted sand, silt, and clay.



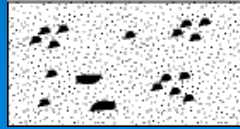
Bacons Castle Formation, 45 ft. Intertongued sands and clays, prominent red coloration.



Sedley Formation, 15 ft. Brown sands and clays.

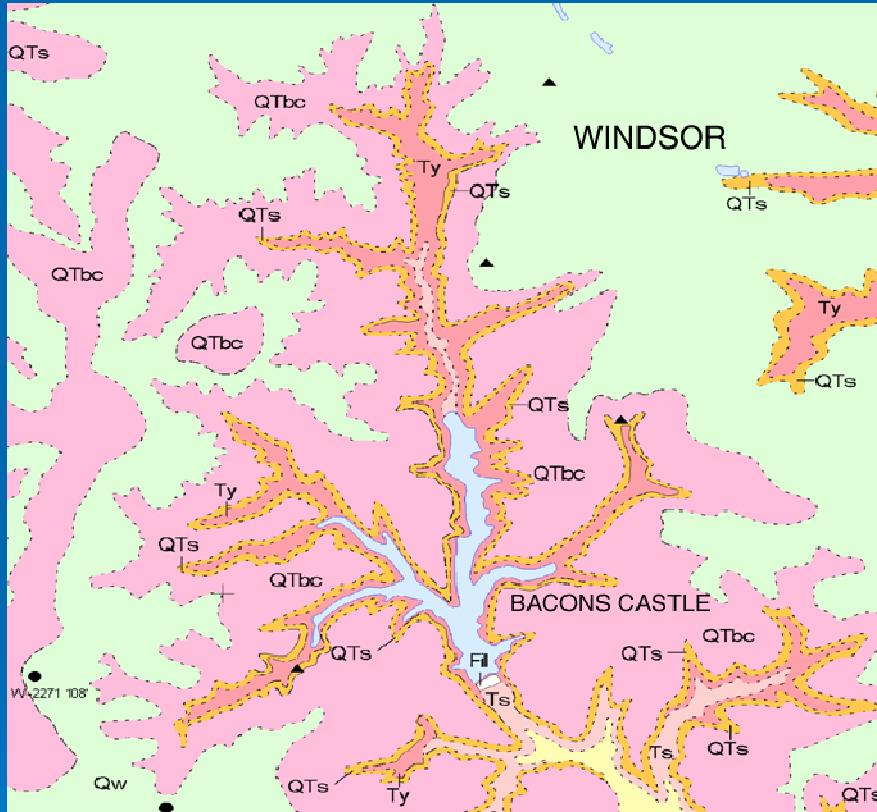


Yorktown Formation, 50 ft. Highly fossiliferous clays and sands.

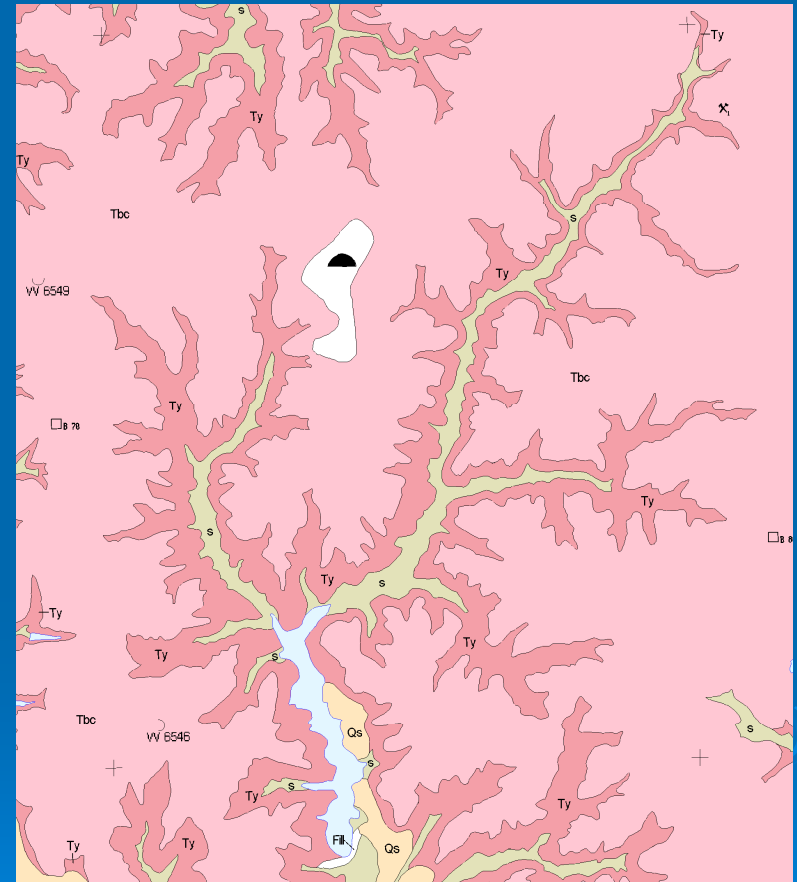


St. Marys Formation, 15 ft. Highly fossiliferous interbedded sands.

Geology of the Coastal Plain

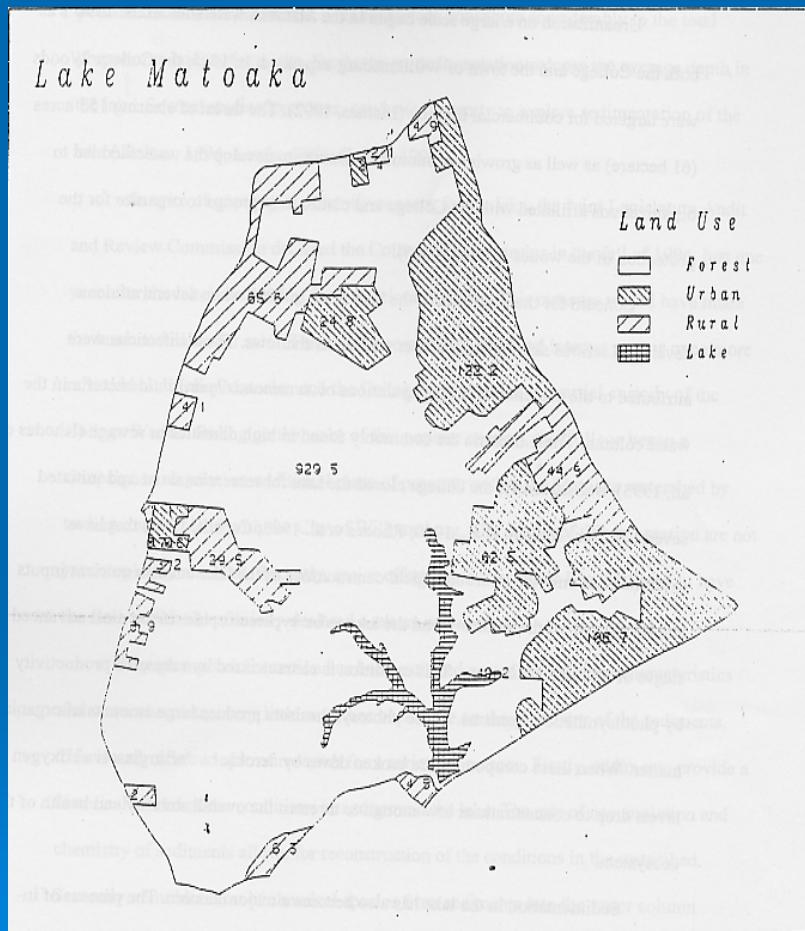


Geologic map, Williamsburg Quadrangle, 1999



Geologic map, Norge Quadrangle, 1988

Land use



From Nielsen et al. 1990

Jolly Pond



James City County website

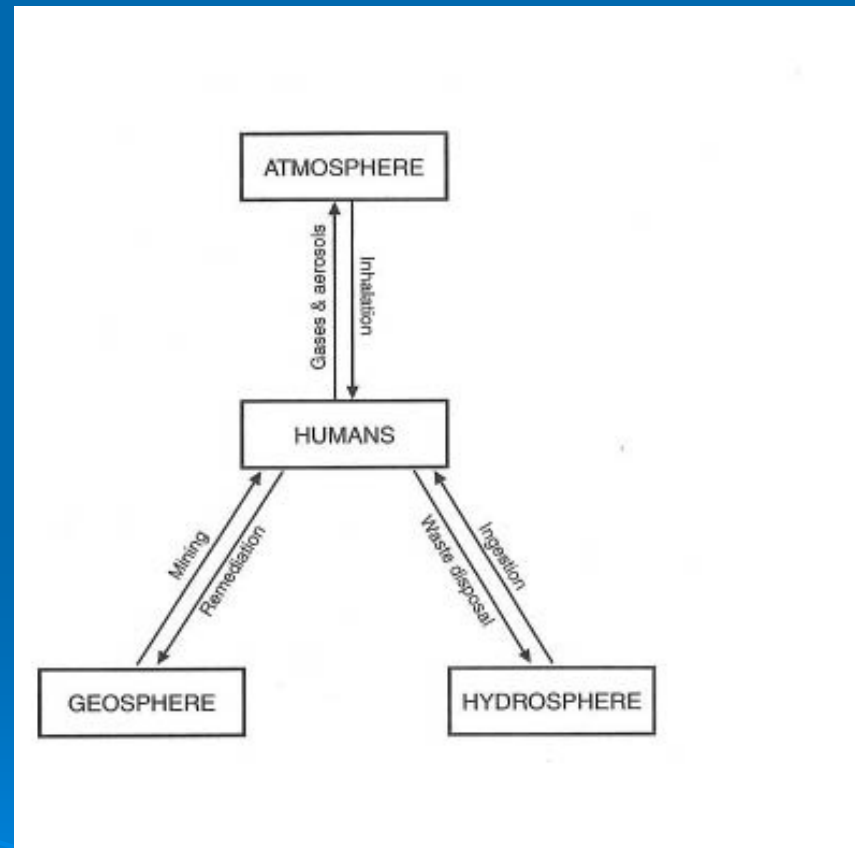
Both sites were chosen for their relative level of development.

Methods: field work



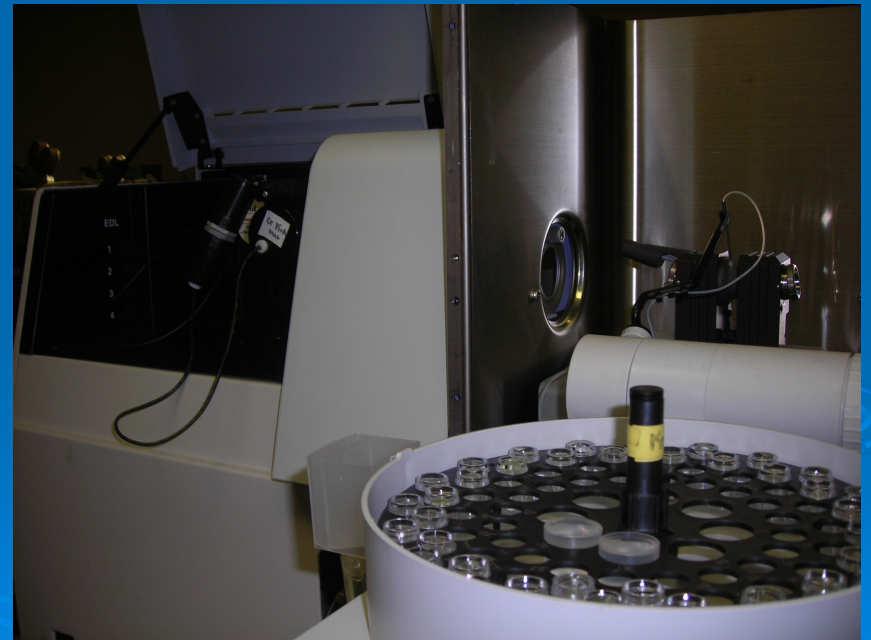
Methods: Heavy Metals

- Heavy metals are among the most persistent because they are difficult to destroy or break down.
- It is anticipated that more developed watersheds will have higher concentrations of these heavy metals.

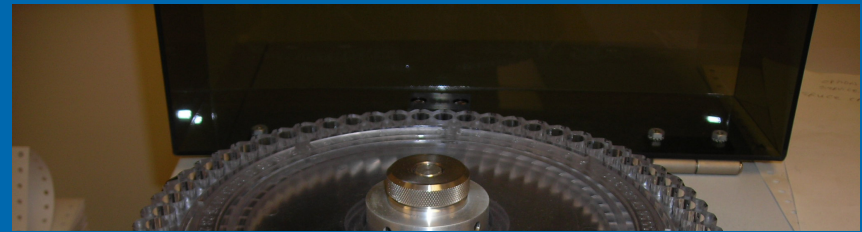


Methods: Heavy Metals

- Metals measured by graphite furnace atomic absorption spectroscopy: Pb, Cd, Cr



Methods: C:N



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