

## SUBSTRATE CHARACTERIZATION OF RETROGRESSIVE OLIGOTROPHY IN YELLOWSTONE LAKE, YELLOWSTONE NATIONAL PARK

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### Objectives

Our research attempts to characterize the recent historical events in Yellowstone Lake, especially with regard to the hypothesis that the lake has become more oligotrophic.

### Methods

Sediment cores were collected at five stations (Figure 1) within the lake during the first week in August, 1983, and sectioned to a depth of about 60 cm. to date, pigment analyses, pore water chemistry, sediment porosity, and dating have been partially or fully completed.

Pigment analyses included chlorophyll A, B, C; phaeophytins, and carotenoids. Over 1000 spectral analyses have been completed and a computer program is currently being written to aid in the completion of the data analysis. Pore-water nutrients that have been analyzed include  $\text{SiO}_2$  and  $\text{NH}_4$ —these data await final analysis. Sediment dating using Pb-210 and Cs-137 is underway, and preliminary data indicate that Pb-210 can be used to successfully date sediments within the last 100 years. Instrumentation for the analysis of sedimentary organic carbon, nitrogen, phosphorus and sulfur is being set up and samples are ready for analysis. As a supplementary project, James Coggins collected 41 grayling guts from Grebe Lake. These have been examined for helminth parasites.

### Results

The investigation to date has basically proceeded as originally planned, however, we have made some changes in the scope of the study to allow us to better interpret the chronology of positive or negative changes in productivity. We hope to do some additional coring in the lake during the latter half of July, 1984. These cores will be subjected to dating and stratigraphic x-ray analysis to help determine depositional patterns, e.g., pollen. Also, our emphasis has centered on the more recent (100 years) historical events in the lake rather than distant, glacial times.



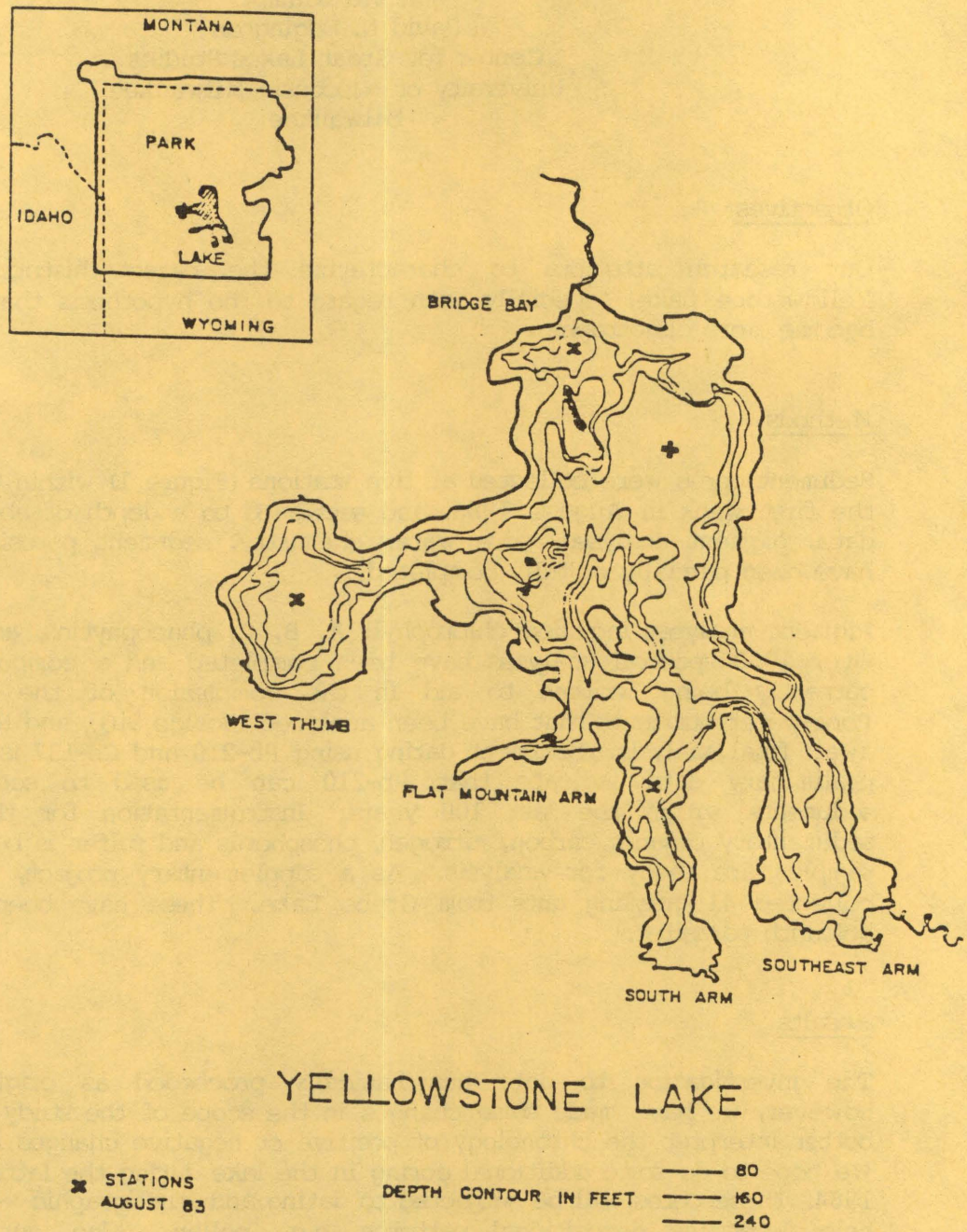


Figure 1. Sampling stations.



### Conclusions

With these changes in mind, we hope that an extension of the project until December 31, 1984, can be granted. We are not requesting additional funding, however, it is hoped that those monies originally budgeted can carryover into this time extension. This extension will further aid our investigation of what appears to be a false-bottom of unconsolidated material in a localized portion of the lake. This phenomenon was discovered during our August, 1983, benthic probing efforts. This area is a suspected thermal-vent and perhaps a region of curious biological and chemical pathways which is the theme of a proposed NSF grant for exploratory research to be developed by us during spring, 1984.