LEAD TIME HYDROLOGIC INVESTIGATIONS AT LAKE GEORGE, N.Y.

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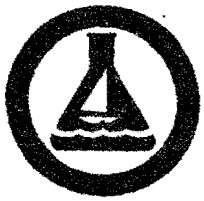
Eastern Deciduous Forest Biome
IBP Memo Report 72-49



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1972

A final technical report for Union Carbide Subcontract No. 3392 for the Eastern Deciduous Forest Biome, IBP, Lake George Site

FWI Report 72-29

PREFACE

This Memo Report is being submitted as required for Subcontract No. 3392 with Union Carbide Corporation for the Eastern Deciduous Forest Biome, IBP, Lake George Site. It should be fully recognized that the information presented within this report is that generated from investigations on the Hydrologic Cycle at Lake George. Although these studies were Lead Time in nature, the submission date has allowed the authors to extend their conclusions beyond the scope of the objectives stated in that proposal as a result of data obtained and reported on (Eastern Deciduous Forest Biome, IBP Memo Report 71-123) more recently.

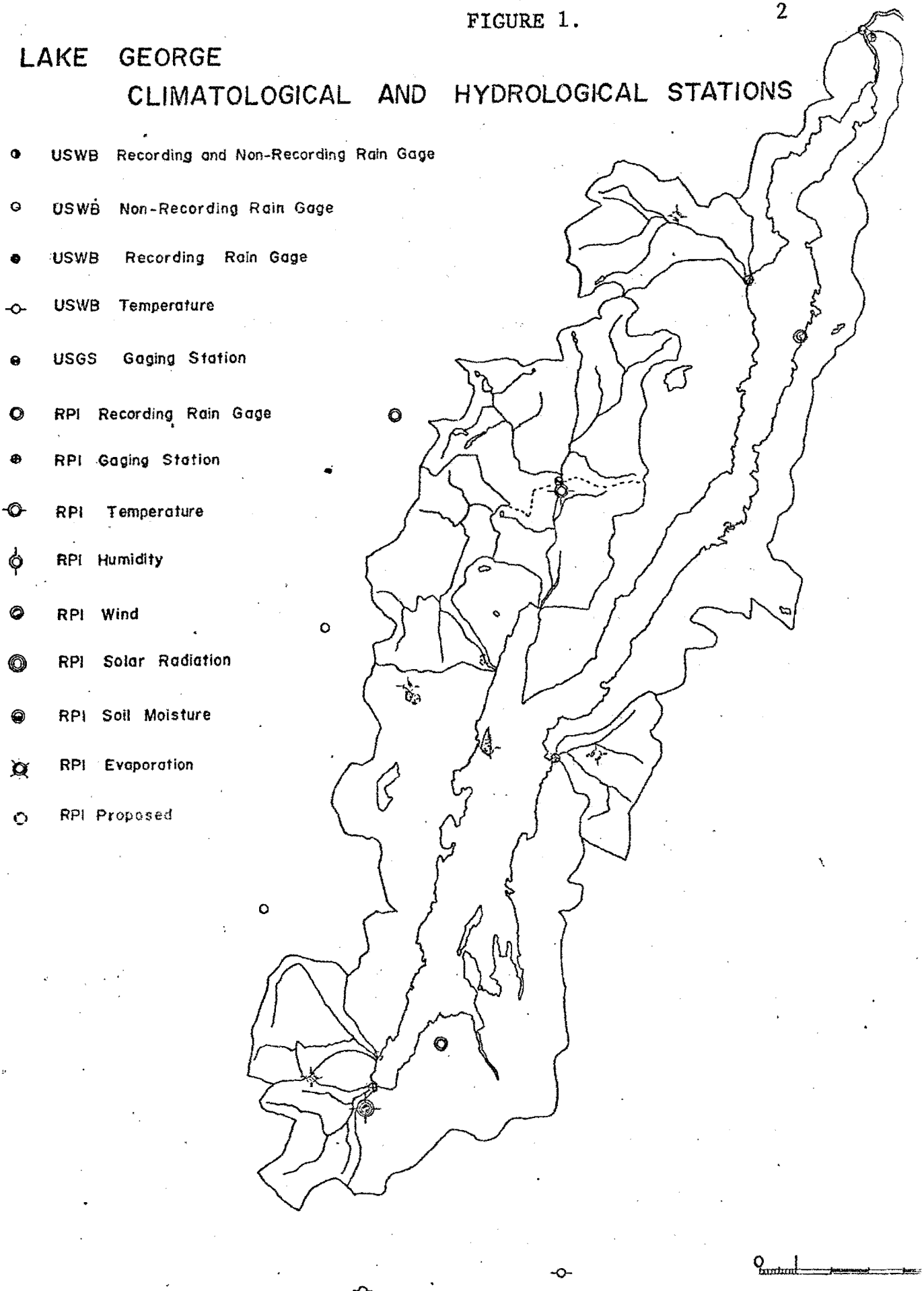
This report documents the development of a hydrologic and climatologic network as part of the hydrologic modeling work being done at the Lake George/IBP site. This network was developed to provide formerly unavailable data within the Lake George Basin.

The major, if not the only, input of water into the lake basin is precipitation. The available data for this parameter were largely from outside the basin, with only one station inside the basin. The precipitation varies considerably in the area; for instance, in 1968 a station outside the basin at the south end received 7.58 inches more than a station inside the basin at the north end. Because of the topography of the area which produces these orographic effects, making difficult the extrapolation of data from surrounding locations, a precipitation network was set up inside the basin. This network, which is spread throughout the basin in order to record at least major orographic effects, now consists of 8 recording precipitation gages. This and other stations are illustrated in Figure 1.

In addition to precipitation, temperature and humidity measurements were considered prime climatologic elements. In this case, there were no measurements within the basin. Residents of the area had often noted, however, that temperatures in the basin were usually more moderate than those outside due to the effect of the lake. Hence, 3 stations were established along the length of the basin to continously measure temperature and humidity,

FIGURE 1.

LAKE GEORGE
CLIMATOLOGICAL AND HYDROLOGICAL STATIONS



Hydrologic measurements in the basin were also rather sparse. The USGS had, for some time, been measuring the discharge from Northwest Bay Brook, the largest stream in the basin, and the outlet of the lake at Ticonderoga. They also measured lake level at one location. To supplement this a system of 9 more stream gaging stations were installed which cover a total of 43 percent of the land area of the basin. These should provide a much better base for runoff estimates since it was suspected that the discharge per unit area would vary considerably in different watersheds.

The data collected from this network have added measurably to the understanding of the basin's climatology and hydrology. From the data collected by the precipitation gages it was possible to construct the isohyetal map illustrated in Figure 2 which shows a trend of decreasing precipitation from the southwest end of the basin toward the northeast corner. In one five month period (January-May) the average temperature outside the Lake George basin was measured to be 32.7°F and 32.3°F inside the basin, at quite similar locations. However, the average monthly temperatures outside the basin varied over a range of 44°F while those inside the basin varied only by 39°F. As might be expected, daily temperatures showed even greater fluctuations outside the basin. Hydrological measurements of stream discharge showed that in one fairly typical month, the discharge from Northwest Bay Brook, which was the only one previously measured, was 1.984 cfsm. Discharges from other streams ranged from a low of 1.084 cfsm to a high of 4.152 cfsm during the same period.

FIGURE 5

ISOHYETAL MAP W.Y. 1971

(OCT. - MAY)

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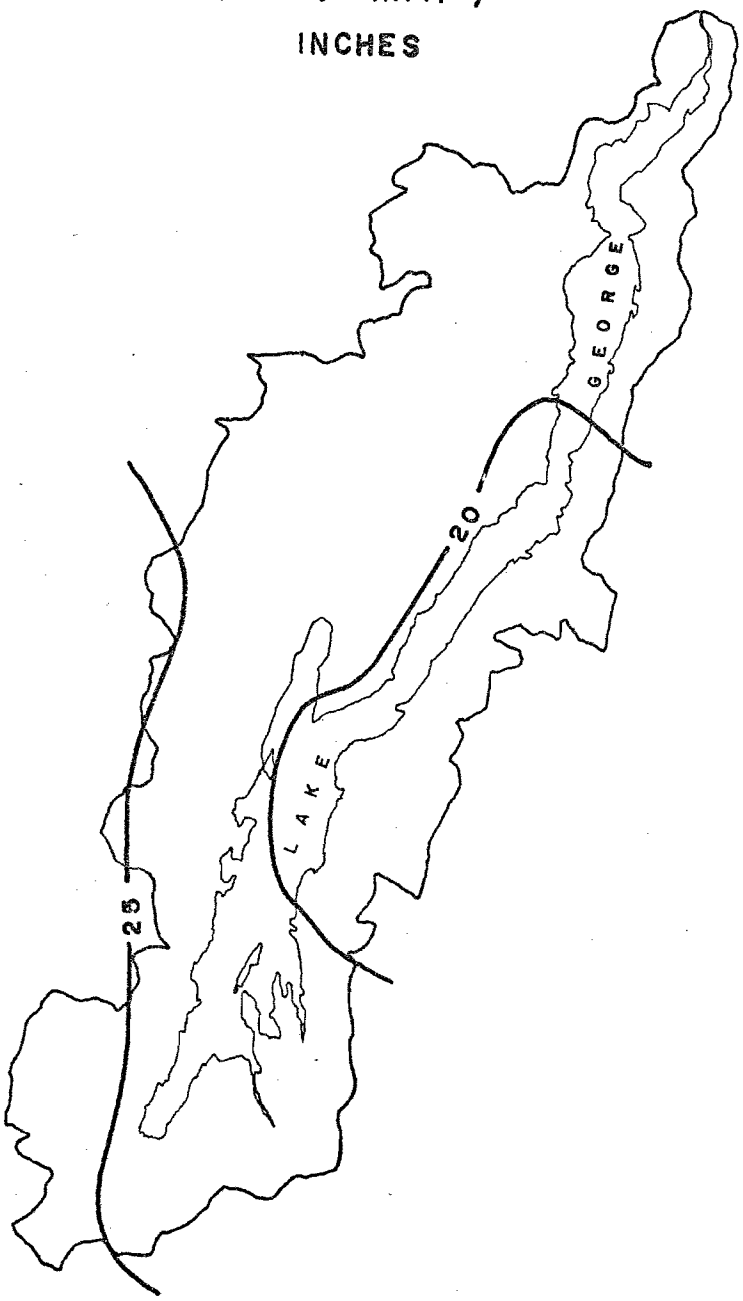

With the availability of much more complete data it will be possible to considerably upgrade the original model (HYDRO 1). It will now be possible to predict hydrologic conditions both more accurately and over smaller segments of the basin. The water balance on the land portion of the basin for instance, can be more accurately evaluated using the larger number of representative watersheds, thereby taking into account variations in topography, vegetation, and soil cover throughout the basin. The use of the more extensive climatic values will also help in increasing the validity of the water balance both through more representative precipitation values and by making better evaporation estimates possible using the basin temperature and humidity values. This will be reflected in revised model versions of HYDRO 1.