SPATIAL AND TEMPORAL SNOWCOVER DISTRIBUTION IN NEW YORK STATE

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INTRODUCTION

Snowcover surveys in New York State were begun on a systematic basis by the Hudson River-Black River Regulating District about 1926. The first surveys were in the Black River basin, in the west-central Adirondack Mountain region of northern New York (Fig. 1). Within 10 years, snow surveys were prevalent in the remaining four major drainage systems of the Adirondacks--the St. Lawrence, Upper Hudson, and Mohawk River basins and the Lake Champlain basin. During that period, similar snow surveys were begun in the Catskill Mountains of east-central New York.

In 1937, the U.S. Geological Survey became the coordinating agency for the New York Cooperative Snow Survey. The purpose was to unify data collection activities and provide a forum for the exchange and dissemination of information to an expanded group of governmental agencies, utilities, and private citizens. Participation increased gradually and had become statewide (except for Long Island and the New York City area) by the early 1970's.

This report presents two maps showing the mean water equivalent of snowcover for the bimonthly March surveys, and four maps showing the change in water equivalent of snowcover between successive surveys from January through April. Statistics were calculated from the New York Cooperative Snow Survey data base, which contained more than 43,300 observations as of the end of the 1983 season.

DATA BASE

The growth of the New York Cooperative Snow Survey is evident from the wide range of available periods of record from different basins. The Allegheny River and Lake Erie basins have 12 and 17 years of record, respectively, whereas the Black River and Upper Hudson River basins have 39 and 40 years, respectively. At present, about 320 sites are monitored by 11 governmental agencies (municipal, state, federal) and utilities, as well as by several private groups and individuals. About 75 percent of the sites are snow courses, the remainder are point measurements or snow stakes. Site locations are chosen and maintained by the measuring agency. Monitoring is done with a variety of field equipment, ranging from the Adirondack snow tube and scales to the modified 8-inch (20.3 cm) rain gage of the National Weather Service. Data are grouped by 14 major drainage basins. The mean water equivalent is computed for each basin and each survey period.

Snow surveys are scheduled at the outset of each season. They are conducted monthly beginning the first week in January, then bimonthly beginning with mid-March until the snowpack is depleted. This schedule enables synoptic monitoring of the changing snowpack at regular intervals, accomodates extension of the historic data base, and provides logistical lead time for agencies to plan manpower needs for the coming season. Field measurements are conducted Monday through Wednesday of the survey week. Data are

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transmitted via telephone to the Snow Survey Committee in Albany. Results are compiled and a summary report prepared for distribution by Friday of survey week.

RESULTS

The maximum water equivalent usually occurs in either the March 1 or mid-March collection period. The statewide patterns in the distribution of water equivalent of the snowpack for these periods is shown as the mean for the period of record in figures 2 and 3.

The long-term record from this network was the basis for the series of four accumulation/ablation maps (figs. 4-7). These maps were prepared by computing the net change in water equivalent annually for each site between measurement periods. The mean change (as water equivalent of snowcover) was then calculated from the annual changes for each site. Only pairs of succeeding measurements for a given site were considered; that is, a site measured in January had to have been measured in February to obtain a value for computation of a mean site change for that period.

The accumulation/ablation maps illustrate the mean change in water equivalent of snow cover between standard survey periods and depict the statewide pattern of accumulation and ablation of the snowpack. The maps indicate a wide temporal and spatial variability of snowcover that results from differences in latitude, topography, lake-effect storms and frequency of winter thaws. Although the results may not be applicable to specific small watersheds, they represent a reasonable estimate of the long-term, regional patterns of water storage within the snowpack.

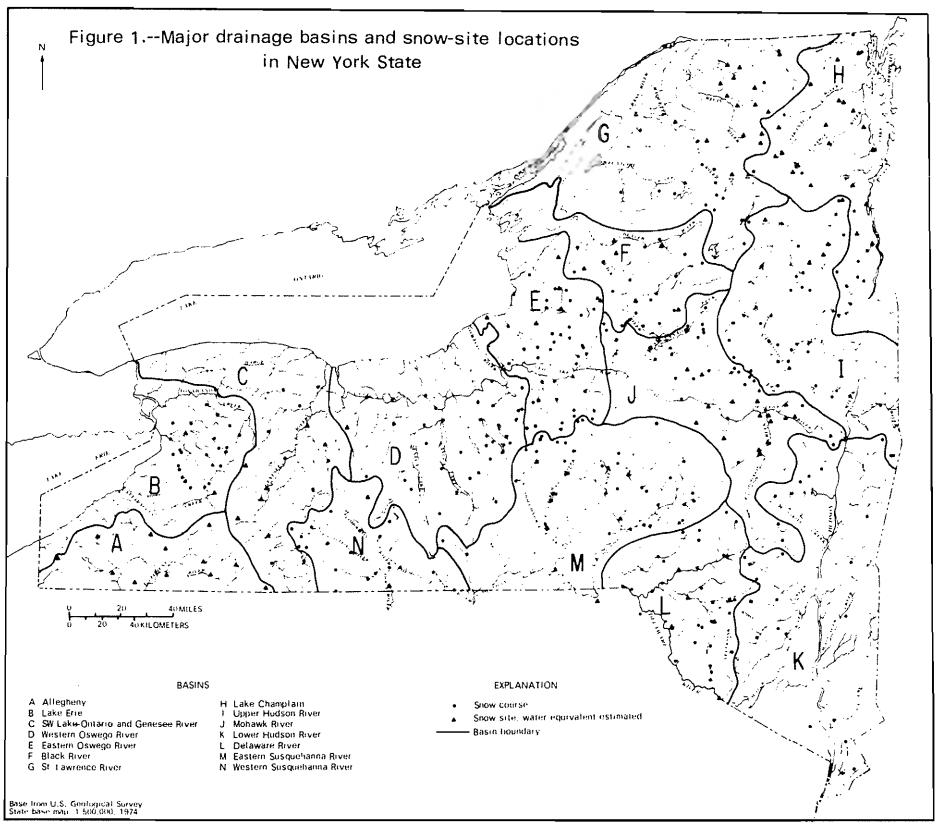

Figure 1.--Major drainage basins and snow-site locations in New York State

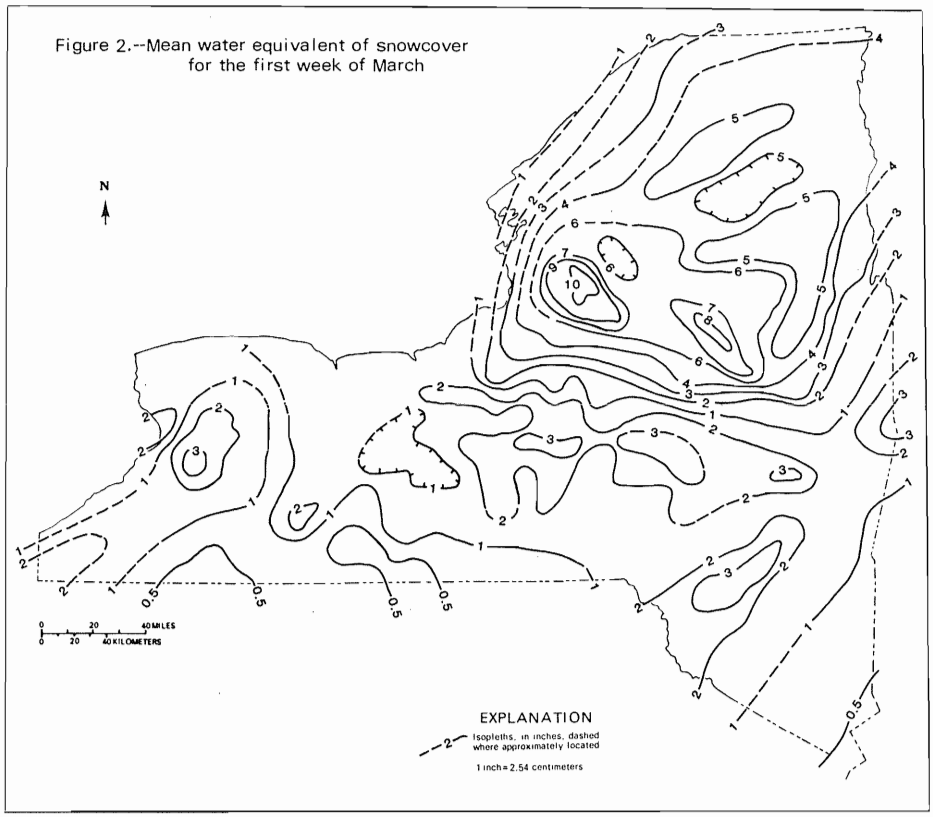

Figure 2.--Mean water equivalent of snowcover for the first week of March

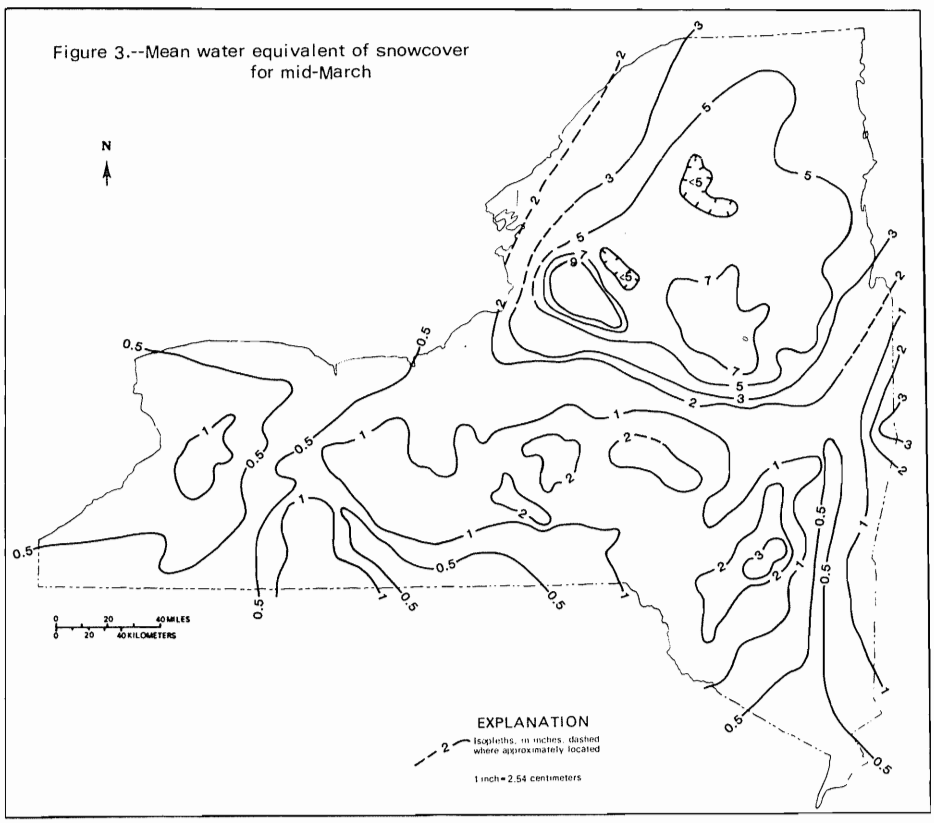

Figure 3.--Mean water equivalent of snowcover for mid-March

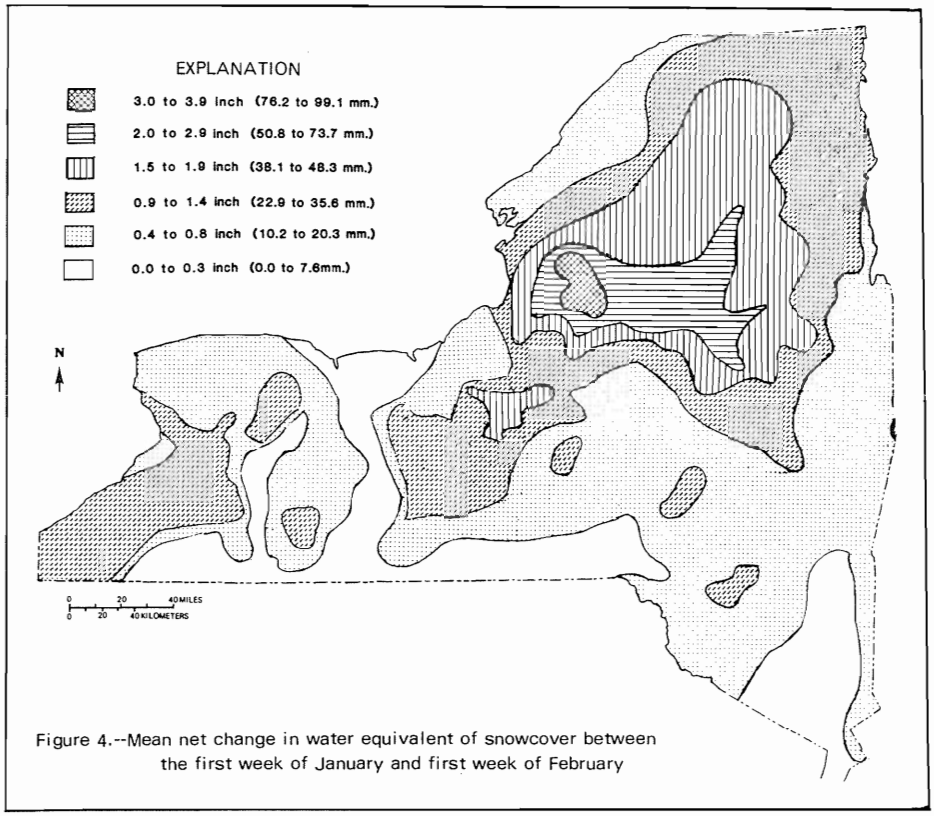

Figure 4.--Mean net change in water equivalent of snowcover between the first week of January and first week of February

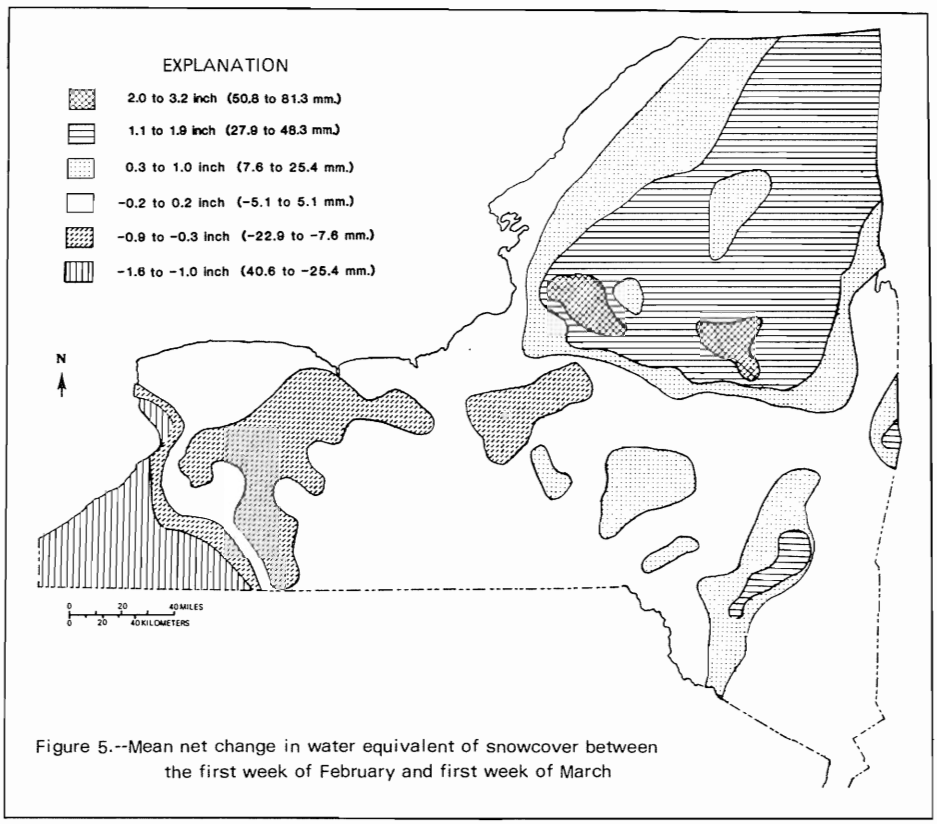

Figure 5.--Mean net change in water equivalent of snowcover between the first week of February and first week of March

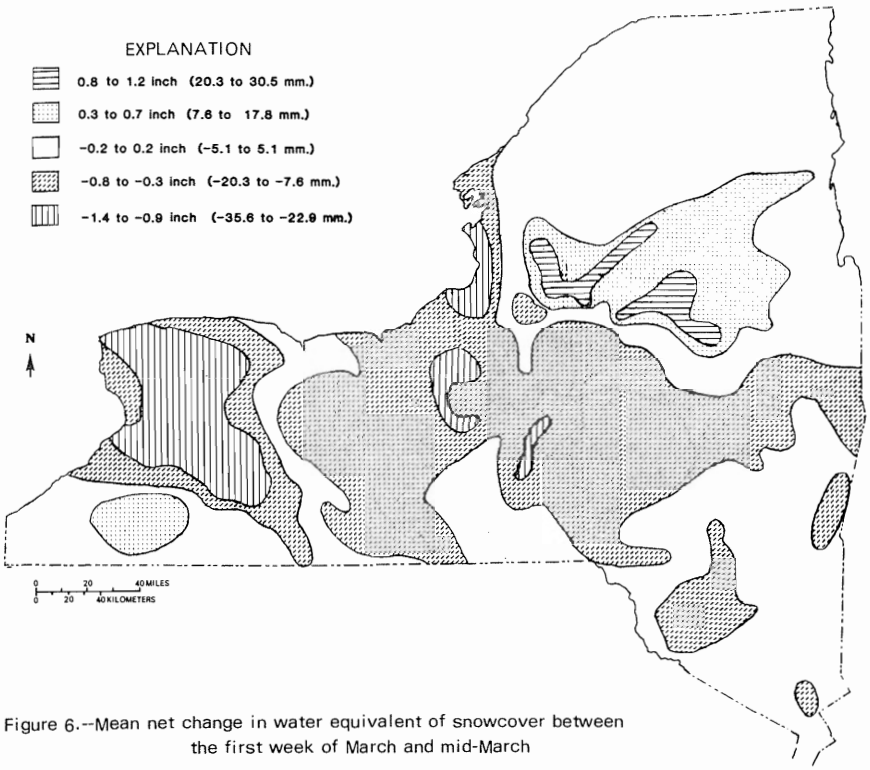

Figure 6.--Mean net change in water equivalent of snowcover between the first week of March and mid-March

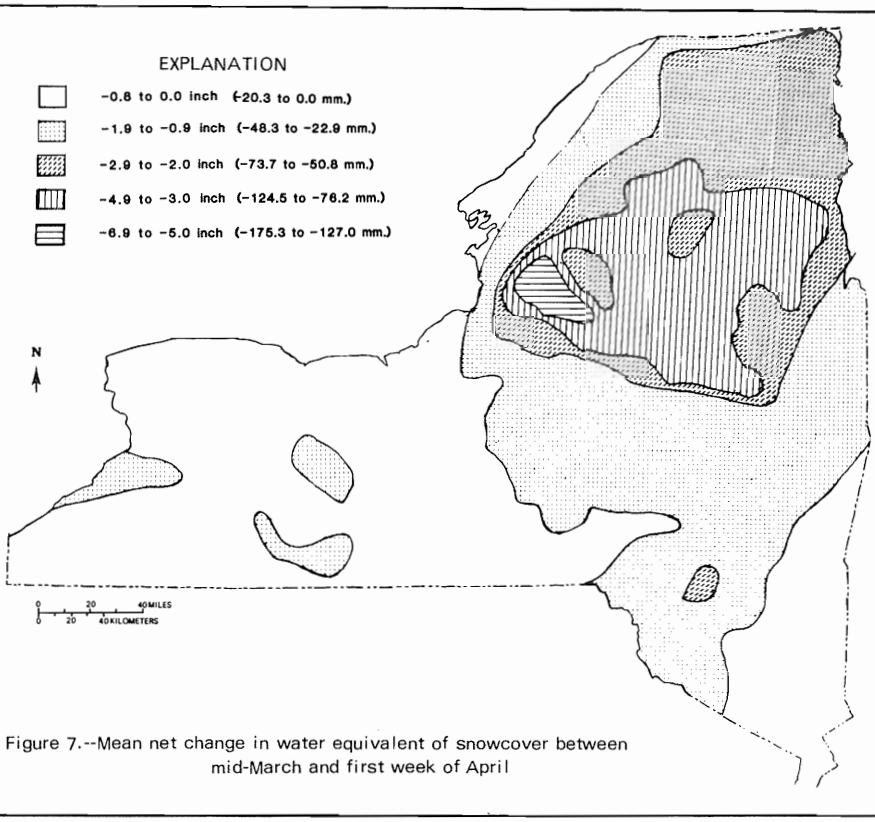

Figure 7.--Mean net change in water equivalent of snowcover between mid-March and first week of April