SUMMARY OF THE PANEL DISCUSSION [1/] AT THE EASTERN SNOW CONFERENCE, February 1967

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The New York Cooperative Snow Survey was formed in 1937 and now includes 21 cooperating agencies that are measuring about 335 snow courses and about 135 snow-depth stations in New York and adjoining states. The list of cooperators is basically the same as it was when the snow surveys were first started, with the oldest stations dating back to about 1930. Since the organization of the Snow Survey, the U.S. Geological Survey has been the coordinating agency for New York State and the agency responsible for assembling, reproducing, and distributing the monthly surveys.

Snow courses have generally been set up by the agency that measures the snow, although the Geological Survey has helped in some instances by furnishing literature and suggestions. The Geological Survey has generally followed the principles devised by the Soil Conservation Service and used in the Western United States. These principles and practices have been slightly modified to fit conditions in the Northeastern United States. The following discussion concerns some of the basic problems facing the Snow Survey.

Snow courses should be constructed and maintained before the snow season, preferably during the fall. A path should be cleared through a snow course to provide easy travel with snow shoes or skis. Sampling points should be placed at 100-foot intervals and their position marked on a nearby tree with either surveyors' tape or paint. An area about 5-foot square should then be marked off at each 100-foot interval, and a mat of leaves or straw placed in the 5-foot square area to provide protection for the sampling equipment and to help hold the snow core in the snow tube. A sample can then be taken from the square for each snow survey without disturbing the surrounding or adjacent area of the square. Disturbing and packing the snow has long been a problem because it is generally a month between snow surveys and new snow may cover all signs of tracks made on the previous snow survey. Snow that has been packed down will tend, of course, to have a higher density than undisturbed snow and will not give a true sample.

A snow course is generally laid out in a hardwood forest, although some cooperators measure in open fields adjacent to hardwoods and others measure both in the hardwoods and in the fields. The hardwoods intercept little snowfall and offer some protection from the sun and wind, factors which can have considerable influence in reducing the snow depth and water

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content. In the Northeast, with the comparatively low elevations, a thaw can occur any time after the first snowfall of the winter, reducing or completely eliminating the accumulated snowpack. If a thaw occurs in January or February, it is generally a temporary condition and the snowpack will probably return.

A snow course with a northern or northeastern exposure will offer the best protection against thaws. Courses laid out with southern and western exposures will have less snow because they are subjected to more sunlight and are more influenced by the prevailing wind. Because snow depth does vary with direction of exposure, it should be remembered that the measurements are average for only the snow course and not for all the surrounding area.

Because snow courses are often located near a road, accessibility is not too great a problem. Roads do not ordinarily allow complete coverage of a river basin, but with the increased availability of snowmobiles, coverage of more remote sections of a basin is quite possible. Ski areas provide another source of easy access, especially to higher elevations. Ski-area operators are generally so interested in snow reports that they will provide over-snow travel or a chair-lift ride to an otherwise inaccessible snow course. Care should be exercised to avoid taking measurements in drifting snow and, in ski areas, additional care is needed to avoid snow that has been disturbed by skiers.

An average of 10 samples should be reported for each snow course, although the number of samples in reports published by the New York Cooperative Snow Survey range from 1 to 10. Samples should be taken at 100-foot intervals to obtain as great a coverage as possible. A snow course should be as flat as possible to avoid false snow-depth readings and to reduce wind effect on the snowpack. Snow courses should be located at a variety of elevations; their locations should be distributed throughout a river basin, from the headwaters to the downstream reaches. In addition to elevation, latitude and longitude should be determined and a description or sketch of each snow course prepared. These descriptions would prove especially valuable if a cooperator needed additional data from a course whose operations had been discontinued by the original cooperator, or if a snow course were to be reactivated after several years of layoff.

When a snow survey is completed, the data should be tabulated and transferred to the collection agency as rapidly as possible. Since there are slmost 500 entries to be made for each snow survey publication, time is very important in preparing the tabulation. If the data are not distributed by Friday of the snow survey week, they will be too old to be of much immediate value.

The condition of the soil under the snowpack is of great importance when one tries to predict runoff. Since it is possible for frost to enter and leave the soil at different intervals during the winter, it is even more important to determine and to keep a running account of the soil temperature and moisture. At the present time there are only three stations in New York State reporting any soil data, and these are only temperature. These three stations are the Geneva Experiment Station at

Geneva, the Agriculture School near Canton, and the Agriculture School at Cornell. These stations are reporting daily maximum and minimum temperatures at 4- and 8-inch levels. To make any forecast of runoff from snow cover, a hydrologist should know what possibility exists of infiltration into the soil under the snowpack. If soil moisture and temperature data were available at the time of snow surveying, a general knowledge of runoff possibilities could be obtained. To fill in gaps between soil moisture and temperature stations, snow surveyors should report whether or not there was frost in the ground when the snow surveys were made.

Since 1964, when the Soil Conservation Service conducted tests on Mt. Hood and in Alaska with all types of snow samplers, it has been felt that the Adirondack-type sampler gives the best results for most of the range of snow depths found in the Northeast. It is also felt that if all cooperators used this type of equipment there would be fewer questions regarding the reliability of the data.

Several cooperators have discussed, informally, the idea of organizing a meeting of all snow pluggers involved in the New York Cooperative Snow Survey as well as pluggers from adjacent states. This meeting would last for about a day and could feature talks and demonstrations by different snow pluggers. Some controversial subjects for discussion might include:

1. Better distribution of snow courses.
2. Better coverage of snow surveys.
3. Less duplication by cooperators in one area or in overlapping areas.
4. More information about soil conditions.
5. Coordination of snow surveys and snow courses with adjoining states.
6. Standardization of equipment and measuring practices.
7. Number of samples per snow course.
8. Frequency of snow surveys.

This meeting could be held as often as necessary, perhaps once every 5 years. New or improved equipment could be displayed and demonstrated at such meetings. These meetings should have the support of all cooperators involved with the snow survey.

As a final suggestion, a committee could be designated to draw up a set of rules to be used by all cooperators. After almost 30 years of snow surveying it would seem logical to have a committee to regulate the measuring and reporting practices of snow surveyors in the Northeast.