Snowpack in Maine—Maximum Observed and March 1 Mean Equivalent Water Content

Water-Resources Investigations Report 01-4258

In cooperation with the
Maine Department of Conservation
Maine Geological Survey

U.S. Department of the Interior
U.S. Geological Survey

Cover photograph: Retired USGS employee Gordon Keezer preparing to measure snow depth and equivalent water content on Route 16 near Kingsbury, Maine, February 1969
By: Barbara Keezer

U.S. Department of the Interior
U.S. Geological Survey

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By Marc C. Loiselle, Maine Geological Survey
and Glenn A. Hodgkin, U.S. Geological Survey

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Augusta, Maine
2002

U.S. DEPARTMENT OF THE INTERIOR
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CONVERSION FACTORS

Multiply	By	To obtain
foot (ft)	0.3048	meter
inch (in.)	25.4	millimeter

Snowpack in Maine—Maximum Observed and March 1 Mean Equivalent Water Content

By Marc C. Loiselle and Glenn Hodgkins

ABSTRACT

Historical snow data have been analyzed using geographic information systems software to determine the magnitude and distribution of maximum observed equivalent water content of snowpack for the State of Maine. Data from 109 sites with an average of 43 years of record were used to generate the map of maximum observed equivalent water content. Maximum observed water content ranged from less than 8 inches in south-coastal Maine to more than 20 inches in the northwestern mountains. A map of mean equivalent water content in snowpack on or about March 1 also was prepared with data from these sites. The March 1 mean equivalent water content ranged from less than 4 inches near the coast to more than 9 inches in northern Maine.

INTRODUCTION

The equivalent water content of snowpack is the amount of water contained in the snow that is on the ground. Water in the snowpack will run off into streams, rivers, and lakes and recharge the ground-water system when it melts, typically in late winter and spring. Flood-forecasting agencies, people who live near streams, and many water-dependent industries need to know how much water to expect from snow-melt each year. The Maine Cooperative Snow Survey Program, run jointly by the Maine Department of Conservation, Maine Geological Survey (MGS) and the U.S. Geological Survey (USGS), compiles data collected by many agencies and private companies on a regular basis in late winter and spring. Statewide water equivalent maps are available within a day after each snow survey in late winter and early spring on the Internet at
http://www.state.me.us/mema/weather/snow.htm.

The depth and water content of the snowpack have been measured at selected sites in Maine for more than 90 years. This information on snow depth and equivalent water content has been collected by electric-power utilities, water-power companies, pulp and paper companies, the National Weather Service (NWS), and the USGS in cooperation with the State of Maine.

Hayes (1972) published a summary map report of snowpack data in Maine based on a compilation of data for the period 1941–65. This report was the only statewide publication on mean equivalent water content of snowpack. In addition to mean equivalent water content, the Hayes report shows the average density of snow on March 1 and the average date of maximum water content of the snow across the State.

In 1991, the USGS and the MGS began to compile all historical snow-survey data for the State. The compilation was completed in 1993 and has been supplemented with additional measurements annually since then. This report presents results of the analysis of historical snow-survey data to determine the areal characteristics of the maximum observed and March 1 mean equivalent water content of snowpack for the State. The maps and data presented in this report can be used by State and local governments, water-resources agencies, power companies, engineering design professionals, biologists, and others who are interested in the observed extremes of Maine’s winters during the past 90 years.

SNOW-SURVEY DATA FOR MAINE

The sources of snow-survey data used in this report include the USGS; MGS; NWS; the St. John River Forecast Center, New Brunswick; the Quebec Ministry of the Environment; the New Hampshire Department of Environmental Services; PDI New England, Inc. (formerly part of Maine Public Service Company); PPL Maine, LLC (formerly part of Bangor Hydro-Electric Company); Kennebec Water Power Co.; FPL Energy of Maine, LLC (formerly part of Union Water Power Company); Georgia Pacific Corp.; Great Northern Paper, Inc.; and Sappi Limited (formerly S.D. Warren Company).

Locations of snow-survey sites were digitized into a geographic information system (Environmental Systems Research Institute (ESRI) ArcInfo version 7.2.1) and linked to a tabular database containing the date of measurement, snow depth, and equivalent water content. Various quality-assurance checks of the data were performed. Site identification numbers, dates, and measurements were examined to eliminate duplicate entries in the tabular database. Snow depths, equivalent water contents, and calculated snow densities (equivalent water content divided by snow depth) were screened for unreasonable values, and anomalous entries were checked. As of summer 2000, the database contained approximately 21,000 measurements made at 282 snow-survey sites. Of the 282 sites, 162 have more than 10 years of record. The number of snow-survey sites plotted against their period of record (in years) is shown in figure 1.

The distribution of snow-survey sites in Maine and adjacent areas of New Hampshire, and Quebec and New Brunswick, Canada is shown in figure 2. The sites are well distributed across Maine; however, almost all sites with more than 10 years of record are at altitudes less than 2,000 ft, and over 60 percent of the sites are at altitudes less than 1,000 ft (fig. 3). Most of the snow-survey sites shown in figure 2 are located in relatively flat areas of mixed hardwood and softwood forest. Measurements are not taken in softwood areas.

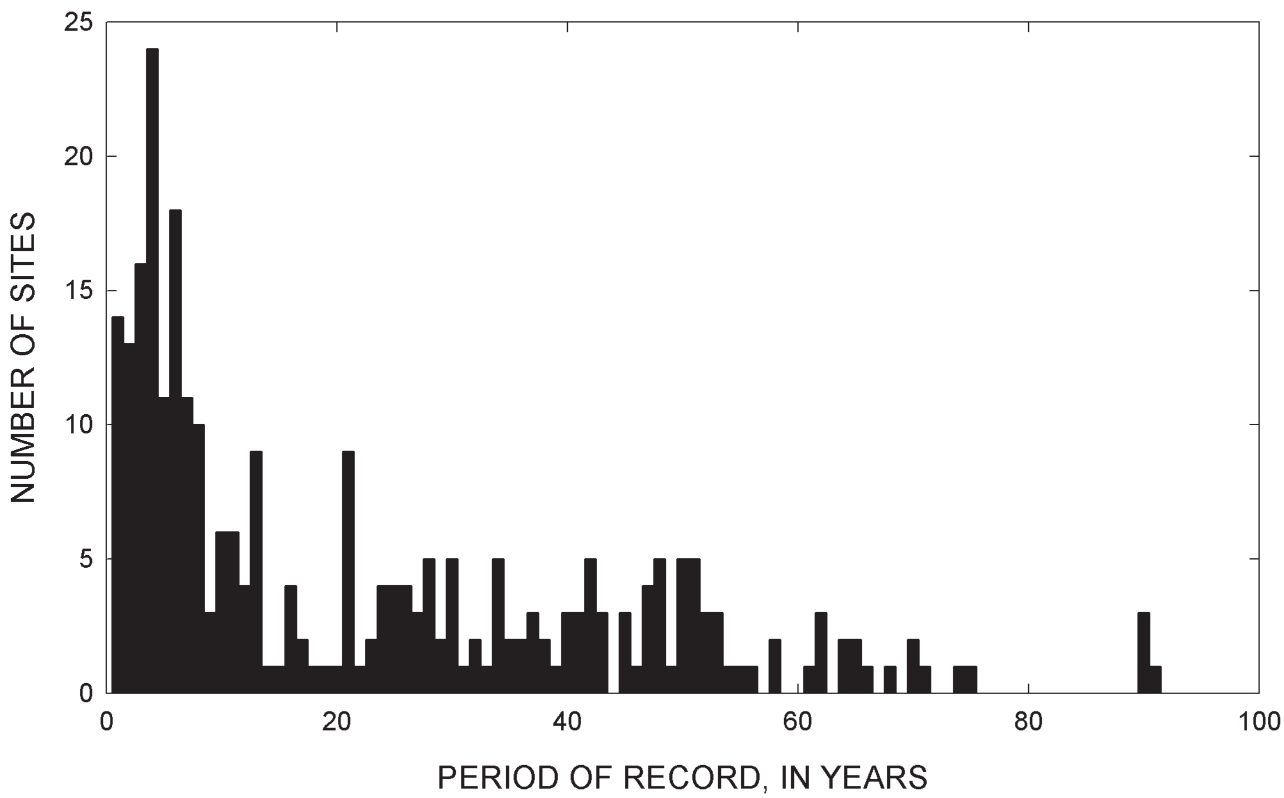


Figure 1. Number of snow-survey sites in and near Maine and period of record.

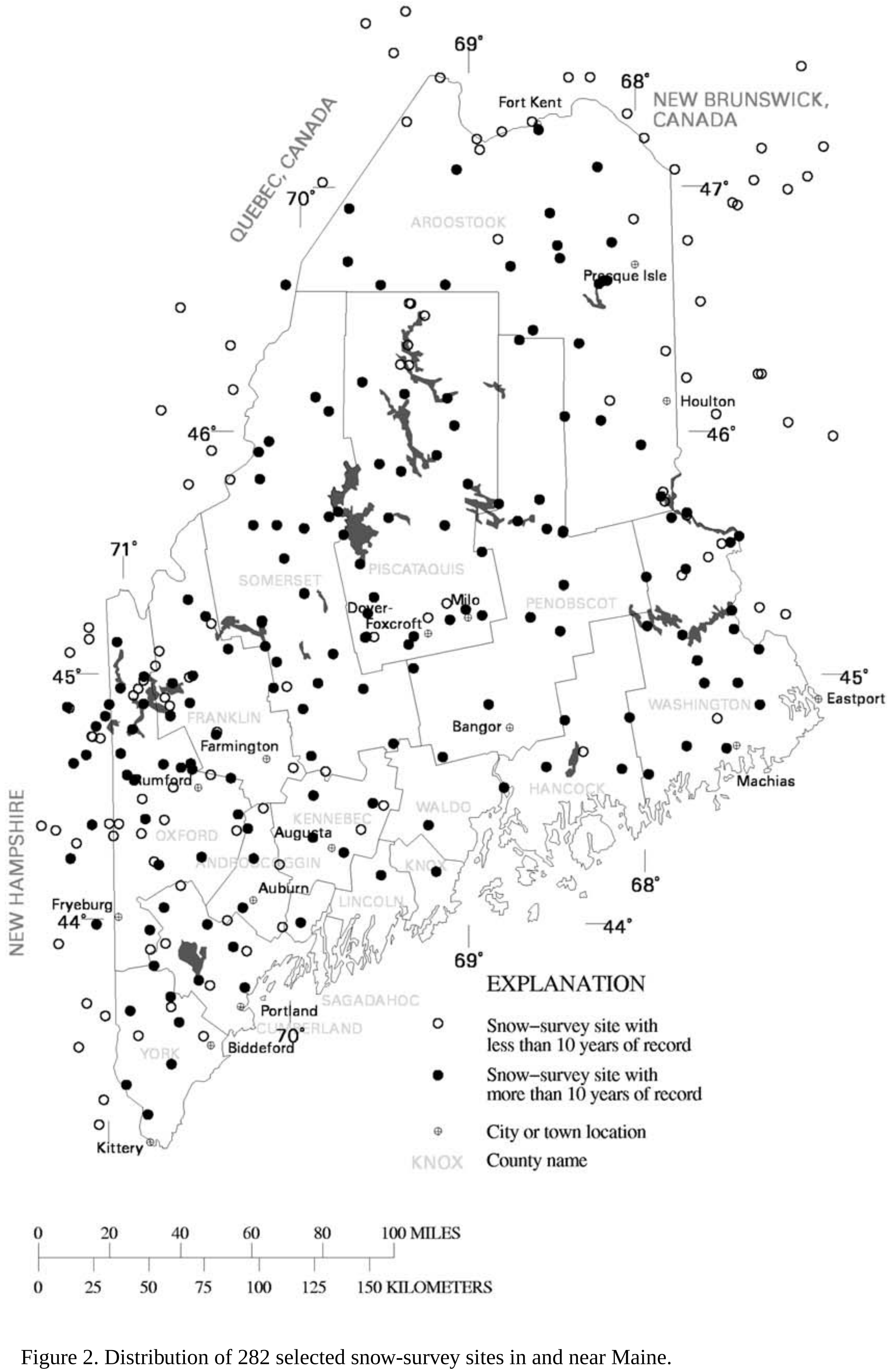


Figure 2. Distribution of 282 selected snow-survey sites in and near Maine.

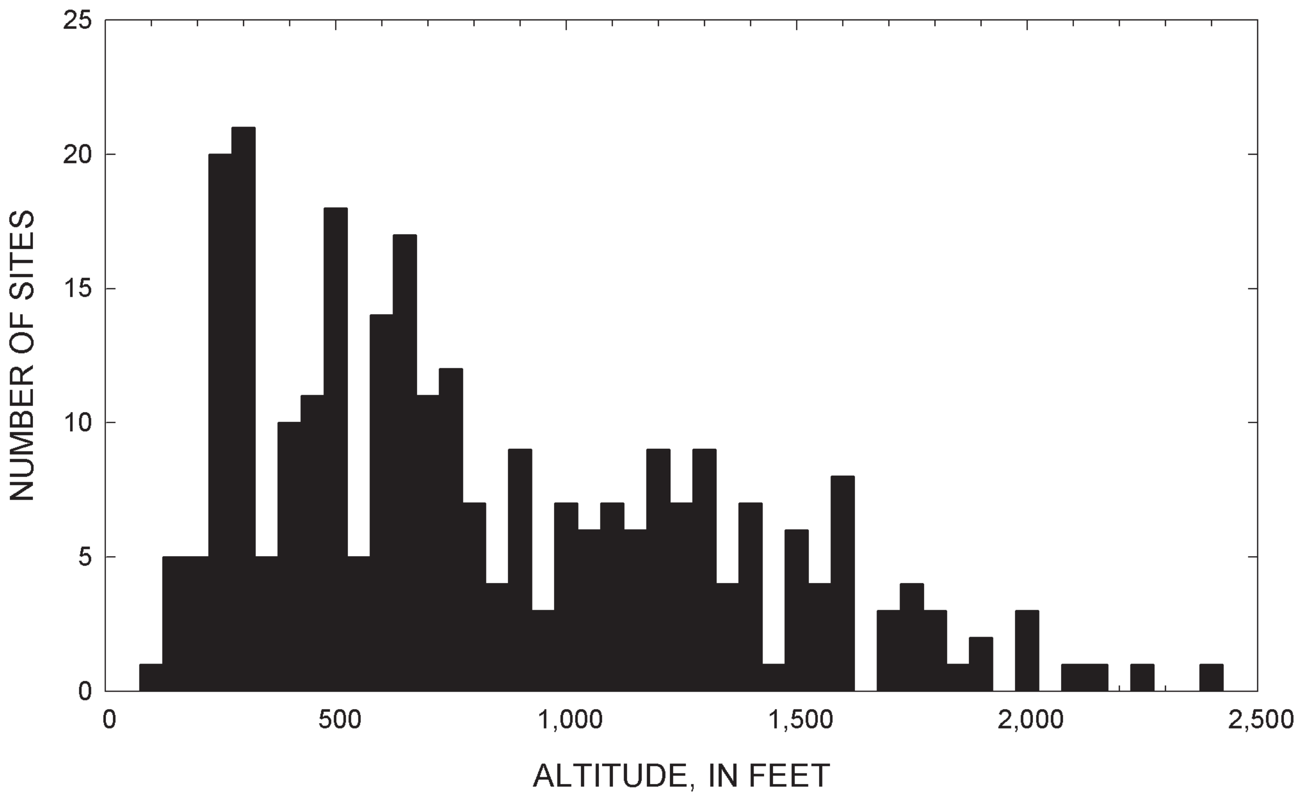


Figure 3. Number of snow-survey sites in and near Maine with more than 10 years of record and altitude of site.

ANALYSIS OF DATA ON MAXIMUM OBSERVED EQUIVALENT WATER CONTENT

There are 282 snow-survey sites in and near Maine with equivalent water-content data. The 120 sites with less than 10 years of data were dropped from the analysis, leaving 162 sites. A computer program was written to identify the highest water-equivalent value measured at each site for the 162 sites with more than 10 years of record. These maximum values occur in March or April with very few exceptions, confirming the work of Hayes (1972, fig. 2), which shows that the average date of maximum water content of the snowpack ranges from early March along the coast to late March in northern Maine.

Analysis of the date of the maximum value at each site showed that 92 of the 162 values occurred during the winters of 2 years—1963 and 1969 (fig. 4). Many sites with observed maximum values in years other than 1963 and 1969 were not sampled during these two heavy snow years. In particular, data collected consistently at a number of sites in central and southern Maine since the late 1980s as part of the Maine Cooperative Snow Survey Program has significantly increased the number of sites with 10 or more years of record that do not have data in 1963 and 1969.

A map of snow-survey sites with more than 10 years of record sorted by the year of the maximum equivalent water content measurement is shown in figure 5. During the winter of 1969, maximum values of water content were in the western two-thirds of the State (area west of the solid line in fig. 5). During the winter of 1963, maximum values of snow-water content primarily were in the eastern half of the State (east of the dashed line in fig. 5). This distribution is not unreasonable because these maximum snow-water content values may be caused by a single major storm or several storms that follow the same storm track.

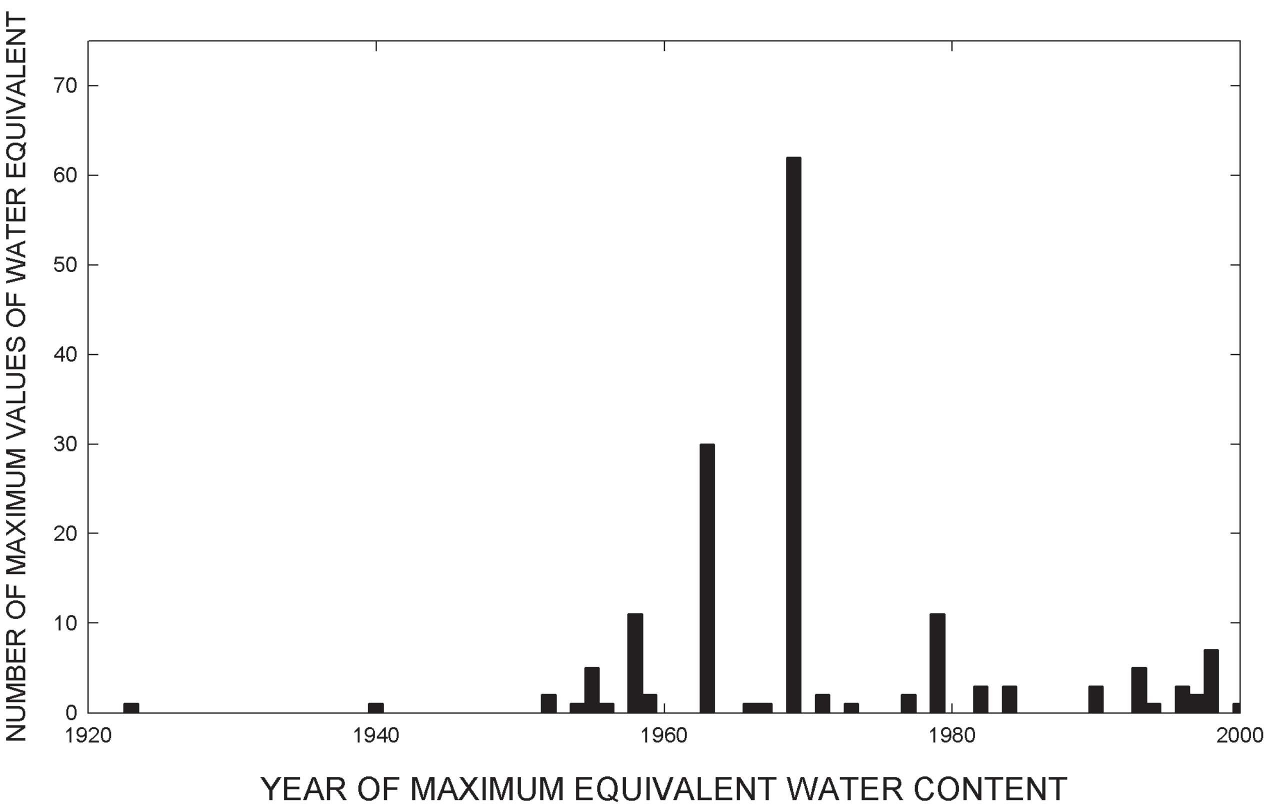


Figure 4. Number of maximum observed equivalent water content meausrements and year measured for snow-survey sites in and near Maine with more than 10 years of record.

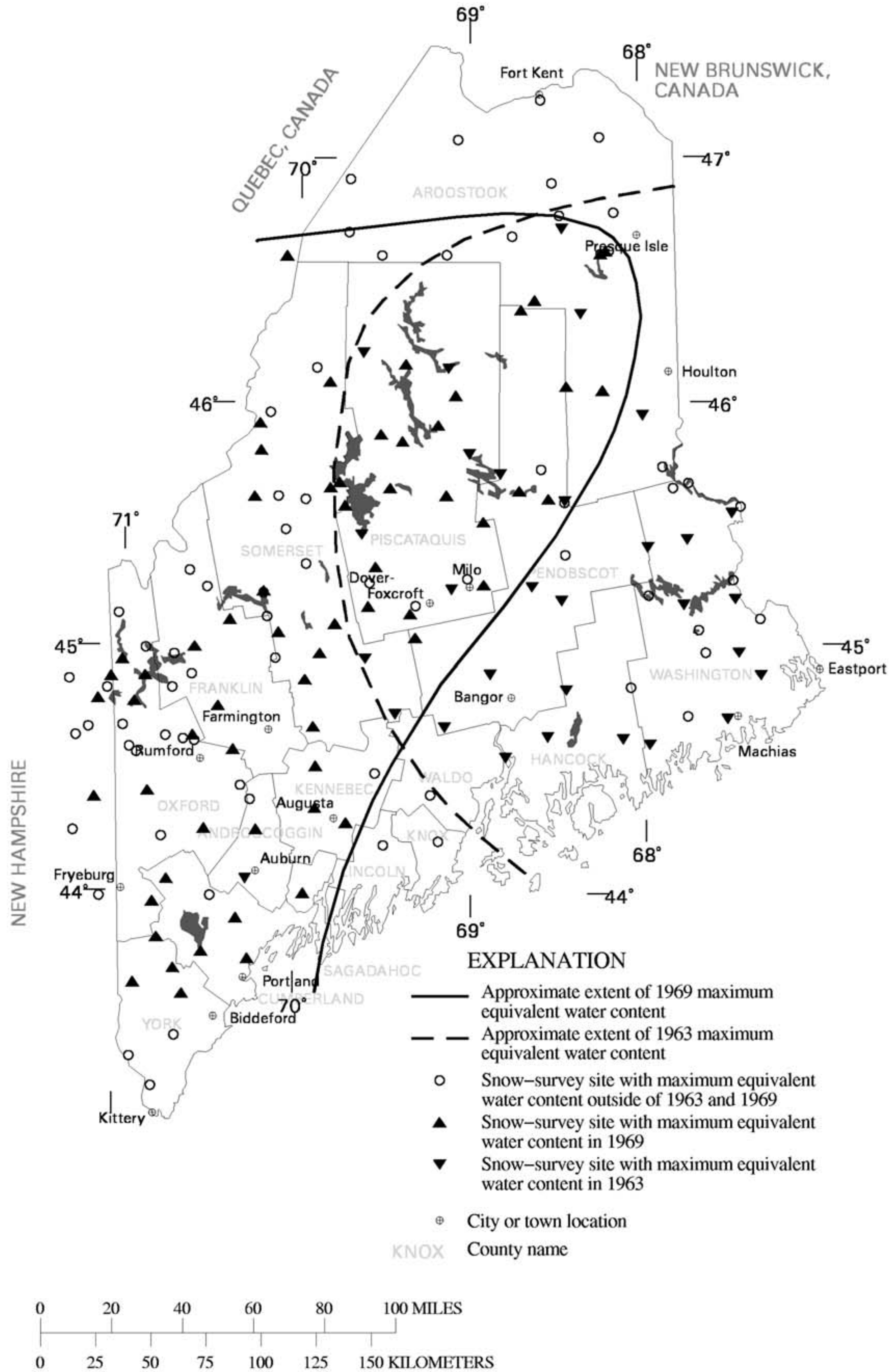


Figure 5. Snow-survey sites in and near Maine with more than 10 years of record and maximum observed equivalent water content measured in 1963, 1969, and all other years.

Sites with maximum equivalent water-content values measured in years other than 1963 or 1969 were evaluated for inclusion in the analysis by comparing the maximum values at these sites to the closest sites with measurements in either 1963 or 1969. The percent deviation for these sites is shown in figure 6. As expected, most measurements of equivalent water content in other years were much lower than measurements of water content from neighboring sites in 1963 or 1969; however, there are various exceptions. In northern Aroostook County, the percent differences are much lower and more evenly distributed between positive and negative values than the rest of the State (fig. 6). It is unlikely that 1963 or 1969 were extremely high snow years in far northern Maine. Of the 13 sites shown in figure 6 in northern Aroostook County, 9 sites have measurements in 1963 or 1969 that were not the maximum values for the period of record. Eight of the 13 sites have maximum values in years after 1969.

A few sites in and near southern and central Maine have maximum observed equivalent water content in years other than 1963 and 1969. These values may reflect local site conditions. One of these sites is in eastern Maine (Baring), one is in New Hampshire (Conway), and one is in west-central Maine (Parlin Pond). These measurements were made in the 1950's and 1960's. Two sites in central Maine had more than 25 percent positive differences (Grindstone and Milo). The maximum equivalent water content at these sites was measured in 1940 and 1959, respectively.

The remaining sites in Maine had negative percent differences. All maxima observed after 1969 (with the exception of the eight values in northern Aroostook County) had negative differences. The majority of these sites were not active before 1969. This result suggests that, overall, water-content measurements in snowpack in the southern 80 percent of the State after 1969 are not indicative of maximum values. Outside of far northern Maine, observed maxima in years other than 1963 and 1969 (with the exception of Baring, Conway, Parlin Pond, Milo, and Grindstone) are all less than values at neighboring sites measured in 1963 or 1969. At 43 of 47 sites, the observed values are less than 90 percent of the observed maxima at neighboring sites that were measured in 1963 or 1969.

Based on the results described above, only sites measured in 1963 or 1969 plus the 13 sites in northern Maine discussed above and the five sites (Baring, Conway, Parlin Pond, Milo, and Grindstone) discussed in the previous paragraph were included in the final analysis. One site, Harmony/Athens in south-central Maine, measured in 1963, had a maximum observed equivalent water content that was 55 percent lower than surrounding sites with maxima measured in 1969. This site was sampled in 1963 but was not sampled in 1969, the peak snow year for this part of the State, and was dropped from the analysis. This left 109 sites in this analysis to describe the areal variation of maximum observed snow water equivalent values across the State.

The final 109 sites (out of the original 162 sites) with more than 10 years of record that remain in the analysis are shown in figure 7 and table 1. In the final data set, 12 winters are represented among the 109 measurements, with 83 percent of the maximum measurements occurring in the heavy snow years 1963 and 1969. The distribution of the maximum values is shown in figure 8.

The 109 sites shown in figure 7 were used to prepare a contour map (fig. 9) of maximum observed equivalent water content in snowpack by the method described below using the ESRI ArcInfo GRID module. The 109 data points shown in figure 7 were used to prepare a 1,000-meter by 1,000-meter grid of maximum observed equivalent water content in snowpack. An inverse distance formula with a weighting exponent of 3 was used to calculate water content in snowpack in grid cells with no data points. The weighting exponent of 3 was selected as an appropriate smoothing factor for the areal density of data points on the map. This grid of maximum observed equivalent water content in snowpack was converted to a contour map using the GRID module. The resulting line coverage was smoothed manually to remove artifacts of the raster-to-vector conversion. Contour lines are expected to be more accurate in areas with a high density of snow-survey sites than in areas with a low density of sites.

The highest maximum observed equivalent water-content measurements (16 to 21 in.) were in the mountains of western Maine. The lowest values (8 to 12 in.) were in southern and central coastal areas. Values in the rest of Maine generally ranged from 12 to 16 in.

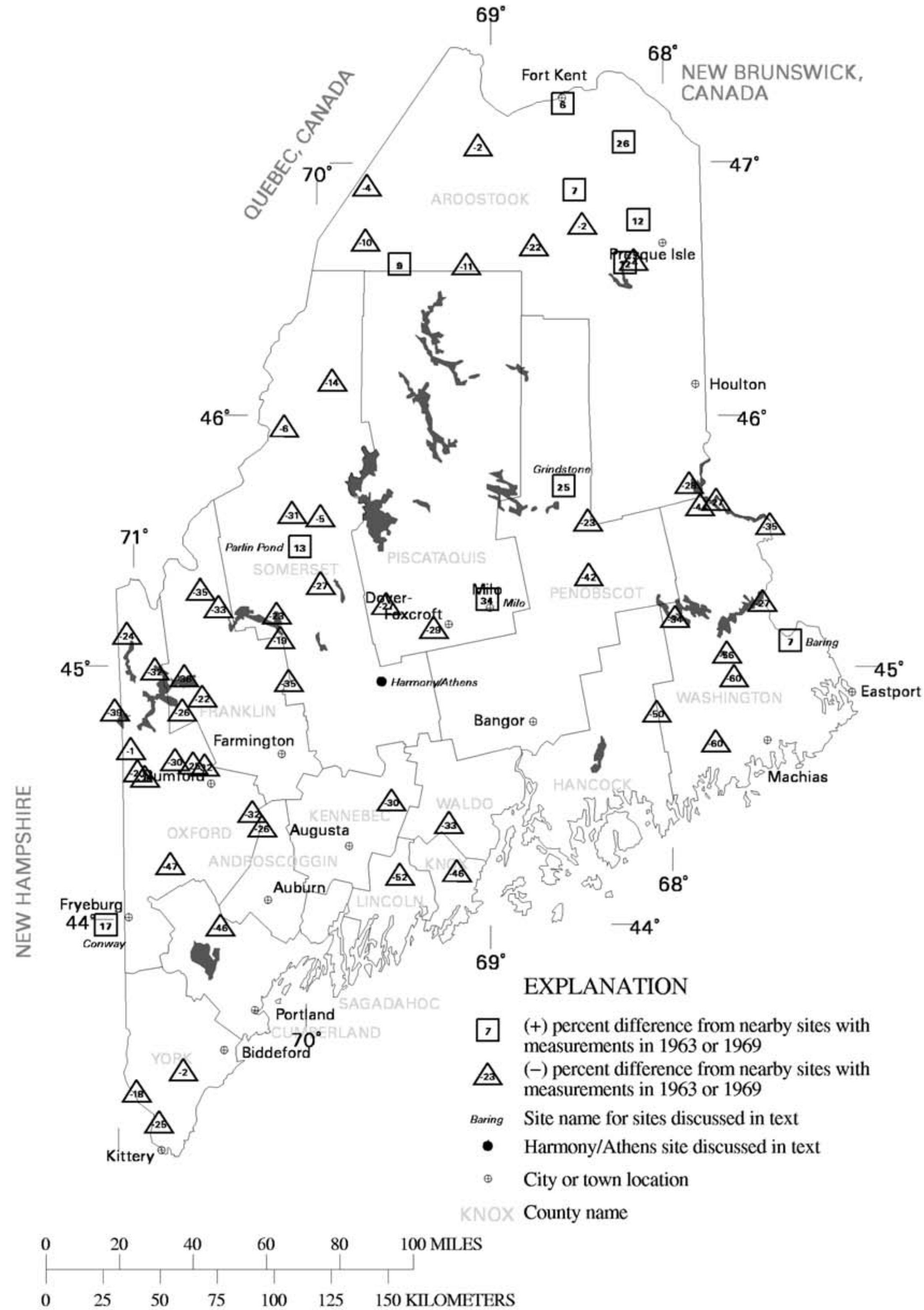


Figure 6. Percent difference between maximum observed equivalent water contentin snowpack ot sites in and near Maine measured in years other than 1963 and 1969, and neighboring sites with maximum observed equivalent water content measured in 1963 or 1969.

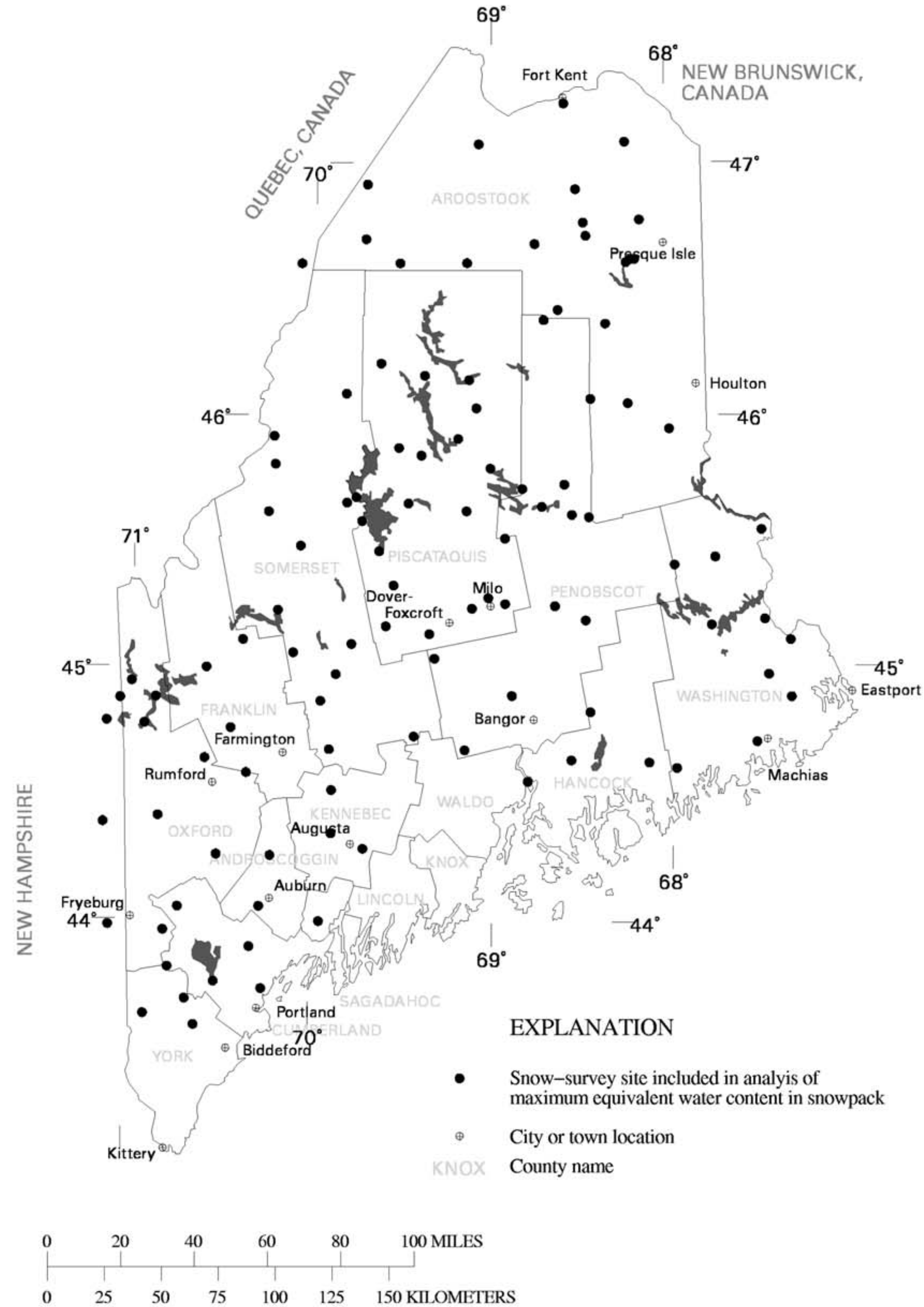


Figure 7. Areal distribution of 109 selected snow-survey sites in and near Maine used to prepare the maximum observed equivalent water-content map.

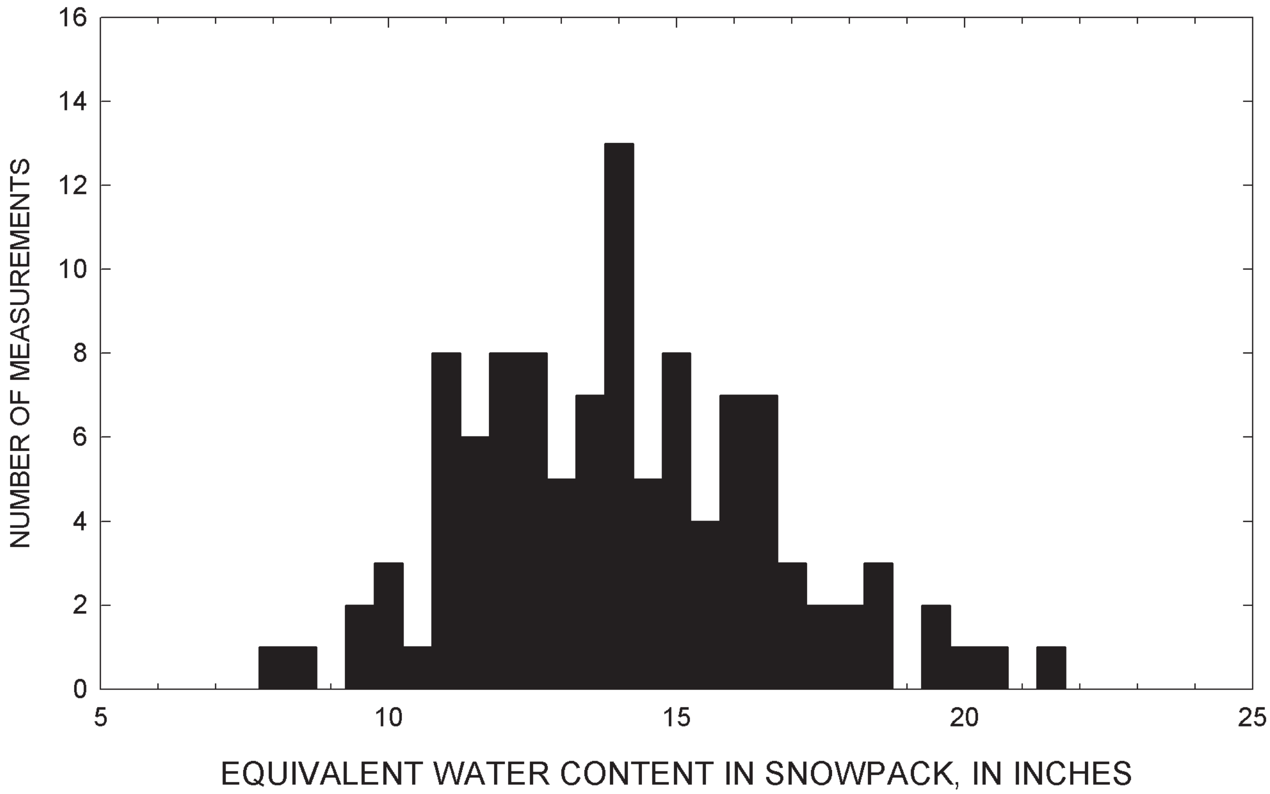


Figure 8. Distribution of maximum observed eqivalent water content in snowpack for 109 selected now-survey sites in and near Maine.

There are few snow-survey sites above 2,000 ft in altitude in Maine (fig. 3), and no attempt was made to include altitude effects in the creation of the grid of maximum observed equivalent water content in snowpack. The depth and water content of seasonal snowpack usually increases with altitude because of the larger number of snowfall events and lower amounts of evaporation and snowmelt (Gray and Prowse, 1993). The maximum observed equivalent water content for areas above 2,000 ft may be seriously underestimated in figure 9.

Altitude effects combined with local site conditions such as forest type, slope, and aspect at a single site are responsible for much of the smaller-scale variability in maximum observed equivalent water content in snowpack. Because there is more variability in maximum equivalent water content in Maine than is represented by observed water content, local areas may have higher or lower water content than is shown in figure 9.

ANALYSIS OF DATA ON MEAN EQUIVALENT WATER CONTENT ON MARCH 1

The 109 sites discussed in the previous section (fig. 7, table 1) also were used to prepare a contour map of mean equivalent water content in snowpack on or about March 1 (fig. 10). A program was written to extract all values of equivalent water content for a site in a 7-day window (+/- 3 days) centered on March 1. The resulting data sets were examined, and any site with fewer than 10 measurements was removed from the sample set. It was possible for a site to be included in the map of maximum observed equivalent water content and excluded from the map of mean equivalent water content on March 1. This results because a site may have had more than 10 years of record but the site was not sampled on or about March 1 in some of those years. Seven of the 109 sites shown in figure 7 had fewer than 10 measurements on or about March 1; 102 sites were used to prepare figure 10.

To prepare the map of mean equivalent water content on or about March 1, the mean water content for each of the 102 sites was calculated and stored with the data points. Using the ESRI ArcInfo GRID module, a 1,000-meter by 1,000-meter grid of mean equivalent water content in snowpack was created. An inverse distance formula with a weighting exponent of 3 was used to calculate water content in snowpack in grid cells with no data points. This grid of mean equivalent water content in snowpack was converted to a contour map using the GRID module. The resulting line coverage was manually smoothed to remove artifacts of the raster-to-vector conversion. Contour lines are expected to be more accurate in areas with a high density of snow-survey sites than in areas with a low density of sites.

The mean equivalent water content (fig. 10) ranged from 3 to 5 in. along the coast to 7 to 9 in. in the mountains of northwestern Maine and in northern Maine. This map shows less small-scale variability than the map of maximum observed equivalent water content.

As with the maximum observed equivalent water content map, March 1 mean equivalent water content (fig. 10) may be seriously underestimated in areas with altitudes above 2,000 ft. Local areas at other altitudes may have higher or lower mean water equivalents than those shown in figure 10.

SUMMARY

Historical snow data have been analyzed using geographic information systems (GIS) software to determine the magnitude and distribution of maximum observed equivalent water content of snowpack for the State of Maine. Available data from the beginning of records at sites through the winter of 1999/2000 were compiled as part of the Maine Cooperative Snow Survey Program, run jointly by the Maine Department of Conservation, Maine Geological Survey and the USGS. The data were collected by electric-power utilities, water-power companies, pulp and paper companies, the National Weather Service, and the USGS in cooperation with the State of Maine.

Data from 109 sites with an average of 43 years of record were used to generate the map of maximum observed equivalent water content in the GIS software. Some sites had as many as 90 years of data. An inverse distance formula was used to calculate water content in snowpack in areas with no data.

Maximum observed water content ranged from less than 8 in. in south-coastal Maine to more than 20 in. in the northwestern mountains. Maximum observed water content was between 12 and 16 in. over much of the State. A map of mean equivalent water content in snowpack on or about March 1 also was prepared with data from these sites. The March 1 mean equivalent water content ranged from less than 4 in. near the coast to more than 9 in. in northern Maine. Mean water content was between 5 and 7 in. over a large part of the State.

REFERENCES CITED

Gray, D.M., and Prowse, T.D., 1993, Snow and floating ice, *in* Maidment, D.R., ed., Handbook of hydrology: McGraw-Hill, p 7.9.

Hayes, G.S., 1972, Average water content of snowpack in Maine: U.S. Geological Survey Hydrologic Investigations Atlas HA-452, scale 1:1,000,000.

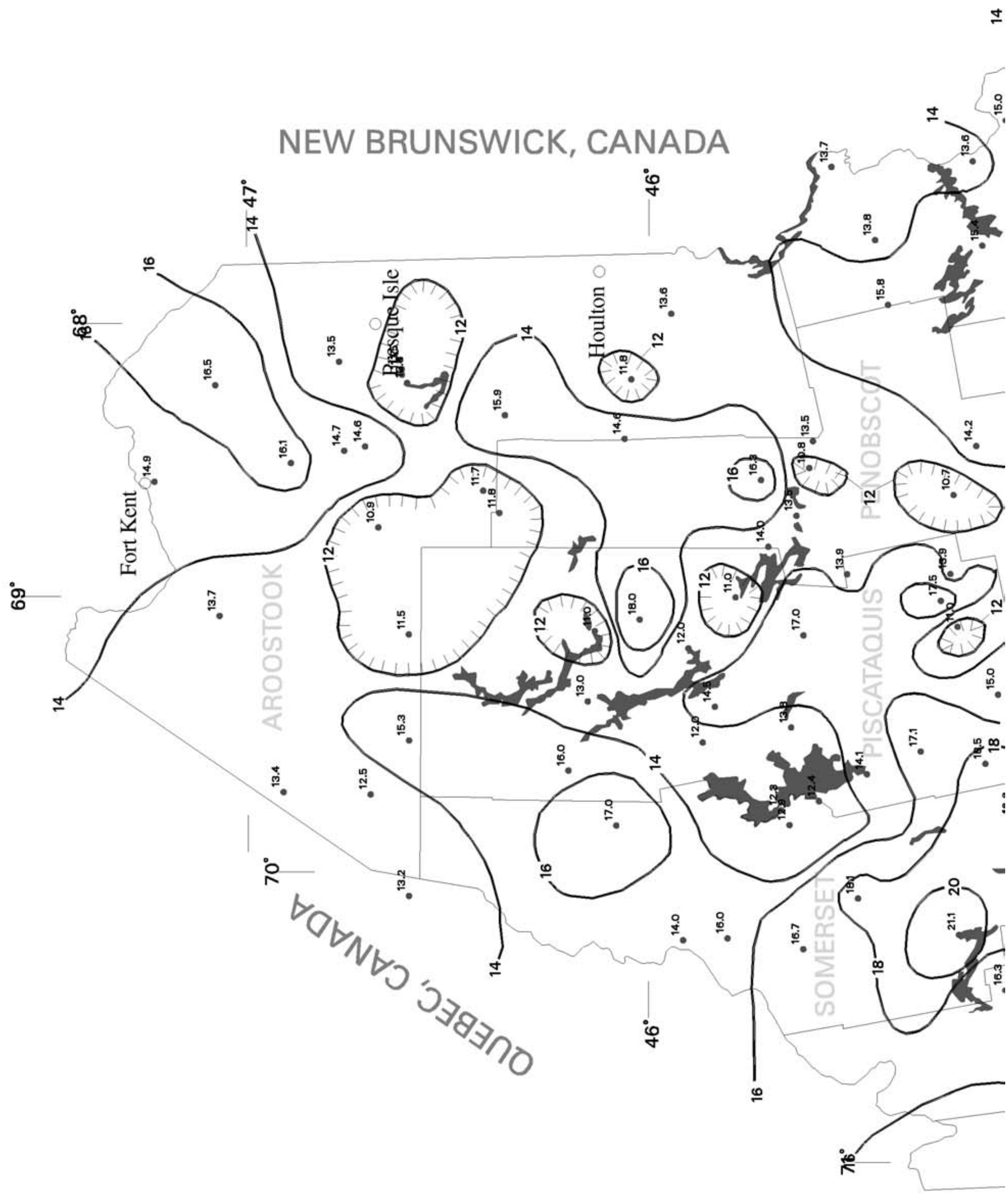
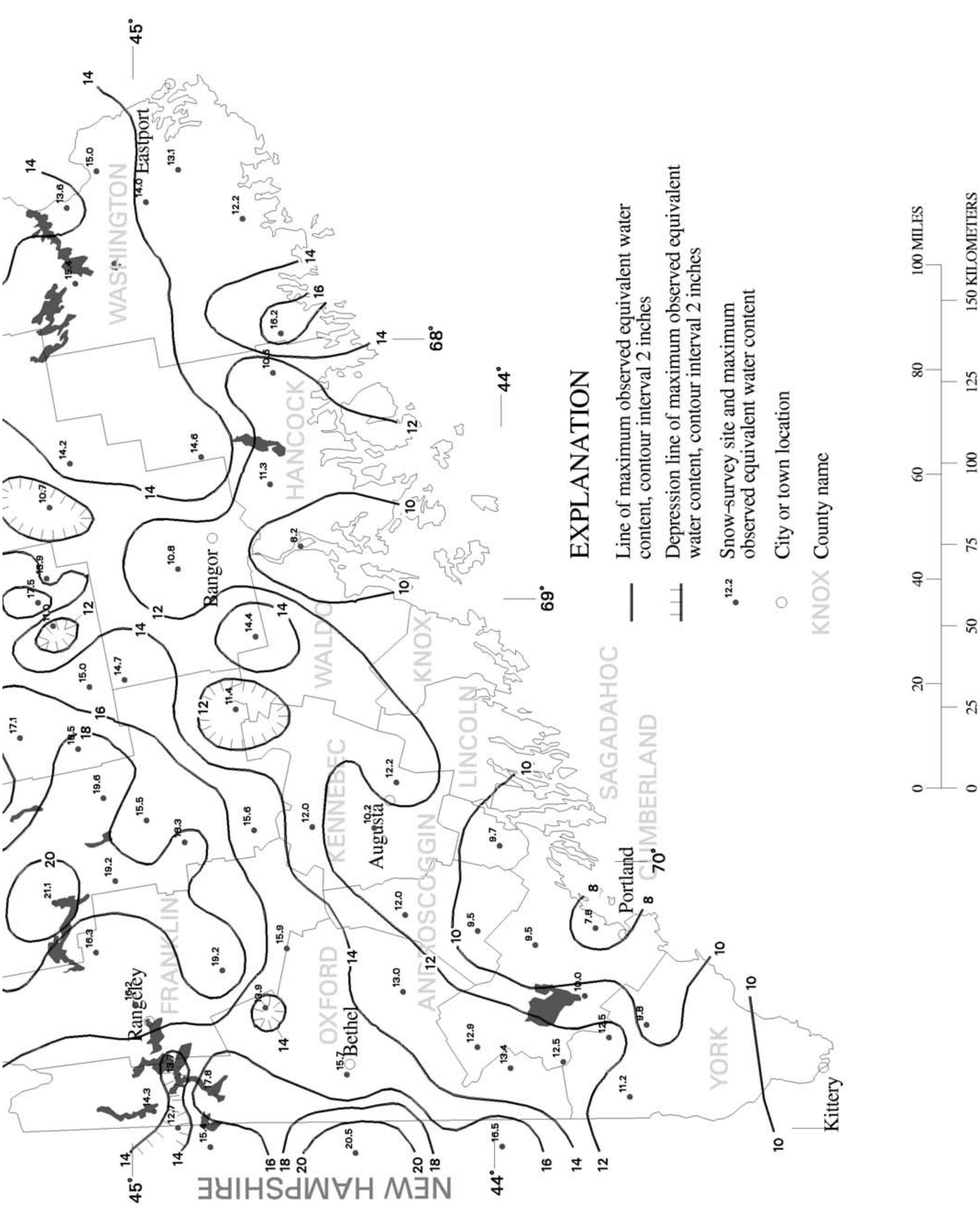


Figure 9. Maximum observed equivalent water content in snowpack in and near Maine.



EXPLANATION
Line of maximum observed equivalent water content, contour interval 2 inches
Depression line of maximum observed equivalent water content, contour interval 2 inches
Snow-survey site and maximum observed equivalent water content
City or town location
KNOX County name
WASHINGTON
HANCOCK
WALDO
KNOX
LINCOLN
SAGADAHOC
CUMBERLAND
KENNEBEC
ANDROSCOGGIN
OXFORD
FRANKLIN
YORK
NEW HAMPSHIRE
Eastport
Bangor
Augusta
Portland
Rangeley
Bethel
Kittery
45°
44°
68°
69°
70°
100 MILES
150 KILOMETERS

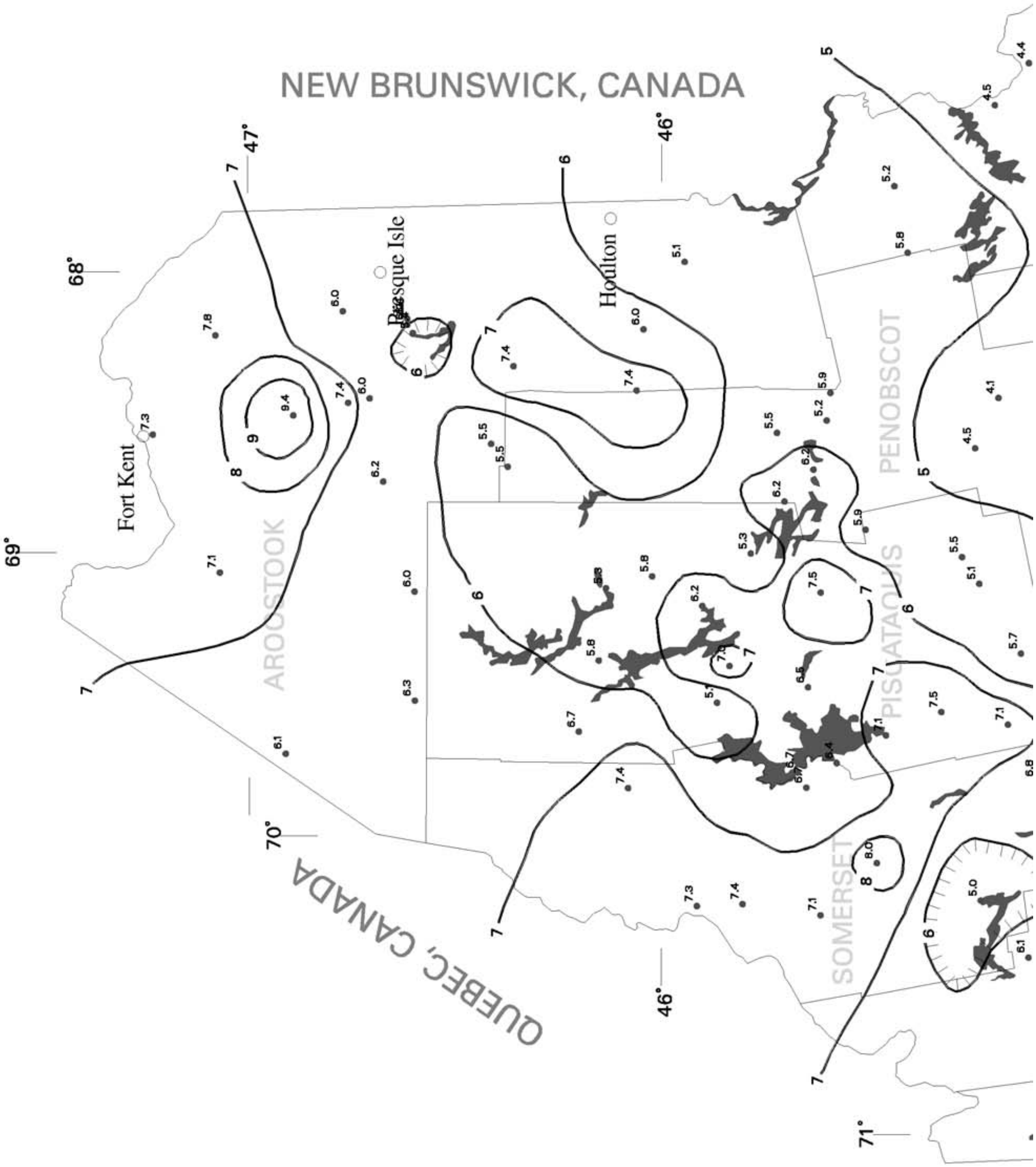
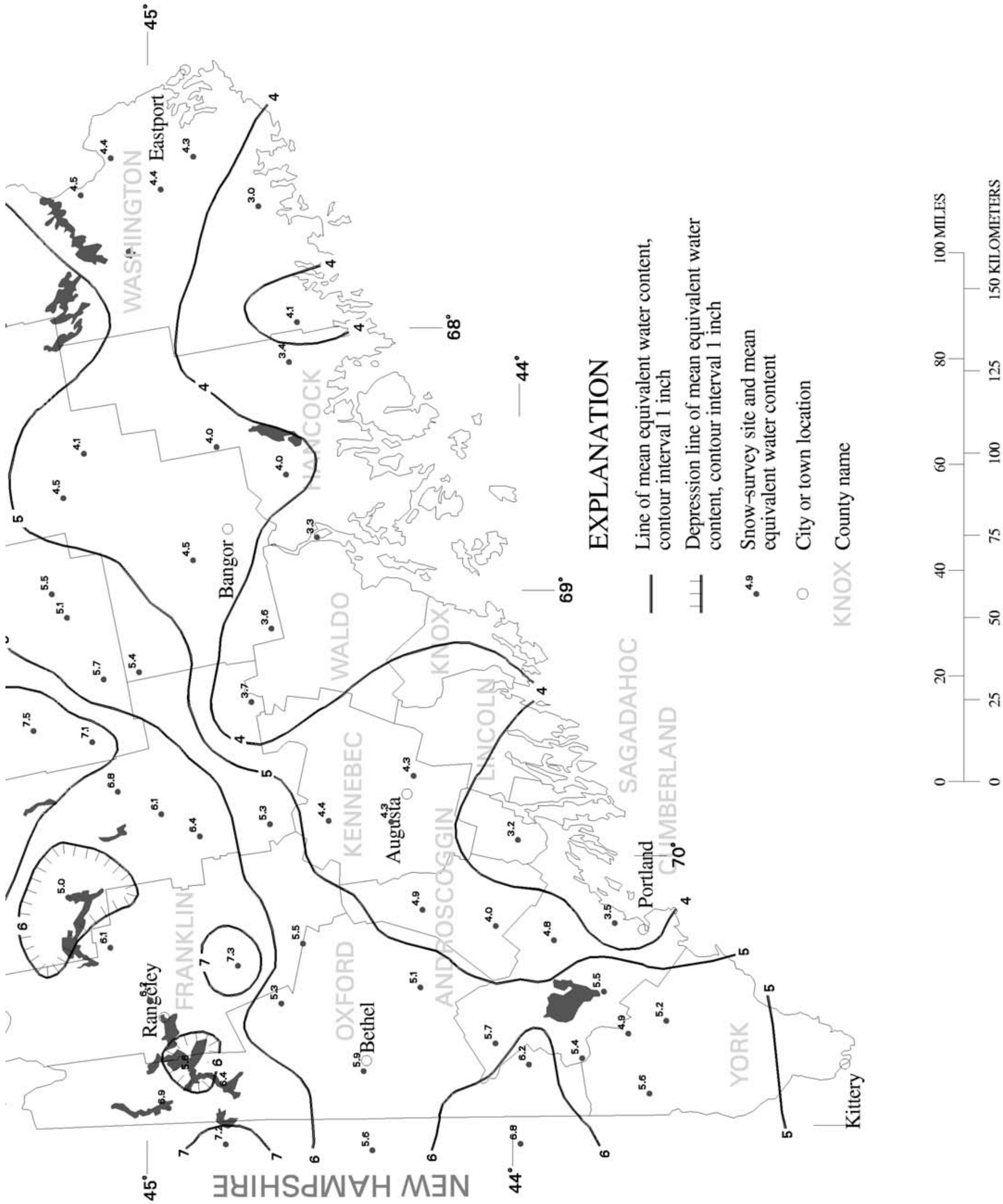


Figure 10. Mean equivalent water content in snowpack in and near Maine on or about March 1.



EXPLANATION
Line of mean equivalent water content, contour interval 1 inch
Depression line of mean equivalent water content, contour interval 1 inch
4.9 Snow-survey site and mean equivalent water content
City or town location
KNOX County name
0 20 40 60 80 100 MILES
0 25 50 75 100 125 150 KILOMETERS
45°
44°
68°
69°
70°
NEW HAMPSHIRE
WASHINGTON
HANCOCK
WALDO
KNOX
LINCOLN
SAGADAHOC
CUMBERLAND
KENNEBEC
ANDROSCOGGIN
OXFORD
FRANKLIN
YORK
Eastport
Bangor
Augusta
Portland
Rangeley
Bethel
Kittery

Table 1. Site name, location, altitude, years of record, maximum observed equivalent water content, and March 1 mean equivalent water content for 109 selected sites in and near Maine

[Letters or words in parentheses in the site name are part of the historical name]

Site name	Latitude		Longitude		Altitude (feet)	Years of record	Maximum observed equivalent water content (inches of water)	Mean equivalent water content on or about March 1 (inches of water)
	Degrees	Minutes	Degrees	Minutes				
ALLAGASH	47	5	69	4	623	62	13.7	7.1
AMHERST	44	50	68	27	650	70	14.6	4.0
ASHLAND	46	43	68	28	801	58	14.6	6.0
AUBURN	44	4	70	17	289	30	9.5	4.0
AUGUSTA	44	17	69	42	203	49	12.2	4.3
AZISCOHOS/AZISCOHOS DAM	44	57	70	60	1,568	91	14.3	6.9
BAILEYVILLE	45	12	67	28	200	50	13.6	4.5
BARING	45	7	67	20	200	29	15.0	4.4
BELGRADE	44	31	69	53	295	38	12.0	4.4
BETHEL	44	25	70	50	728	47	15.7	5.9
BRASSUA	45	39	69	49	1,066	71	12.9	6.7
BRIDGTON	44	3	70	43	489	42	12.9	5.7
BUCKSPORT	44	33	68	48	118	30	8.2	3.3
CARROL-KOSSUTH	45	25	67	58	581	45	15.8	5.8
CAUCOMGOMOC LAKE	46	12	69	37	1,089	45	16.0	6.7
CHASE CAMPS/POMKEAG (F)	46	23	68	42	794	21	11.8	5.5
CHERRYFIELD	44	36	67	58	253	24	16.2	4.1
CLAYTON LAKE	46	36	69	31	1,033	22	15.3	6.3
CONWAY	43	59	71	6	538	54	16.5	6.8
COOPER MOUNTAIN	44	58	67	27	505	41	14.0	4.4
CORNISH	43	49	70	46	453	49	12.5	5.4
CRAWFORD POND	45	37	69	8	1,299	43	17.0	7.5
DAAQUAM (CANADA)	46	36	70	5	1,207	21	13.2	not computed
DALLAS	45	0	70	35	1,499	47	16.2	6.2
DEAD RIVER	45	14	70	11	1,099	40	21.1	5.0
DEDHAM	44	38	68	33	351	36	11.3	4.0
DENMARK	43	58	70	48	594	26	13.4	6.2

Table 1. Site name, location, altitude, years of record, maximum observed equivalent water content, and March 1 mean equivalent water content for 109 selected sites in and near Maine—Continued

[Letters or words in parentheses in the site name are part of the historical name]

Site name	Latitude		Longitude		Altitude (feet)	Years of record	Maximum observed equivalent water content (inches of water)	Mean equivalent water content on or about March 1 (inches of water)
	Degrees	Minutes	Degrees	Minutes				
DEXTER	45	3	69	19	558	30	14.7	5.4
DIXFIELD	44	35	70	21	751	31	15.9	5.5
DIXMONT	44	41	69	9	643	23	14.4	3.6
DOVER-FOXCROFT (B)	45	8	69	21	581	55	15.0	5.7
DYER BROOK	46	3	68	14	682	35	11.8	6.0
ERROL/ERROL DAM	44	47	71	8	1,299	90	15.4	7.2
FALMOUTH	43	44	70	15	141	26	7.8	3.5
FORT KENT	47	14	68	35	594	65	14.9	7.3
FRANKLIN	44	38	68	7	249	42	10.6	3.4
FROST POND/RIPOGENOUS DAM	45	55	69	11	1,129	50	12.0	6.2
GORHAM, N.H.	44	23	71	8	860	51	20.5	5.6
GRAND LAKE STREAM	45	10	67	46	299	28	15.4	not computed
GRAY	43	54	70	20	315	28	9.5	4.8
GREENVILLE/GREENVILLE JUNCTION	45	28	69	38	1,178	66	14.1	7.1
GRINDSTONE	45	44	68	35	299	65	16.3	5.5
GUERETTE	47	5	68	14	843	53	16.5	7.8
HEDGEHOG MOUNTAIN/CHAPMAN A	46	37	68	12	607	21	11.7	6.2
HEDGEHOG MOUNTAIN/CHAPMAN B	46	37	68	11	699	21	11.5	6.4
HIGHLAND SCHOOL	45	4	70	6	1,001	21	19.2	not computed
HOLLIS CENTER	43	35	70	37	236	20	9.8	5.2
HOULTON (B)	45	57	67	60	604	46	13.6	5.1
HURD POND	45	48	69	0	630	37	11.0	5.3
JACKMAN/JACKMAN STATION	45	37	70	15	1,253	70	16.7	7.1
JONES POND	45	48	70	13	1,588	39	16.0	7.4
KENDUSKEAG	44	54	68	53	102	42	10.8	4.5
KINGSBURY	45	10	69	35	1,024	27	18.5	7.1
KNOWLES CORNER	46	22	68	21	889	48	15.9	7.4
KOKADJO	45	39	69	28	1,572	49	13.8	6.5
LOBSTER LAKE	45	52	69	31	997	40	12.0	5.1

Table 1. Site name, location, altitude, years of record, maximum observed equivalent water content, and March 1 mean equivalent water content for 109 selected sites in and near Maine—Continued

[Letters or words in parentheses in the site name are part of the historical name]

Site name	Latitude		Longitude		Altitude (feet)	Years of record	Maximum observed equivalent water content (inches of water)	Mean equivalent water content on or about March 1 (inches of water)
	Degrees	Minutes	Degrees	Minutes				
LOWELL	45	12	68	28	200	61	14.2	4.1
MACHIAS LAKE	46	41	68	45	965	24	10.9	6.2
MANCHESTER	44	21	69	53	358	32	10.2	4.3
MARION	44	53	67	20	194	25	13.1	4.3
MATTASEUNK	45	36	68	27	299	25	13.5	5.9
MAYFIELD (BINGHAM UPPER)	45	6	69	47	1,358	48	19.6	6.8
MEDFORD	45	16	68	55	299	26	13.9	not computed
MEDWAY	45	37	68	33	299	43	10.8	5.2
MERCER	44	41	69	54	354	56	15.6	5.3
MIDDLE DAM	44	47	70	55	1,450	90	17.8	6.4
MILLINOCKET	45	39	68	43	482	46	13.5	6.2
MILLINOCKET LAKE	45	43	68	49	610	38	14.0	6.2
MILO	45	17	69	1	397	62	17.5	5.5
MONSON	45	20	69	33	1,266	29	17.1	7.5
MOOSEHEAD	45	35	69	44	1,047	74	12.4	6.4
MUSQUACOOK	46	36	69	8	1,270	21	11.5	6.0
NEWFIELD	43	38	70	54	561	23	11.2	5.6
NINEMILE (B)	46	42	69	43	997	23	12.5	not computed
NORTH ANSON	44	52	69	57	397	58	18.3	6.4
PARLIN POND	45	29	70	4	1,709	68	18.1	8.0
PATTEN	46	4	68	26	899	35	14.6	7.4
PENOBSCOT LAKE	45	55	70	13	1,749	41	14.0	7.3
PITTSFIELD (B)	44	44	69	26	249	51	11.4	3.7
PORTAGE	46	46	68	28	735	48	14.7	7.4
RAGGED LAKE	45	51	69	24	1,132	52	14.5	7.0
ROCKWOOD	45	41	69	46	1,181	75	12.3	6.7
ROXBURY	44	39	70	35	705	51	13.9	5.3
RUSSELL POND/RUSSELL STREAM	46	5	69	49	1,516	50	17.0	7.4
SALMON POOL (E)	46	25	68	37	879	21	11.7	5.5

Table 1. Site name, location, altitude, years of record, maximum observed equivalent water content, and March 1 mean equivalent water content for 109 selected sites in and near Maine—Continued

[Letters or words in parentheses in the site name are part of the historical name]

Site name	Latitude		Longitude		Altitude (feet)	Years of record	Maximum observed equivalent water content (inches of water)	Mean equivalent water content on or about March 1 (inches of water)
	Degrees	Minutes	Degrees	Minutes				
SEBAGO	43	46	70	31	299	31	10.0	5.5
SEBEC	45	15	69	6	623	37	11.0	5.1
SEVEN ISLANDS (CHARLIE POND)	46	55	69	43	1,099	21	13.4	6.1
SOLON (BINGHAM)	44	59	69	52	449	32	15.5	6.1
SOURDNAHUNK LAKE	46	2	69	5	1,385	48	18.0	5.8
SOUTH PARIS	44	16	70	31	453	51	13.0	5.1
SOUTH LIMINGTON	43	41	70	40	299	26	12.5	4.9
SQUA PAN (D)	46	36	68	14	659	34	10.8	5.4
SQUA PAN (C)	46	36	68	14	659	34	12.4	5.7
STRATTON	45	7	70	23	1,201	51	16.3	6.1
TELOS	46	9	69	7	1,017	34	11.0	5.3
TOPSFIELD	45	26	67	44	745	29	13.8	5.2
TOPSHAM	44	0	69	57	200	27	9.7	3.2
TURNER	44	16	70	13	499	42	12.0	4.9
UMBAZOOKSUS LAKE	46	10	69	23	978	41	13.0	5.8
UPPER DAM	44	53	70	52	1,476	90	13.7	5.6
VANCEBORO	45	33	67	29	400	26	13.7	not computed
WASHBURN	46	47	68	9	499	62	13.5	6.0
WELD-PHILLIPS	44	46	70	27	1,198	34	19.2	7.3
WENTWORTH LOCATION, N.H.	44	53	71	4	1,352	19	12.7	not computed
WEST SEBOEIS/LONG A	45	31	68	55	597	45	13.9	5.9
WEST ENFIELD	45	15	68	39	151	34	10.7	4.5
WHITNEYVILLE	44	42	67	31	98	50	12.2	3.0
WINTERVILLE	46	54	68	31	702	49	16.1	9.4

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