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UTAH COOPERATIVE SNOW SURVEYS

and

WATER-SUPPLY FORECASTS

1941

by

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(In charge of Utah Cooperative Snow Surveys)

Utah Agricultural Experiment Station
Department of Irrigation & Drainage

Irrigation Division
of the
Soil Conservation Service

United States Weather Bureau

Utah State Engineer

United States Forest Service

United States Park Service

Cooperating

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WATER SUPPLY FORECAST FOR UTAH, 1941

George D. Clyde, Irrigation Engineer
Utah Agricultural Experiment Station

During the period from March 28 to April 1, snow surveys were completed on all of the Utah cooperative snow courses. The water content in snow storage at this time may be taken as indicative of the April-September and July-September runoff with, of course, later modification of estimates in accordance with subsequent precipitation and temperature conditions.

This report presents:

1. Forecasts of April-September and July-September runoff for the streams on whose drainage areas snow surveys have been conducted for a sufficient number of years to make it possible to forecast streamflow quantitatively.
2. A brief statement of conditions on other watersheds of the state, based on available reports.
3. A water forecast summary by drainage basins.
4. A comparison of runoff from principal Utah streams.
5. Storage in reservoirs as of April 1.
6. Results of annual snow surveys grouped according to stream basins.

Bear River Above Bear Lake and the Bear Lake Drainage.

In 1940 the April-September yield of the Bear River at Harer, Idaho was 39,500 acre feet and the July-September yield 13,200 acre feet, of this discharge only 6,610 acre feet for April-September and 1,550 acre feet for July-September flowed into Bear Lake. The yield of the streams tributary to Bear Lake for the same periods was 16,700 and 2,900 acre feet, respectively. The rise of the lake level in 1940 was from 5912.86 feet on April 1 to a maximum of 5912.95 feet on May 1, from which it fell to 5908.26 feet on October 1. By March 31, 1941, the elevation of the lake surface was 5908.68 feet which represents approximately 408,000 acre feet of available water.

This is the equivalent of more than a full year's irrigation supply for the lands served from this source. The water users having rights to Bear Lake storage will, therefore, not suffer a water shortage during 1941.

The snow surveys on the headwaters of the Bear River and near Bear Lake show a high cover only 92 percent of that in 1940. The snow cover at the Goodman Ranch about 20 miles above Evanston is only 29 percent of that in 1940. The snow cover and ground conditions indicate that the April-September yield of Bear River at Stewart Dam to Bear Lake in 1940 will probably not exceed 6,000 acre feet and the yield of the Bear Lake tributary streams for the same period will probably reach 17,000 acre feet. The level of Bear Lake will probably rise to 5,909.2 feet maximum and fall by the end of the irrigation season to 5,904.68. The April-September flow at Harer, Idaho, will probably not exceed 25,000 acre feet with 10,000 acre feet running off during the July-September period.

Logan River Drainage.

The April-September yield of the Logan River in 1939 was 77,000 acre feet with 24,500 acre feet running off during the July-September period. The river was discharging on September 1, 1940, 105 c. f. s. as compared to a predicted flow of 110 c. f. s. The maximum discharge occurred on May 14 in the amount of 620 c. f. s.

The high snow cover this year contains less water than in 1940 but the cover below 7,000 feet is slightly greater than in 1940. The heavy rains in September of 1940 filled the soil storage and the runoff yield during 1941 per unit of water in snow storage should be greater than in 1940. There will be slightly more spring high water in 1941 and the flood stage will reach a somewhat higher peak. The total April-September runoff will probably reach 79,000 acre feet with approximately 23,000 acre feet running off during the July-September period. The maximum discharge will probably not exceed 700 c. f. s. with a minimum September flow of 100 c. f. s.

Cub River Drainage.

The snow cover at Franklin Basin is representative of the conditions on the Cub River watershed. This year that cover is 71 percent of 1940 and 43 percent of the long time normal. The snow cover at low elevations is about the same as in 1940. The soil under the snow is wet but to date there has been little rise in streamflow. There will be little spring high water and the late season flow will be somewhat less than in 1940.

Maple, High, Summit, and Providence Creeks.

These drainages are all on the west side of the Bear River Range and are relatively short and steep. The low snow is entirely gone from these areas, and at 7,000 feet the cover is slightly less than it was in 1940. The late season flow from these streams can be expected to be similar to that in 1940, and there will be little spring high water.

Blacksmith Fork Drainage.

The snow cover on the Blacksmith Fork drainage this year is heavier than in 1940 particularly at the lower elevations. On the higher levels the cover is slightly less than in 1940. The soil is moist under the snow, partly the result of heavy September precipitation and partly the result of premature melting. In spite of this the discharge on April 1 was not much above the normal winter flow. The April-September yield of the Blacksmith Fork River in 1940 was 23,900 acre feet with 9,100 acre feet running off during July-September. The soil priming losses this year will be less than in 1940 and the April-September yield should be approximately 30,000 acre feet and the July-September yield 10,000 acre feet. The late season flow may be as low as 50 c. f. s. and the maximum spring flow may reach 250 c. f. s.

Little Bear River Drainage.

The Little Bear River has an average elevation lower than the Blacksmith Fork. The high cover is slightly less than in 1940, but the low cover is 10 to 15 percent higher. There will be little high water and the late season flow will be slightly less than in 1940. The Hyrum Reservoir will fill but the early season irrigators will divert all of the natural flow early so there will be little waste over the Hyrum spillway.

Ogden River Drainage.

The April-September yield of the Ogden River above Huntsville in 1940 was 28,000 acre feet of which 5,200 acre feet ran off during the July-September period. The snow cover at Geertsen Creek and Monte Cristo this year averages only 95 percent of that in 1940. The low snow is all gone. The South Fork of the Ogden above Huntsville will yield during April-September of 1941 not to exceed 28,000 acre feet of which probably 5,000 acre feet will run off during July-September. On April 1, of this year the Pine View Reservoir contained 6,620 acre feet out of a 41,000 acre foot capacity. Early season demands for irrigation will limit the water available for storage and unless abnormally high temperatures prevail during melting season the Pine View Reservoir will not fill to more than 30,000 acre feet this year.

Weber River Drainage.

The major portion of the water in Weber River comes from four main tributaries: Chalk Creek, Lost Creek, East Canyon, and the main Weber above Oakley. Snow courses are located on each of these tributaries. At 7,000 feet elevation on Chalk Creek there was no snow on April 1 this year. The snow cover on the higher areas in East Canyon is 116 percent of that in 1940. Moisture in the earth mantle is high. The East Canyon Reservoir contained on April 1, 12,650 out of a capacity of 28,000 acre feet. In 1940 only 7,000 acre feet were stored in the East Canyon Reservoir after April 1. In 1941 probably not more than 10,000 acre feet will be available for storage. The East Canyon Reservoir this year will not fill to more than 24,000 acre feet.

The Weber River above Oakley last year yielded 72,600 acre feet of which 11,700 acre feet ran off during the July-September period. The snow cover on the upper Weber River this year averages 93 percent of that in 1940. The low snow cover is heavier than in 1940 and the soil is quite moist under the snow. The Weber River will yield during the April-September period this year not to exceed 77,000 acre feet of which probably 12,000 acre feet will run off during the July-September period.

The Echo reservoir contained on April 1, 1941, a total of 18,140 acre feet. Its capacity is 74,000 acre feet. In 1940 the storage in the Echo reservoir increased from 19,000 on April 1 to 52,000 on June 1. The reservoir did not fill. Unless unusually high temperatures prevail through April the Echo Reservoir will probably not fill to more than 60,000 acre feet.

Salt Lake Watersheds.

These watersheds include City, Emigration, Parleys, Big Cottonwood and Little Cottonwood Creeks. The snow cover on these areas is represented by snow courses at Parley's Canyon Summit, Silver Lake, and Mill "D" South Fork. The average water content of the snow cover on these watersheds this year is 104 percent of that in 1940. The April-September yield of Big Cottonwood Creek in 1940 was 24,600 acre feet of which 3,600 acre feet ran off during the July-September period. This

year the yield per unit of snow cover will be greater than last year because of the moist soil under the snow. It is estimated that the April-September yield of Big Cottonwood Creek in 1940 will not exceed 25,000 acre feet of which 4,000 acre feet will probably run off during the July-September period.

Provo River and Utah Lake Drainage.

The April-September yield of the Provo River at Provo in 1940 was 87,400 acre feet of which 28,300 acre feet ran off during the July-September period. The snow cover on the headwaters of the Provo River, as indicated by the April 1 surveys, has a water content 106 percent of that in 1940. The low snow has disappeared but the ground is quite moist under the high cover. Unless abnormally high temperatures prevail during April and May there will be no unusually high spring runoff this year. The yield per unit of water in snow storage will be greater than in 1940. The probable April-September yield of the Provo River at the forks will not exceed 93,000 acre feet of which approximately 26,000 acre feet will run off during the July-September period.

There are at present 279,000 acre feet of water in Utah Lake. Unless unusually high melting temperatures prevail there will probably be less than 10,000 acre feet from the Provo River available for storage in Utah Lake this year. There is, however, sufficient water in Utah Lake now to provide a full irrigation water supply during the 1941 season. Rigid conservation should be practiced, however, so that a reserve may be built up in Utah Lake to protect the users against future dry years.

American Fork River Drainage.

The snow storage on the American Fork River watershed is represented by measurements at the Dutchman Ranger Station, South Fork Ranger Station, Camp Altamont, and Timpanogas Divide snow courses. The snow cover at the Dutchman Ranger Station is 128 percent of that in 1940, while at South Fork the snow cover contained 4.9 inches of water where in 1940 there were only a few patches of snow along the course. At Altamont the snow cover is 190 percent of that in 1940 and at the Timpanogas Divide 161 percent. The snow cover is heavy at low elevations compared to 1940. The soil under the snow was well primed by the September rains and a runoff 75 percent greater than that in 1940 can be expected.

Hobble, Payson, Santaquin Creeks and Spanish Fork River.

The runoff to be expected from these watersheds is indicated by the snow cover at the Hobble Creek Divide, East Portal and the Mammouth Ranger Station. The average water content at these three courses is the same as in 1940. The low snow cover has, however, entirely disappeared from this area but the ground under the high cover is fairly wet. There will be little, if any, excessive high spring flow from any of these streams. The April-September runoff and the discharge of each of these streams on the first of October should be slightly greater than that in 1940.

Strawberry Reservoir.

The snow cover on the Strawberry watershed above the Strawberry Reservoir is 104 percent of that in 1940. The storage in the Strawberry Reservoir on the first of April this year was only 33,200 acre feet as compared to 54,300 acre feet in 1940. Much of the snow cover in the valley area above the reservoir has melted but the yield from this watershed should be somewhat greater than 1940 owing to the ground moisture conditions. The increase in storage as a result of the spring run-off in 1940 was 16,000 acre feet. This year it should be about 17,000 acre feet. The maximum storage available this year will therefore be not more than 50,000 acre feet.

San Pitch Drainage.

The snow cover on the west side of the Wasatch Plateau which drains into the San Pitch River contains approximately 89 percent as much water as in 1940. The low snow cover in this area is deficient but the soil under the high cover is moist. Little high water from any of these streams can be expected unless unusually high melting temperatures prevail. It is estimated that the seasonal run-off from the tributaries to the San Pitch River will be approximately 90 percent of that in 1940.

Salina Creek Drainage.

The snow storage on the Salina Creek watershed as measured at the Gooseberry Ranger Station snow course is 115 percent of that in 1940. The low snow cover has melted with no rise in streamflow. The ground moisture conditions are better than in 1940 and a seasonal discharge 10 to 15 percent in excess of that in 1940 can be expected.

Clear Creek Drainage.

The snow storage on this watershed is almost identical with that in 1940. The earth mantle, however, contains more moisture and probably 10 percent more runoff can be expected.

Main Sevier River Drainage.

The water in snow storage on the Sevier River above Salina as indicated by snow courses at Widstoe-Escalante Summit, Panguitch Lake, Harris Flat Ranger Station, Duck Creek Ranger Station, Cedar Breaks and Fish Lake, is over 200 percent of that in 1940. There is an unusually heavy low snow cover and the ground under the high snow cover is wet. Unusually high temperatures during April and May will cause high spring floods and fill the reservoirs. Low temperatures will retard melting, and materially improve the natural flow rights. The natural flow from the Sevier River for the April-September period will probably exceed 200 percent of that in 1940.

The Otter Creek Reservoir contained on April 1, 1941, 24,780 acre feet of water out of a capacity of 52,600. The heavy snow cover on the East Fork of the Sevier from which the major portion of this storage water comes will insure the filling of this reservoir to capacity in 1941.

The Piute Reservoir contained on April 1, 1941, 51,740 acre feet out of a capacity of 90,000 as compared with 59,000 acre feet on the same date in 1940. Rapid melting during the first 20 days in April will add considerably to the Piute storage.

The Sevier Bridge Reservoir on April 1, 1941, contained 94,000 acre feet as compared with 120,800 acre feet last year. The capacity of the reservoir is 236,000 acre feet. Under normal melting conditions probably 50,000 acre feet of water will be available for storage in the Sevier Bridge Reservoir bringing the maximum storage for 1941 up to 144,000 acre feet.

The Gunnison Reservoir in west Millard County contained on April 1, 1941, 11,000 acre feet of water, the same as in 1940. This reservoir has a capacity of 20,000 acre feet and will probably fill by May 1.

In spite of the relatively heavy snow cover on the Sevier River watershed, little high water is to be expected unless abnormally high temperatures prevail. The late season flow will probably exceed 100 percent of that in 1940. There will be sufficient water in the storage reservoirs on the Sevier River to carry the storage rights throughout the season and the prospects for the primary users is much better than in 1940 and approaches that in 1937 and 1938.

Fillmore Drainage.

The snow cover on the Fillmore watersheds this year is only 73 percent of that in 1940. The low snow has disappeared but the ground is moist under the high cover. No high water can be expected this year on any of the streams draining the west side of the Pavant Range. The seasonal flow of these streams can be expected to be about 25 percent less than in 1940.

Coal Creek Drainage.

The high snow cover on the Coal Creek watershed this year contains over 200 percent more water than in 1940. There is a relatively heavy low snow cover. The earth mantle was well primed by the fall rains and this should increase the water yield from the snow cover. The April-September yield of Coal Creek in 1940 was 13,000 acre feet of which 3,000 acre feet ran off during the July-September period. It is estimated that the April-September yield in 1941 from Coal Creek will not exceed 25,000 acre feet of which 4,500 acre feet may be expected to run off during the July-September period.

Beaver River Drainage.

The snow cover on the Beaver River watershed this year is approximately 119 percent of that in 1940. The low snow cover is relatively heavy and the earth mantle well primed with moisture. It is estimated that the April-September yield of the Beaver River during 1941 will be approximately 35,700 acre feet as compared to 30,300 acre feet in 1940. Of this 35,700 acre feet approximately 6,000 acre feet can be expected to run off during the July-September period. In spite of the moist condition of the soil and the low snow cover no prolonged high water is to be expected. The maximum flow will probably not exceed 450 c. f. s. and the minimum may go as low as 30 c. f. s.

Virgin River Watershed.

The snow cover on the water-shed of the Virgin River this year is 223 percent of that in 1940 with a fairly heavy cover at 7,000 feet elevation. The soil under the snow is well primed as a result of the heavy fall rains. The main fork of the Virgin River can be expected to yield 195 percent of that in 1940, while the flow from the Santa Clara Creek will probably be as much as 170 percent of that in 1940. The yield of the Virgin River at Virgin for the April-September period will probably not exceed 120,000 acre feet of which approximately 25,000 may be expected to run off during the July-September period, Little spring melting has taken place and rapid rise in temperature may cause fairly high spring flood stages.

Salt Creek at Nephi

There are no snow courses on this watershed, but the Mammouth Ranger Station which is located about 15 miles to the east gives a fair index of the probable water supply. An estimate based on this snow course indicates that the runoff in 1941 will be approximately equal to that in 1940. There will, however, be no high spring flow unless unusual melting temperatures prevail during April and May.

Price River Drainage.

The Price River at Helper is affected by the releases from the Scofield Reservoir, as well as by the snow cover on the upper Price River watersheds. On April 1, 1941, the snow courses on the headwaters of Fish Creek showed a water content about equal to that in 1940. The low snow cover is somewhat heavier than in 1940. The storage in the Scofield Reservoir on April 1, 1941, was 5,000 acre feet as compared with 6,000 acre feet on the same day of 1940. The low cover this year, however, will more than compensate for this smaller storage, and the high cover should yield approximately the same water as in 1940. It is estimated that the maximum storage in the Scofield Reservoir will not exceed 27,000 acre feet in 1941. The discharge from the Scofield Reservoir during the summer of 1941 should equal that in 1940, and the yield of the Price River at Helper should, therefore, be indicated by the snow cover on the headwaters of the Price River and the Indian Canyon Summit. The snow cover on the headwaters of the Price River on April 1, 1941, was 96 percent of that on the same date in 1940, while at the Indian Canyon Summit it was 200 percent of that in 1940. It is estimated that the April-September yield of the Price River at Helper this year will not exceed 50,000 acre feet of which approximately 18,000 acre feet will run off during the July-September period.

Huntington Creek:

The discharge of Huntington Creek at Huntington this year will probably reach 50,000 acre feet for the April-September period and 11,000 acre feet during July-September.

Cottonwood Creek.

The discharge of Cottonwood Creek at Orangeville this year may reach 55,000 acre feet for the April-September period and as much as 8,000 acre feet during July-September.

Ashley Creek:

The April-September yield of Ashley Creek during 1940 was 38,300 acre feet

of which 9,300 acre feet ran off during the July-September period. The snow cover as measured at Lake Fork Mountain and King's Cabin indicates a potential water supply 228 percent of that in 1940. This potential water supply compares favorably with that in 1935 and 1938. It is estimated that the April-September yield of Ashley Creek in 1941 will not exceed 60,000 acre feet of which probably not more than 15,000 acre feet will run off during the July-September period.

Uinta River and Whiterocks Creek.

Water in snow storage on these w tersheds this year is approximately twice that in 1940. The April-September yield of Whiterocks Creek at Whiterocks for 1940 was 33,400 acre feet of which 11,600 acre feet ran off during the July-September period. In 1941 the yield for the same periods will probably not exceed 55,000 and 15,000 acre feet, respectively.

The yield of the Uinta River at Neola during the April-September period of 1940 was 48,300 a cre feet of which 22,300 acre feet ran off during the July-September period. In 1941 the yields for the same respective periods can not be expected to exceed 70,000 and 30,000 acre feet.

Lake Fork Drainage.

The snow cover on the high areas at the head of Lake Fork this year is 220 percent of that in 1940. The low snow cover is fairly heavy and the ground moist. There will be no high spring runoff but the seasonal yield will probably be twice that in 1940.

Duchesne River Drainage.

This stream heads near the west end of the Uinta Mountains. There are no snow courses directly on the area, but the Lost Lake snow course on the Provo River is fairly representative of the conditions on the headwaters of the Duchesne. The snow cover at Lost Lake this year is 96 percent of that in 1940. In 1941 the April-September yield will probably equal that in 1940, or 62,000 acre feet during the April-September period of which probably 16,000 acre feet will run off during the July-September period.

North Side of the Uinta Mountains.

The snow cover on the watersheds located on the north side of the Uinta Mountains is represented by snow measurements at the Hewinta, and Hole-in-the-Rock Ranger Stations and at the Beaver Meadows Reservoir. The Beaver Meadows is a new course and only two years record is available. The average cover at the Hole-in-the-Rock and Beaver Meadows is 125 percent of that in 1940. There will be no high spring flow and the seasonal yield will probably not exceed 125 percent of that in 1940.

Blue Mountain Area.

The snow cover in this area is more than twice that in 1940. The seasonal yield with a normal spring precipitation should be at least twice that in 1940.

La Sal Mountain Area.

The snow cover on the La Sal Mountain this year is 115 percent of that in

1940 and owing to the fall rains the runoff may be as much as 120 percent of that in 1940.

SUMMARY

It is seen from the foregoing analysis that the snow cover on the watersheds of Utah this year is extremely spotted. On a few areas it is as much as 200 percent of 1940 and approaches a long time average. On other areas it is quite similar to 1940 which in general represents about 50 percent of a long time average.

The watersheds on which shortages will be serious in 1941 are as follows:

1- Bear River (natural flow users) approximately 63 percent of 1940.
2- Cache Valley, Weber, Salt Lake, Utah Lake (except American Fork River) and Strawberry Reservoir areas will yield about the same as in 1940 for natural flow users. The storage users will have ample supplies.
3- San Pitch River Tributaries (90 percent of 1940)
4- Fillmore Areas (75 percent of 1940)
5- Price River Watershed (104 percent of 1940)
6- Huntington Creek Watershed (106 percent of 1940)
7- Duchesne River (100 percent of 1940)

Salina Creek and Clear Creek on the Sevier, Beaver River, the streams draining the North side of the Uinta Mountains and the La Sal Mountain area will yield probably 25 percent more water than in 1940.

The Sevier River above Marysvale, Coal Creek, Virgin River, Montezumia Creek and the Uinta Basin streams except the Duchesne will yield approximately 200 percent of that in 1940 and approach a long time average flow. Water shortages on these areas will not be serious.

The probable maximum storage in Utah that will be available for irrigation in 1941 is 1,171,500 acre feet. This is less than in 1940, but sufficient to carry all storage rights through the irrigation season.

Due to the absence of low snow on all the watersheds, unusually high water during the spring runoff period is not to be expected. However, high runoff for a few days is possible if a combination of temperature and spring precipitation develops which will melt the high snow at a rapid rate.

Water conservation should be practiced by all users. The use of storage water should be limited to the absolute needs in order that the hold-over may be built up for next year. All users should clean their canals immediately so as to enable them to take advantage of early spring flow where storage reservoirs are not available.

The following tables give a brief summary of the water supply forecasts, reservoir storage, and the snow cover data for 1941.

SUMMARY TABULATION
Water Supply Forecast for Utah, 1941.

Drainage Area	April-Sept. Forecast in Percent of 1940	April-Sept. Forecast in Percent of Long Time Normal	Est. Max. Storage available in 1940 A.F.
Bear River at Harer, Idaho	63	9	
Inflow to Bear Lake:			
From Bear River	90		441,300
From Tributary Stream	102		
Cache Valley Streams:			
Logan River	103	48	
Blacksmith Fk. River	125	41	
Other Streams	100		14,600
Weber Drainage:			
Ogden River	100	43	30,000
Weber at Oakley	106	52	84,000
Salt Lake Watersheds	102	55	
Utah Lake & Jordan River Drainage:			
Provo River	106	50	
American Fork River	175	90	
Other Streams	106	50	
Utah Lake			289,000
Strawberry Reservoir	104		50,000
Sevier River Drainage:			
San Pitch River	90		Small Lakes Full
Salina Creek	115		
Clear Creek	110		
Main Sevier	200	100	180,000
East Fork	200	100	52,600
Fillmore Area	75		
Beaver River Watershed	120	107	Small Lakes Full
Coal Creek Watershed	200	100	
Virgin River Watershed:			
Virgin River	200	100	
Santa Clair Creek	180	90	
Price River Watershed	104	50	27,000
Uinta Basin Streams:			
Ashley Creek	156	94	
Unita River	200	79	
Whiterocks Creek	200	79	
Lake Fork River	200	79	30,000
Duchesne River	100	54	
Huntington Creek	106	81	
Cottonwood Creek	224	76	
North Side of Uinta Mts.	125		
Montezuma Creek	200		
La Sal Mt. Area	120		

-- FORECAST SUMMARY --

Table I

NAME OF STREAM OR BASIN	Run-off in 1000's of Acre-Feet								Expected Run-off for 1941 in per cent of 1940	
	1941 *		1940		1939		1938			
	I	II	I	II	I	II	I	II	I	II
BEAR RIVER										
Bear River at Tarer, Idaho	25.0	10.0	39.5	13.2	149.6	25.2	295.6	55.0	63	77
Bear Lake Drainage	17.0		16.7	2.9	38.9	6.2	85.7	18.7	102	
CACHE VALLEY STREAMS										
Logan River	79.0	23.0	77.0	24.5	92.5	28.7	147.1	43.4	103	94
Blacksmith Fork River	30.0	10.0	23.9	9.1	33.7	11.9	59.4	18.6	125	110
Little Bear River									110	100
Miscellaneous Small Streams									100	90
WEBER RIVER										
South Fork of Ogden River	28.0	5.0	28.0	5.2	36.4	6.2	60.7	8.4	100	96
Weber River at Oakley	77.0	12.0	72.6	11.7	83.7	14.3	132.4	21.9	106	103
SALT LAKE CITY WATERSHEDS										
Big Cottonwood Creek	25.0	4.0	24.6	3.6	27.5	5.0	40.7	7.5	102	111
PROVO RIVER AND UTAH LAKE										
American Fork River									175	160
Provo River	93.0	26.0	37.4	28.3	110.2	32.9	180.8	49.6	106	92
Hobble Creek									110	105
Spanish Fork River									105	100
SEVIER RIVER										
San Pitch Tributaries									90	90
Salina Creek									115	110
Clear Creek									110	105
East Fork of Sevier									200	190
Sevier River at Kingston	25.0	12.0	18.1	9.7	29.6	13.5	70.9	10.4	138	124
INDEPENDENT STREAMS										
Fillmore Watersheds									75	70
Beaver River	35.7	6.0	30.3	5.1	16.6	4.4	36.0	7.7	118	118
Coal Creek near Cedar City	25.0	4.5	13.1	3.0	11.8	3.2	32.1	4.1	191	150
UINTAH BASIN STREAMS										
Duchesne River at Tabiona	62.0	16.0	62.3	14.4	74.7	15.0	124.9	25.4	100	111
Whiterocks River at Whiterocks	55.0	15.0	33.4	11.6	50.0	17.9	87.4	26.2	164	129
Ashley Creek at Vernal	60.0	15.0	38.3	9.3	45.1	12.5	66.4	19.2	156	161

--FORECAST SUMMARY--

Table I (Cont'd.)

NAME OF STREAM OF BASIN	Run-off in 1000's of Acre-Feet								Expected Run-off in 1941 in Per cent of 1940	
	1941*		1940		1939		1938			
	I	II	I	II	I	II	I	II	I	II
NORTH SIDE UINTAH MOUNTAINS									125	120
PRICE RIVER										
Price River	50.0	18.0	48.1	18.3	47.4	14.2	73.4	23.4	104	98
Huntington Creek	50.0	11.0	47.2	10.5	39.8	10.7	56.9	14.6	106	105
Cottonwood Creek	55.0	8.0	24.6	3.6	48.0	6.9	60.3	9.0	224	222
VIRGIN RIVER										
Virgin River	120.0	25.0	61.5	24.4	68.3	33.6	124.6	22.3	195	102
LA SAL MOUNTAINS										
Mill Creek									120	115
MONTICELLO AREA										
Montezuma Creek									200	190
Salt Creek at Nephi									100	100

I - April to September, inclusive
II - July to September, inclusive
* - Forecasted Flow

Table II

COMPARISON OF RUN-OFF FROM PRINCIPAL UTAH STREAMS
In 1000's of Acre-Feet

NAME OF STREAMS	April-September Run-off						July-September Run-off					
	Average	1937	1938	1939	1940	Forecast for 1941	Average	1937	1938	1939	1940	Forecast for 1941
Ashley Creek near Vernal	84.0	67.7	66.5	45.1	38.3	60.0	15.9	18.3	19.2	12.5	9.3	15.0
Bear River at Marer	286.0		295.6	148.6	39.5	25.0	59.7		55.0	25.2	13.2	10.0
Beaver River at Beaver	33.3	47.7	36.0	16.6	30.3	35.7	7.9	8.8	7.7	4.4	5.1	6.0
Big Cottonwood Creek near Salt Lake City	45.0	32.6	40.7	27.5	24.6	25.0	11.5	6.2	7.5	5.0	3.6	4.0
Blacksmith Fork at Hyrum	72.5	58.6	59.4	33.7	23.9	30.0	24.2	17.6	18.6	11.9	9.1	10.0
Coal Creek Near Cedar City		32.8	32.1	11.8	13.1	25.0		4.0	4.1	3.2	3.0	4.5
Cottonwood Creek at Orangeville	72.1	62.1	60.3	48.0	24.6	55.0	15.5	12.2	9.0	6.9	3.6	8.0
Duchesne River at Tabiona	114.3	122.7	124.9	74.7	62.3	62.0	28.0	26.4	25.4	15.0	14.4	16.0
Huntington Creek near Huntington	62.4	62.2	56.9	39.8	47.2	50.0	15.6	15.5	14.6	10.7	10.5	11.0
Logan River at Logan	164.7	119.4	147.1	92.5	77.0	79.0	54.0	39.7	43.4	28.7	24.5	23.0
Ogden River, S. Fork near Huntsville	64.7	62.9	60.7	36.4	28.0	28.0	8.6	8.1	8.4	6.2	5.2	5.0
Price River near Helper	85.2	105.4	73.4	47.4	48.1	50.0	16.7	27.6	23.4	14.2	18.3	18.0
Provo River at Provo	185.9	178.2	180.8	110.2	87.4	93.0	50.1	47.6	49.6	32.9	28.3	26.0
Sevier River near Kingston	57.6	87.6	70.9	29.6	18.1		15.5	14.2	10.4	13.5	9.7	
Uinta River near Neola	89.4	115.3	131.1	77.9	58.3	70.0	38.4	52.3	48.1	33.3	22.3	30.0
Virgin River at Virgin	95.8	148.4	124.6	68.3	61.5	120.0	31.0	26.0	22.3	33.6	24.4	25.0
Weber River at Oakley	148.7	107.8	132.4	83.7	72.6	77.0	30.5	17.6	21.9	14.3	11.7	12.0
Whiterocks River near Whiterocks	52.7	82.3	87.4	50.0	33.4	55.0	19.1	24.8	26.2	17.9	11.6	15.0

AVAILABLE STORAGE IN PRINCIPAL RESERVOIRS

ACRE-FEET - APRIL 1

Table 3

Reservoir	Maximum Capacity	Content on April 1, in Acre-feet						Per Cent Filled in 1941
		1936	1937	1938	1939	1940	1941	
Bear Lake	1,420,000	71,000	396,750	582,700	794,000	678,000	406,500	28
Utah Lake	830,000	141,000	303,000	392,900	463,000	372,000	279,000	34
Echo Reservoir	74,000	15,400	49,000	55,470	37,150	19,000	18,140	25
East Canyon	28,000	17,400	20,000	10,640	19,700	21,000	12,650	45
Strawberry	278,000	15,100	61,500	81,580	38,180	54,280	33,200	12
Scofield	30,000	12,000	15,750	8,000	15,500	6,000	5,000	17
Rocky Ford	25,070	10,266	20,000	19,600	18,600	10,130	12,300	49
Sevier Bridge	236,000	41,680	67,600	89,500	150,000	122,820	94,000	40
Piute	90,000	39290	45,500	78,000	67,000	59,000	51,740	57
Otter Creek	52,600	17050	22,700	40,000	44,800	30,400	24,780	47
Gunnison	20,000	3500	20,000	18,500	16,500	11,000	11,000	55
Hyrum	14,600		9,721	10,430	9,950	13,200	10,000	68
Pine View	41,000		1,500	26,100	10,650	17,955	6,620	16

Table IV

UTAH COOPERATIVE SNOW SURVEYS - 1941
(Data for all Snow Courses)

SNOW COURSES BY DRAINAGE AREAS	Course No.	Elevation in Feet	Date of Survey	Depth of Snow in Inches	Water Content of Snow in Inches	Density in Per cent	Corresponding Water Content 1938	1939	1940	Normal Water Content of Snow at April in Inches	Water Content of Snow on Date of Survey in % of Normal	Corresponding Per cent Last Year	Moisture Condition Under Snow
CACHE VALLEY STREAMS													
Franklin Basin (Idaho)	1	8200	3/29/41	45.3	15.4	34.0	24.8	20.4	21.8	35.5	43.4	61.5	Moist
Tony Grove Lake	2	8600	3/29/41	55.8	21.7	38.9	36.5	25.2	27.0	45.1	48.0	59.3	Wet
Tony Grove Ranger Sta.	3	6250	3/29/41	12.4	4.6	38.1	11.4	5.5	2.0	11.3	40.7	17.5	Wet
Spring Hollow No. 3	4	7000	3/29/41	24.5	9.8	40.0	14.5	8.5	8.1	19.0	51.5	42.6	Wet
Spring Hollow No. 4	5	8000	3/29/41	56.9	18.4	32.4	21.9	19.4	20.5	32.7	56.3	64.7	Moist
Mount Logan	6	9000	3/29/41	54.3	19.4	35.7	27.5	20.8	23.5	39.1	49.6	60.0	Wet
Smithfield Spring	7	7000	4/4/41	43.2	17.1	39.4	23.1	17.8	20.6				
Garden City Summit	9	8200	3/26/41	38.7	12.8	33.1	20.4	16.7	12.6	24.4	52.5	51.6	Wet
Blake Ranger Station	12-A	8000	3/30/41	37.5	11.6	30.9	23.6	11.5	10.7	--	--	--	
BEAR RIVER													
Garden City Summit	9	8200	3/26/41	38.7	12.8	33.1	20.4	16.7	12.6	24.4	52.5	51.6	Wet
Headwaters of Bear R.	10	8600	3/27/41	23.5	5.6	23.8	7.9	9.6	7.2	--	--	--	
Goodman Ranch	10-A	7900	3/26/41	6.4	1.6	25.0	5.9	--	5.5				
Monte Cristo Ran. Sta.	12	9000	3/29/41	48.2	16.4	34.0	30.7	20.3	17.0	20.4	80.4	82.5	Moist
OGDEN RIVER													
Huntsville-Wheeler Div.	11-A	5775	No	Report			4.0	3.6	N.S.	11.1		0.0	
Monte Cristo Ran. Sta.	12	9000	3/29/41	48.2	16.4	34.0	30.7	20.3	17.0	20.4	80.4	82.5	
Blake Ranger Station	12-A	8000	3/30/41	37.5	11.6	30.9	23.6	11.5	10.7				
Geertsen Creek	12-B	8200	3/31/41	44.0	16.7	37.9	17.2	14.9	17.9	--			Wet
WEBER RIVER													
Parley's Canyon Summit	15	7500	3/29/41	45.4	16.8	37.0	17.2	14.6	14.4	21.4	78.4	67.3	
Beaver Creek Ran. Sta.	24	7500	3/31-41	11.8	4.9	41.5	8.5	4.6	3.3	10.5	46.6	31.4	
Washington Long Lake	27	10300	3/29/41	59.1	19.8	33.5	30.6	24.4	23.6	43.1	45.9	54.8	
Airway Beacon-Chalk Cr.	29	7000		No	Snow		3.1	N.S.	N.S.	--			
Smith and Morehouse	30	7600	3/27/41	26.7	9.5	35.6	14.1	9.9	10.1	14.9	63.7	67.8	

Table IV (Cont'd.)

UTAH COOPERATIVE SNOW SURVEYS - 1941
(Data for all Snow Courses)

SNOW COURSES BY DRAINAGE AREAS		Elevation in Feet	Date of Survey	Depth of Snow in Inches	Water Content of Snow in Inches	Density in Per Cent	Corresponding Water Content 1938	1939	1940	Normal Water Content of Snow on Apr. 1 in inches	Water Content of Snow on Date of Survey in % of Normal	Corresponding per cent Last Year	Moisture Condition Under Snow
WEBER RIVER (cont.)													
Redden Mine (Upper)	31	9000	3/28/41	41.8	15.6	37.3	21.4	17.7	15.9	24.4	62.7	62.7	
Redden Mine (Lower)	31-A	8500	3/28/41	41.6	15.0	36.0	21.7	16.5	14.8				
SALT LAKE WATERSHEDS													
Parrish Creek Summit	13	8000	3/31/41	62.0	25.5	41.0	24.5	17.8	24.0				
Barnard Creek	13-A	8000	3/31/41	72.7	28.0	38.6	24.8	21.0	26.1				
Lamb's Canyon	14	6600	3/27/41	41.5	14.6	35.2	16.0	10.0	11.5				
Parley's Canyon Summit	15	7500	3/29/41	45.4	16.8	37.0	17.2	14.6	14.4	21.4	78.4	67.3	
Silver Lake	16	8725	3/28/41	59.1	19.9	33.7	26.7	20.5	18.4				Wet
Mill D South Fork	16-A	7400	3/29/41	45.6	15.7	34.4	18.8	17.3	17.3				
South Willow Creek	66	8000	3/29/41	53.0	19.2	36.2			13.2				
PROVO RIVER & UTAH L.K.													
Dutchman Ranger Station	17	7500	3/28/41	44.7	18.1	40.5	18.1	14.1	11.0	26.5	68.3	41.5	
Timpanogos Cave Camp	18	5500		No	Snow		N.S.	N.S.	N.S.				
South Fork Ranger Sta.	19	6100	3/28/41	10.5	4.9	46.6	Patchy	N.S.	N.S.				
Camp Altamont	20	7300	3/29/41	39.0	16.0	41.0	19.8	10.1	8.4				
Timpanogos Loop Road Div.	21	8200	3/29/41	52.7	21.5	40.8	26.5	15.8	13.3				
Aspen Grove	21-A	6900	3/29/41	40.3	17.8	44.1	17.0	10.7	7.5				
Y.L.M.I.A. Site	21-B	6000	3/29/41	24.3	11.5	47.3	7.2	5.3	Patchy				
Hobble Creek Summit	22	7300	3/27/41	31.2	10.2	32.8	11.7	7.6	10.3				Wet
Daniels-Strawberry Sum.	23	8000	3/29/41	34.0	11.1	32.6	15.9	10.2	10.3	21.5	51.6	48.0	
Beaver Creek Ranger Sta.	24	7500	3/31/41	11.8	4.9	41.5	8.5	4.6	3.3	10.5	46.6	31.4	
Soapstone Ranger Sta.	25	7800	3/30/41	25.4	8.7	34.2	12.0	7.3	8.0	15.2	57.1	52.6	
Trial Lake	26	9800	3/29/41	55.9	18.5	33.1	27.9	21.3	19.9	36.3	51.0	54.9	
Washington Long Lake	27	10300	3/29/41	59.1	19.8	33.5	30.6	24.4	23.6	43.1	45.9	54.8	
Lost Lake	28	9900	3/29/41	51.4	17.7	34.5	24.8	19.6	18.4	33.8	52.4	54.5	
STRAWBERRY RESERVOIR													
Daniels-Strawberry Sum.	23	8000	3/29/41	34.0	11.1	32.6	15.9	10.2	10.3	21.5	51.6	48.0	

Table IV (Cont'd.)

UTAH COOPERATIVE SNOW SURVEYS - 1941
(Data for all Snow Courses)

SNOW COURSES BY DRAINAGE AREAS	Course No.	Elevation in Feet	Date of Survey	Depth of Snow in Inches	Water Content of Snow in Inches	Density in Per cent	Corresponding Water Content 1938	1939	1940	Normal Water Content of Snow on April 1 in Inches	Water Content of Snow on Date of Survey in % of Normal	Corresponding Per cent Last Year	Moisture Condition Under Snow
STRAWBERRY RES. (Cont)													
East Portal	33	7560	3/30/41	34.0	10.3	30.3	12.0	8.8	10.0				
East Portal-Strawberry Divide	33-A	8000	3/30/41	55.4	16.9	30.5	19.4	17.8	17.4				
NORTH SIDE UINTAH MT													
Hewinta Ranger Station	34	9500		No	Report		7.1	6.3	---				
Hole-in-the-Rock	35	9150	3/26/41	21.6	5.0	23.1	7.9	5.6	3.8				Wet
Beaver Meadows	67	8500	3/30/41	26.7	7.3	27.3			6.1				
SOUTH SIDE UINTAH MT													
Lake Fork Mountain	36	10500	3/29/41	40.5	9.1	22.5	9.5	5.1	4.1				
Paradise Park	37	10500	3/28/41	39.9	9.6	24.0	12.3	7.3	3.8				
Mosby Mountain No. 1	38	9700	3/27/41	36.5	9.9	27.1	10.7	6.1	5.1				
Mosby Mountain No. 2	38-A	9500	3/27/41	42.1	8.2	19.4	12.3	6.6	5.8				
King's Cabin No. 1	39	8800	3/28/41	33.3	8.9	26.7	11.7	6.7	4.3	12.6	70.6	30.1	
King's Cabin No. 2	39-A	8600	3/28/41	31.9	8.9	27.9	10.4	6.4	3.3				
Indian Canyon	40	9100	3/28/41	35.3	8.7	24.6	12.4	5.4	4.2				
PRICE RIVER													
Indian Canyon	40	9100	3/28/41	35.3	8.7	24.6	12.4	5.4	4.2				
Gooseberry Reservoir	41	8700	3/30/41	55.2	20.3	36.8	20.5	16.0	20.6	28.3	71.8	73.0	
Mammoth Ranger Station	42	8800	3/30/41	60.3	21.7	36.0	22.4	16.8	21.0	29.0	74.9	72.5	
Staley Ranch	42-A	7600	4/3/41	14.5	3.9	27.0	7.3	N.S.	3.2				
Dry Valley Divide	42-B	7800	4/3/41	25.8	7.3	28.0	12.3	N.S.	8.2				
Clear Creek	42-C	8150	4/3/41	22.4	7.7	34.0	9.4	N.S.	4.6				
Huntington Horseshoe	43	9800	3/31/41	74.4	26.9	36.2	26.1	21.8	28.1	31.8	84.5	88.5	
FILLMORE													
Pine Creek-Chalk Creek	49	8500	3/31/41	31.1	11.2	36.0	15.7	10.6	15.3				
HUNTINGTON, COTTONWOOD AND FERRON CREEKS													
Huntington Horseshoe	43	9800	3/31/41	74.4	26.9	36.2	26.1	21.8	28.1	31.8	84.5	88.5	

UTAH COOPERATIVE SNOW SURVEYS - 1941

(Data for all Snow Courses)

Table IV Cont'd.

SNOW COURSES BY DRAINAGE AREAS	Course No.	Elevation in Feet	Date of Survey	Depth of Snow in Inches	Water Content of Snow in Inches	Density in Per cent	Corresponding Water Content 1938	1939	1940	Normal Water Content of Snow on April 1 in Inches	Water Content of Snow on Date of Survey in % of Normal	Corresponding Per cent Last Year	Moisture Condition Under Snow
HUNTINGTON, COTTONWOOD & FERRON CRK., (cont.)													
G.B.E.S. Alpine	47	10240	3/27/41	61.6	22.4	36.3	20.8	20.5	24.6				
Seeley Cr. R.S. No. 1	48	10000	3/28/41	62.4	21.6	34.7	20.7	20.0	24.0				
Seeley Cr. R.S. No. 2	48-A	10000	3/27/41	53.6	18.1	33.8	15.9	12.8	19.4	22.5	89.9	98.3	
SAN PITCH RIVER													
Mammoth Ranger Station	42	8800	3/30/41	60.3	21.7	36.0	22.4	16.8	21.0	29.0	74.9	72.5	
G.B.E.S. Oaks Ran. Sta.	44	7550	3/28/41	19.4	5.9	30.4	8.6	4.2	9.1				Wet
G.B.E.S. Headquarters	45	8700	3/28/41	45.8	16.1	35.2	17.8	15.3	20.7				Wet
G.B.E.S. Meadows	46	10000	3/27/41	65.0	21.0	32.3	22.4	20.8	22.9				Wet
G.B.E.S. Alpine	47	10240	3/27/41	61.6	22.4	36.3	20.8	20.5	24.6				Moist
SEVIER RIVER													
Gooseberry Ranger Sta.	50	8400	3/29/41	37.2	11.2	30.1	10.2	10.3	9.7				
Fish Lake	51	8700	3/28/41	26.4	8.2	31.0	7.0	6.1	7.6				
Kimberly Mine (Lower)	52	8300	3/28/41	35.6	10.8	30.3	16.1	9.4	11.5	13.2	100.0	99.2	
Kimberly Mine (Upper)	52-A	8900	3/28/41	49.7	14.6	29.4	19.6	12.0	14.0				
Widstoe-Escalante Sum.	53	9500	3/29/41	36.6	13.3	36.4	11.1	7.4	4.5	11.6	114.8	38.8	
Bryce Canyon	54	8000	3/31/41	18.6	7.4	39.7	8.5	3.9	N.S.				
Panguitch Lake	55	8200	3/23/41	18.4	7.6	41.3	9.9	6.0	3.1	5.9	128.8	52.6	
Gravel Springs Junction	56	7500	3/26/41	22.0	8.1	36.8	8.8	N.S.	N.S.				
Harris Flat Ranger Sta.	57	7700	3/26/41	38.1	14.2	37.3	13.4	3.6	Patchy	12.4	114.5	0.0	
Duck Creek Spring	58	8560	3/27/41	53.1	22.8	35.9	20.1	10.1	7.0				
Cedar Breaks	59	10200	3/29/41	67.5	25.1	37.2	29.1	18.7	16.0				
BEAVER RIVER													
Merchants Valley	63	8200	3/29/41	46.1	16.2	35.1	14.6	6.1	12.5	11.5	141.0	108.5	
Otter Lake	63-A	9300	3/28/41	57.6	19.7	34.2	20.7	11.3	17.8				
Big Flat	63-B	10000	3/28/41	72.0	23.6	32.8	23.4	13.9	20.7				

UTAH COOPERATIVE SNOW SURVEYS - 1941

(Data for all Snow Courses)

Table IV (Cont'd.)

SNOW COURSES BY DRAINAGE AREAS	Course No.	Elevation in Feet	Date of Survey	Depth of Snow in Inches	Water Content of Snow in Inches	Density in Per cent	Corresponding Water Content 1938	1939	1940	Normal Water Content of Snow on April 1 in Inches	Water Content of Snow on Date of Survey in % of Normal	Corresponding Per cent Last Year	Moisture Condition Under Snow
COAL CREEK													
Cedar Breaks	59	10200	3/29/41	67.5	25.1	37.2	29.1	18.7	16.0				
Co-op Flat	60	9500	3/27/41	57.4	21.8	38.0	24.3	13.1	10.9	19.0	114.8	57.4	
Webster Flat	61	9200	3/26/41	59.8	23.0	38.5	27.6	14.0	11.0	18.6	123.6	59.1	
VIRGIN RIVER													
Gravel Springs Junct.	56	7500	3/26/41	22.0	8.1	36.8	8.8	N.S.	N.S.				
Harris Flat Ranger Sta.	57	7700	3/26/41	38.1	14.2	37.3	13.4	3.6	Patchy	12.4	114.5	0.0	
Duck Creek Ranger Sta.	58	8560	3/27/41	53.1	22.8	35.9	20.1	10.1	7.				
Cedar Breaks	59	10200	3/29/41	67.5	25.1	37.2	29.1	18.7	16.0				
Co-op Flat	60	9500	3/27/41	57.4	21.8	38.0	24.3	13.1	10.9	19.0	114.8	57.4	
Webster Flat	61	9200	3/26/41	59.8	23.0	38.5	27.6	14.0	11.0	18.6	123.6	59.1	
SANTA CLARA RIVER													
Pine Valley	62	9150	3/28/41	80.7	27.6	33.8	23.8	14.1	16.1				Wet
LA SAL & BLUE MT.													
La Sal Mountain	64	8500	3/31/41	35.1	10.9	31.0	7.8	6.8	9.3				
Buckboard Flat	65	9000	3/29/41	48.7	16.3	33.5	14.4	13.8	7.5				