"Welcome Shelter Near Trail's End"

FEDERAL-STATE · COOPERATIVE SNOW SURVEYS AND IRRIGATION WATER FORECASTS

for

UTAH

APRIL 1, 1947

by

Division of Irrigation, Soil Conservation Service
United States Department of Agriculture

and

Utah Agricultural Experiment Station

in cooperation with

U. S. Forest Service
U. S. Geological Survey
U. S. National Park Service
State Engineer of Utah

State and Local Irrigation Organizations

FEDERAL-STATE COOPERATIVE

SNOW SURVEYS AND IRRIGATION WATER FORECASTS

FOR

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Report Prepared

by

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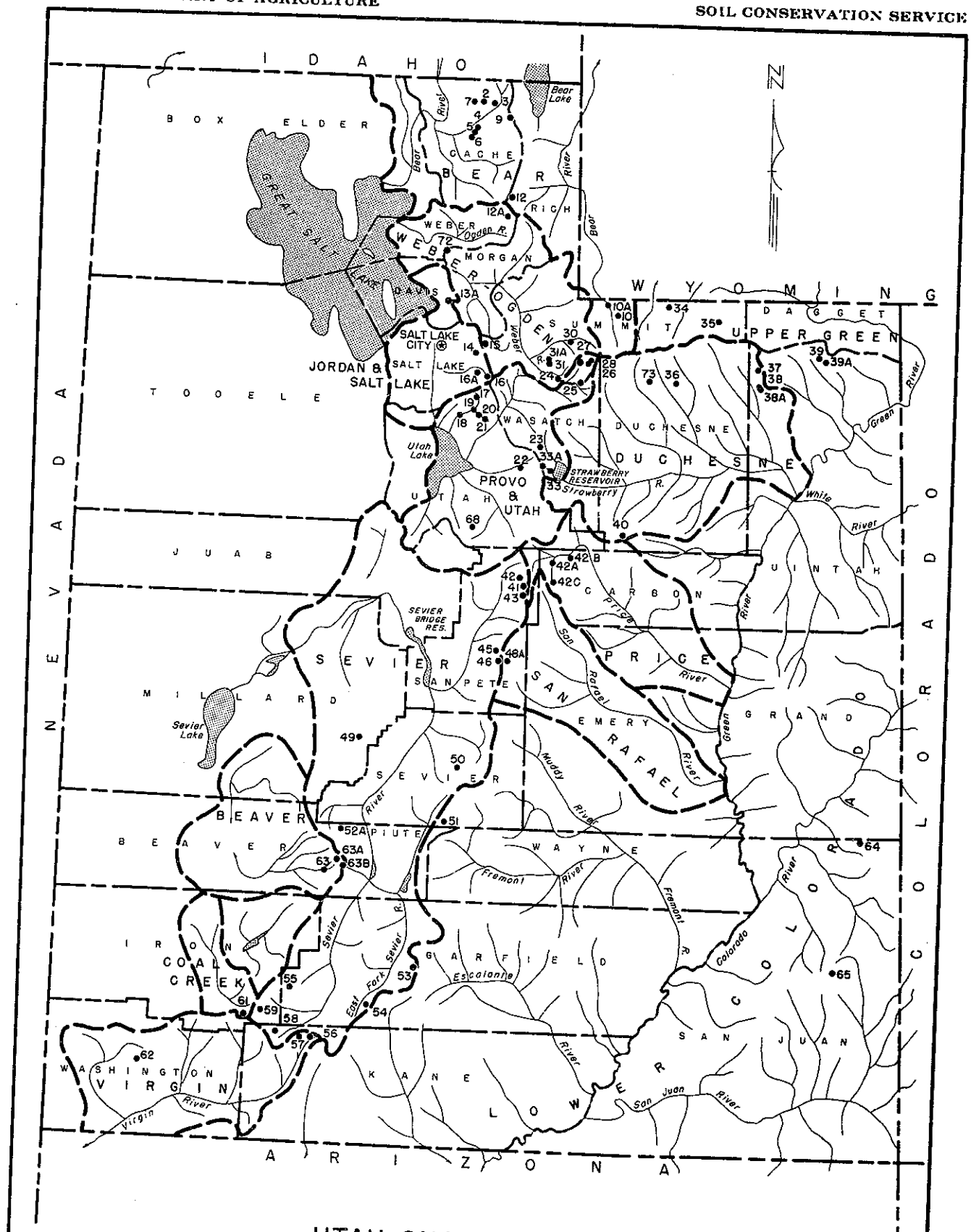

UTAH SNOW COURSES

FEBRUARY, 1947

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SCALE IN MILES

7-L-10712

WATER SUPPLY FORECAST FOR UTAH, 1947

Considerable variation is shown in water supply prospects for the state during 1947. In general supplies are better than a year ago. Slight deficiencies will occur in some areas—notably on the Price River where water supply is expected to be about 70% of the 10-year average. Reservoir storage is excellent with the exception of the Scofield Reservoir where there is little holdover storage and a deficient water supply in prospect.

SUMMARY OF WATER OUTLOOK FOR 1947

As the irrigation season begins water prospects on the Bear River above Harer stand at about 81% of the average of the past ten years. Cache Valley streams will yield 85-95% of the ten-year average with runoff on all of the Bear River system holding up well for a good late-season supply. Flood waters will be at a low level over all of the system.

On the Weber-Ogden Rivers water supplies will vary from 110% on the South Fork of Ogden River to 93% of the 10-year average on the upper Weber River. Storage prospects are good on this system and all reservoirs should be at or near capacity before heavy demand occurs.

Streams draining into the Jordan River and Great Salt Lake will yield a runoff of 93% of the average and only slightly different from 1946.

The Provo River and other Utah Lake streams will yield slightly above the average of the past ten years with the exception of the low-elevation watersheds south of Provo.

Prospects of water supply on the Sevier River are considerably greater than last year and within 10% of the average of the past ten years. Beaver River should yield about 82% of average with Coal Creek about equalling the average figure. Late season supplies in all of this area should be good.

In the Uinta Basin all streams have excellent potential supplies ranging from normal to 30% above. Streams on the north side of the Uinta Mountains will be about equal to average and slightly better than 1946.

The darkest spot in the water supply picture is the Price River where the supplies are expected to be 70% of average with little holdover storage in the Scofield Reservoir.

The San Rafael tributaries of Huntington and Cottonwood Creeks will yield better than last year but only 80-90% of the 10-year average.

The Virgin River will have considerably more runoff than 1946 and should equal about 80 to 90% of average.

Moab and Monticello areas will have a somewhat better water supply than in 1946.

Table I

STREAMFLOW FORECASTS - APRIL 1, 1947

Basin & Stream	April-Sept. Streamflow in 1000's Acre Feet					July-Sept. Streamflow in 1000's Acre Feet				
		Measured Runoff					Measured Runoff			
	Forecast 1947	1946	1945	1944	10-Year Average 1936-45	Forecast 1947	1946	1945	1944	10-Year Average 1936-45
GREAT BASIN DRAINAGE										
Bear River System										
Bear River at Harer, Idaho	180.0	Not Avail.	210.9	278.5	223.5	45.0	Not Avail.	76.9	49.6	46.1
Blacksmith Fork River near Hyrum, Utah	40.0	68.5	48.3	35.3	46.0	15.0	23.9	18.6	14.0	14.7
Little Bear near Paradise, Utah	44.0	54.4	51.5	32.2	----	4.0	5.0	5.3	2.4	----
Logan River near Logan, Utah	110.0	168.5	123.0	96.9	117.6	34.0	48.0	48.8	34.1	37.7
Weber-Ogden Rivers										
South Fork of Ogden River near Huntsville	62.0	77.7	63.7	48.6	55.9	8.0	8.9	10.2	8.2	7.6
Weber River at Oakley	120.0	121.0	110.3	140.4	128.8	22.0	19.3	29.7	27.6	21.6
Jordan River & Salt Lake										
Big Cottonwood Creek near Salt Lake City	34.0	38.2	38.6	41.0	36.5	7.0	7.3	11.9	9.6	7.9

Table I - Page 2
Streamflow Forecasts - April 1, 1947

Basin & Stream	April-Sept. Streamflow in 1000's Acre Feet					July-Sept. Streamflow in 1000's Acre Feet				
		Measured Runoff					Measured Runoff			
	Forecast 1947	1946	1945	1944	10-Year Average 1936-45	Forecast 1947	1946	1945	1944	10-Year Average 1936-45
Provo River & Utah Lake										
American Fork River above Power Plant	35.0	32.3	41.1	34.3	33.5	9.0	6.1	13.4	9.2	8.2
Provo River below Forks**	150.0	140.0	163.8	159.3	146.8	35.0	33.1	52.0	40.4	41.8
Sevier River										
Sevier River at Hatch	70.0	32.0	60.6	77.5	----	25.0	10.3	19.1	19.9	----
Sevier River at Kingston	50.0	15.8	37.4	56.1	53.9	9.0	2.5	9.5	3.3	10.5
Beaver River										
Beaver River at Beaver	30.0	22.6	34.5	43.7	36.8	7.5	4.9	9.4	9.8	8.1
Coal Creek										
Coal Creek near Cedar City	23.0	8.4	20.4	24.0	23.0	3.9	2.2	3.9	3.0	3.7

* Corrected for storage and Weber Diversion

Table I - Page 3

Streamflow Forecasts - April 1, 1947

Basin & Stream	April-Sept. Streamflow in 1000's Acre Feet					July-Sept. Streamflow in 1000's Acre Feet				
		Measured Runoff					Measured Runoff			
	Forecast 1947	1946	1945	1944	10-Year Average 1936-45	Forecast 1947	1946	1945	1944	10-Year Average 1936-45
COLORADO RIVER BASIN										
Upper Green River										
Ashley Creek near Vernal	60.0	36.1	52.7	84.9	59.4	18.0	12.1	20.5	24.5	17.8
Duchesne River										
Duchesne River at Tabiona	110.0	101.9	106.0	121.9	111.2	25.0	17.8	30.3	26.1	24.5
Lakefork River below Moon Lake*	96.0	60.8	76.9	101.8	----	29.0	15.4	32.2	33.7	----
Uinta River near Neola	140.0	65.3	96.5	165.7	110.9	60.0	25.8	46.4	66.6	46.1
Whiterocks at Whiterocks	95.0	40.9	64.2	106.7	80.0	30.0	14.3	25.4	33.0	23.5
Strawberry At Duchesne	98.0	51.6	56.6	87.4	74.0	21.0	11.6	18.9	16.6	17.7
Price River										
Price River near Heiner*	50.0	45.8	58.0	86.1	72.5	3.0	2.4	7.2	6.8	9.2
San Rafael River										
Cottonwood Creek at Orangeville, Utah	58.0	45.5	95.2	83.7	67.8	10.0	7.4	13.3	15.2	10.9
Huntington Creek at Huntington	50.0	46.5	53.7	77.4	60.8	13.0	12.4	17.6	18.5	15.2

* Corrected for storage

Table I - Page 4
Streamflow Forecasts - April 1, 1947

Basin & Stream	April-Sept. Streamflow in 1000's Acre Feet					July-Sept. Streamflow in 1000's Acre Feet				
		Measured Runoff					Measured Runoff			
	Forecast 1947	1946	1945	1944	10-Year Average 1936-45	Forecast 1947	1946	1945	1944	10-Year Average 1936-45
rgin River										
Santa Clara near Central	5.4	2.3	8.2	10.4	----	1.2	0.7	2.3	2.1	----
Virgin River near Virgin	80.0	36.0	69.6	87.0	96.1					

DETAILS OF WATER FORECAST BY DRAINAGES

Below are listed detailed discussions covering each area of the state where snow surveys are made. Discussions are grouped by drainage basins.

BEAR RIVER DRAINAGE

Bear River at Harer:

The majority of the snow cover on the Bear River water shed above Harer is slightly below the average, particularly at the lower elevation stations. At Goodman Ranch surveys show 3.2 inches of water compared with a nine-year average of 4.3. At the head of Bear River snow course, the water content is slightly higher, being 3.0 inches compared with a twelve-year average of 7.7. On Garden City Summit, 15.9 inches of water were found compared with a sixteen-year average of 17.9 inches. At Emmigration Summit a snow water content of 17.4 inches were measured compared with an eleven-year average of 23.3 inches. An early season measurement at Trial Lake near the headwaters of the Bear River showed 25.3 inches of water on March 17. Surveys have not been completed in this area but it is believed that this figure is only slightly less than that which would have been found on April 1. The April 1 average for the Trial Lake station over a sixteen-year period is 24.2 inches. Snow cover at the higher elevations is about equal to that of last year except at the Garden City Summit Course which is only 60% of that measured a year ago. This fact coupled with the lack of low elevation snow cover on this watershed will bring a runoff somewhat less than was experienced in 1946. The average April-September runoff of the Bear River at Harer for the ten-year period 1936-45 is 223,500 acre feet of which 46,100 acre feet is the average runoff for July-September. The figures representing the 1946 runoff are not yet available. It is expected that approximately 130,000 acre feet will runoff during April-September and 45,000 acre feet during July-September.

Bear River at Stewart Dam:

The flow at Stewart Dam is usually a good index of the amount of water available for Bear Lake storage. During the past year, there has been approximately 360,000 acre feet of water available at Stewart Dam. This together with the 110,000 acre feet of inflow from tributary streams into Bear Lake brought the lake elevation to a maximum of 5910.3 feet. This represented a net gain from April 1

of 4.3 feet and a net storage gain of 295,000 acre feet. The level on April 1 of this year was 5918.0 which is three feet above the elevation of a year ago. It is expected that during the coming year the contribution at Stewart Dam will be considerably less than last year as will the contribution of tributary streams flowing directly into the lake. The lake will probably rise before the heavy demands on storage begin, to approximately 5920.0 feet.

Logan River:

During 1946 the runoff of the Logan River near the Utah Power & Light Station was 168,500 acre feet from April through September with 48,000 acre feet occurring from July through September. This was 10% higher than had been anticipated using the snow surveys as a basis one year ago. This increase in supply was brought about by the heavy precipitation which occurred after the forecast was issued.

There is considerable variation of the snow cover at different points on the Logan River watershed this season. Most of the low elevation snow has disappeared while the cover at higher elevations is somewhat variable from one point to another. On the Mount Logan course there were 21 inches of water. The average for the 23 years of record at this station on April 1 is 28 inches. At the Upper Spring Hollow course 18.8 inches were found which compares with a 23-year average of 23.9. At Franklin Basin, a cover of 23.3 inches on April 1 compares more favorably with the 23-year average of 25.3 inches. At Tony Grove Lake the survey was made on March 15 before all of the precipitation had occurred and 28 inches of water were measured. The April 1 average of over 23 years of record at this station is 32.8 inches. At Tony Grove Ranger Station, however, which is at elevation 6250, only 3.8 inches of water were found compared with an average of 10.1.

The Logan River watershed went into the winter season well primed with moisture and it is expected that a high percentage of yield will result from the snow cover.

The forecast for the water supply on the Logan River for the coming season is set at 110,000 acre feet for the April-September period and 34,000 acre feet for the July-September period. This represents a water supply equal to 93% of the ten-year average for April-September and 90% of July-September average.

Blacksmith Fork River:

During the 1946 season Blacksmith Fork River had a total April-September runoff of 68,500 acre feet and a July-September runoff of 23,800 acre feet. This is only slightly over the amount predicted a year ago when the snow surveys were completed.

There are three snow courses located at or near the rim of the Blacksmith Fork watershed. The Mount Logan snow course on the northwest showed a measurement of 21 inches of water which is 75% of the average for the period of record. The Garden City Summit snow course located on the extreme northeast tip of the Blacksmith Fork drainage showed a measurement of 16 inches of water representing 90% of the long-time average for this course. Monte Cristo snow course located near the southern boundary of the watershed measured 24 inches of water which is 110% of the long-time average.

The April-September runoff of the Blacksmith Fork River for the coming season is expected to be approximately 40,000 acre feet. This compares with 68,500 last year and the ten-year average of 46,000. The July-September runoff for the Blacksmith Fork River is expected to be about 15,000 acre feet this season. The July-September runoff in 1946 was 23,900 acre feet and the average for the ten-year period 1936-45 is 14,700 acre feet.

Little Bear River:

The snow course at Monte Cristo Ranger Station furnishes an index of the water supply of the Little Bear River. The water content of the Monte Cristo snow course this year is 24 inches compared with 30.6 inches last year and a long-time average over a 14-year period of 22 inches.

Low snow on this watershed is somewhat less than last year although there is no snow course reflecting this measurement. However, the watershed was well primed as the fall season began and it is therefore expected that fair runoff conditions will exist on the Little Bear River this season. It is expected that the April-September runoff of the Little Bear River will be approximately 44,000 acre feet compared with 54,400 last year. The July-September runoff will be approximately 4,000 acre feet compared with 5,000 last season. This will be more than sufficient water to fill the Hyrum Reservoir to capacity.

Cub River, Maple Creek, High Creek and Summit Creek:

The snow cover at Franklin Basin, Immigration Summit, and Smithfield Spring furnish somewhat of an index for the runoff of these drainages. It is expected that the runoff during the coming season will be fair with the streamflow holding up well throughout the late season. The snow cover at these snow courses is somewhat less than last year although not much different from the long-time average at the higher elevations. The flood discharge from these streams will be considerably less than last year due to early melting of the low elevation snow cover.

Providence and Millville Creeks:

The runoff of these creeks is reflected in the measurement of snow on the Mt. Logan snow course. The snow cover at Mt. Logan this year is only 60% of the near record snow cover of last year. However, in spite of the fact that total runoff for the season in these creeks will be considerably less than last year, it is expected that the late season runoff will hold up fairly well and total supplies should be near normal.

WEBER-OGDEN RIVER DRAINAGE

Ogden River:

The snow cover on the Ogden River watershed stands at about 70% of that of last year at the high elevation station of Monte Cristo. However, the water content of 24 inches recorded this season is slightly better than the average for the past 14 years at this station. The snow course at Dry Bread Pond shows only 45 percent of the moisture recorded last year but is only 0.8 of an inch less than the average for the past ten years at this station. Snow cover at lower elevations is considerably less than last year for this time of season.

The runoff of the south fork of the Ogden River near Huntsville last year was 77,700 acre feet during the April-September period and 8,900 acre feet during July-September. It is expected that the runoff for this season will be somewhat less and should be approximately 62,000 acre feet during April-September and 8,000 acre feet during July-September. This compares with a ten-year average runoff of 55,900 and 7,600 acre feet respectively. Water conditions should be fairly good on the Ogden River generally this season and there should be sufficient water to fill the Pine View Reservoir to capacity.

Weber River:

During 1946 the runoff of the Weber River at Oakley totaled 121,000 acre feet during the April-September period with 19,300 acre feet running off during July-September. It is expected that conditions will be only slightly different from last year this season except that the late season runoff should hold up slightly better. The forecast is set at 120,000 acre feet for the April-September period this year and 22,000 acre feet for the July-September period. Supplies on the Weber River last year were only slightly higher than had been anticipated as a result of the April 1st snow surveys a year ago. This was due to the heavy rains experienced during the early spring months after the surveys were made.

The hold-over storage in East Canyon and Echo reservoirs on the Weber River is approximately the same this time as last year with East Canyon being slightly less. It is expected that both of these reservoirs should be at or near capacity before heavy demand begins this season.

JORDAN RIVER AND SALT LAKE DRAINAGE

Salt Lake Watersheds:

Streams draining directly into Salt Lake from Farmington on south to Murray will runoff approximately the same as last year. Snow cover at the Barnard Creek snow course measures approximately the same as a year ago at this time. Low elevation snow cover on the watersheds is somewhat less than last year because of early melting. However, the watersheds were all well primed last fall by the heavy rains which were experienced before the first snowfall and it is expected that the yield from this snow cover will be a fairly high percentage. At Lamb's Canyon on Parley's Creek the snow cover is slightly less than a year ago while at the Parley's Summit the snow cover is about 83 percent of last year. Both of these snow courses are at fairly low elevation, however, and do not entirely reflect the condition of the watersheds in this area.

Big Cottonwood Creek:

On Big Cottonwood Creek the measurement of snow at Silver Lake shows a water content only slightly different from a year ago while at Mill D South Fork is about 80% of last year. Here again as on most of the watersheds of the state the low elevation snow cover has melted thus eliminating the possibility of heavy spring floods on any of these streams. However, since the watersheds were well primed in the fall it is expected the runoff will hold up fairly well during the summer season. The high elevation snow cover, having remained in storage in the mountain watersheds, will provide a good late season water supply. The runoff of Big Cottonwood Creek near Salt Lake City last year was 38,200 acre feet during April-September period and 7,300 acre feet during July-September. The runoff for the coming season is forecast at 34,000 acre feet during April-September period and 7,000 acre feet during July-September. This compares with averages of 36,500 and 7,900 for the past ten years for these two periods.

PROVO RIVER AND UTAH LAKE DRAINAGE

Provo River:

Snow surveys on the Provo River have not yet been completed. Surveys were made in mid-March, however, at the Trial Lake snow course and at Soapstone Ranger Station which indicated the snow cover is equal to or slightly better than last year. The snow cover at the Daniels Creek Summit course is slightly less than a year ago while that at the Divide between American Fork and Provo Rivers on the Timpanogos loop road is considerably better than a year ago. The measurement on April 1 this year on the Timpanogos loop road divide was 23.6 inches whereas last year there was only 15.4 inches of water at the same time. The flow of the Provo River below the Forks is affected by storage in Deer Creek Reservoir and by diversion from the Weber River through the canal at Woodland. In any forecast of natural streamflow it is therefore necessary to take these factors into account. The corrected runoff for the Provo River below the Forks last year amounted to 140,000 acre feet during the April-September period and 33,100 acre feet during the July-September. The April-September runoff was exactly as had been predicted a year ago, while the July-September runoff was slightly less than had been expected. Both the April-September and the July-September runoffs for the coming season should be slightly better than that of last year with 150,000 acre feet forecast for the April-September period and 35,000 acre feet for July-September. There should be sufficient water available to fill Deer Creek Reservoir to capacity.

American Fork River:

Last season there was no exact prediction of the acre feet of water to runoff from the American Fork River drainage. However, figures have been made available which will permit including the American Fork River in the forecast of water supply for Utah. Last year during the April-September period 32,300 acre feet of water ran off from this drainage with 6,100 acre feet running off during July-September. This was somewhat more than had been expected early in the season when the snow surveys were made, but the snow stored water was augmented by heavy precipitation during the spring months, adding considerably to the water supply in this area.

The snow cover on the American Fork River water shed this season is the highest for several seasons with a high water content particularly at the Timpanogos Loop Road Divide course. The measurement of snow cover on April 1 showed 23.6 inches of water compared with 15.4 inches at this same station last year. The average for the 12-year period record at this snow course is 23.3 inches. At the lower elevations and on the north fork of

the American Fork River the measurement is somewhat less proportionally, with 14.9 inches at Dutchman Ranger Station, and 12.8 inches at Camp Altamont, as compared with 14.1 inches last year at Dutchman and 10.9 at Altamont. These figures are slightly below the 12-year average for these two stations. The runoff from the American Fork River should hold up fairly good throughout the late season months during the coming summer because of the good high elevation snow cover and considerable drifting on the Timpanogos Divide. It is expected that the April-September runoff will amount to approximately 35,000 acre feet, compared with a 10-year average of 33,500; and the July-September runoff should be approximately 9,000 acre feet compared to a 10-year average of 8,200.

Hobble, Payson, and Santaquin Creeks and Spanish Fork River:

The runoff from these watersheds is indicated by the snow cover at the Hobble Creek Summit course, the Strawberry Divide course, the Payson Ranger Station, and the Gooseberry Reservoir snow courses. All of these snow courses with the exception of Payson Ranger Station show a snow cover slightly less than that of last year. The Payson Ranger Station shows 13.8 inches compared with 11.1 inches a year ago. It is expected that runoff from these drainages will be little, if any, less than a year ago and the runoff should hold up fairly well throughout the late season months. This condition is expected because of the condition of the watersheds in the fall before snow accumulation began, which will allow a high percentage of yield from the snow cover and storage there.

Strawberry Reservoir:

The snow cover on the drainage area surrounding Strawberry Reservoir on the north is slightly better than a year ago at the head of Daniels Creek. However, on the divide between Strawberry Reservoir and Diamond Fork, the snow cover is slightly less than last year. It is expected that the yield of the snow flowing directly into Strawberry Reservoir will be approximately 48,000 acre feet during the coming season from April to September. After correcting for evaporation the net inflow of the reservoir should be approximately 36,000. The holdover storage in the reservoir at the present time is slightly less than it was on April 1 of last year, with 115,100 acre feet of available water in storage.

SEVIER RIVER SYSTEM

Sevier River Headwaters:

The snow cover on the headwaters of the Sevier River is considerably better than a year ago. Snow storage is particularly

good at the higher elevations which should be encouraging to farmers in this locality who suffered under the shortage of water last year. The snow surveys at Cedar Breaks show 36.8 inches of water compared with 16.1 inches in 1946 and 25.3 inches average for the past eleven years. At Duck Creek Ranger Station the cover is not so high, with 13.4 inches of water compared with 8.3 inches last year and 17.6 inches average for the period of record. The high density of the snow at this station (almost 50%) makes it evident that considerable melting was occurring at the time of the survey. The ground storage is at a very high level at this station and maximum yield can be expected from the snow cover.

At Panguitch Lake much the same condition exists as at Duck Creek. Three and nine-tenths inches of water were recorded at this station compared with 1.6 a year ago. The underlying earth mantle was very wet. On the Widtsoe-Escalante Summit on East Fork of Sevier the early season precipitation brought an excellent blanket of snow in December and January. A considerable amount of this early cover has melted even at the high elevations. However, on April 1 the snow cover was almost double last season and practically the same as the average of the past 15 years. At Fish Lake, early melting has taken much of the snow cover, with 4.3 inches recorded on April 1 as compared with 5.4 inches a year ago. No snow is recorded at Bryce Canyon--a condition which is prevalent over most of the low elevation watersheds.

Water supplies in this area will be considerably better than 1946. At Hatch last season the April-September runoff was 32,000 acre feet and July-September only 10,300. It is expected that the April-September runoff during the coming season at this station will be approximately 70,000 acre feet with 25,000 acre feet occurring during July-September. Near Kingston, runoff of the Sevier River last season was only 15,800 acre feet (April-September) and 2,500 acre feet (July-September). Forecast at this station for the coming season is set at 50,000 and 9,000 acre feet during April-September and July-September respectively. Otter Creek and Piute Reservoir are 75% filled and should be near capacity before heavy demands are made on storage.

Clear Creek:

Measurement of snow cover on the Clear Creek watershed at Kimberly Mine shows a water content of 13.4 inches compared with 15.4 in 1946 and a 12-year average of 17.4 inches. Runoff is expected to be only slightly, if any, less than last season because of the heavy priming of watershed soil last fall.

Salina Creek:

The snow cover at Gooseberry Ranger Station shows 7.6 inches of water compared with 8.3 inches a year ago. However, supplies are expected to be about the same or only slightly less than last season.

San Pitch River:

Snow cover measurements on the San Pitch headwaters near Fairview show total snow stored water equal to 80-85% of the average for the period of record. However, the ground storage is excellent and it is estimated that runoff will be about 85-95% of the average for the past 18 years. Runoff should be almost equal to that of last season.

On the streams in the vicinity of Ephraim, somewhat better prospects exist. Measurement of snow in Ephraim Canyon show snow-stored water equal to the average of the past 17 years and slightly better than last season.

Sevier Bridge Reservoir storage is not as high as a year ago but is in excellent condition, being 85% full at this time.

INDEPENDENT STREAMS

Fillmore Drainage:

Snow cover in the Pine Creek-Chalk Creek area is recorded at 10.9 inches of water compared with 7.0 inches a year ago and a 17-year average of 11.7 inches. Water supplies should be at least 40% greater than last year and should hold up fairly well through the summer.

Beaver River:

Snow cover on this watershed is good--particularly at the higher elevations. On the divide near Pig Flat Ranger Station 19.8 inches water were found. The 11-year average at this station is 20.9. The 1946 measurement showed only 14.2. At the lower elevation courses near Otter Lake and in Merchant's Valley the cover is proportionately less. At 8200 feet elevation in Merchant's Valley only 8.0 inches of water were recorded compared with 8.8 inches a year ago and a 16-year average of 11.2 inches.

Runoff from Beaver River last season was about as had been expected a year ago with an April-September runoff of 22,600 acre feet and a July-September total of 4,900. Supplies this season are expected to be somewhat improved with the forecast set at 30,000 acre feet during April-September and 7,500 during July-September.

Coal Creek:

Water supplies in vicinity of Cedar City last season were even less than was anticipated when the annual snow survey was made. Only 8,400 acre feet ran off during the April-September period with 2,200 occurring during July-September. Supplies this year should be much better. Snow surveys at Cedar Breaks show a total snow-water content of 36.8 inches compared with 16.1 inches a year ago and an eleven-year average of 25.3 inches. At Webster Flat 18.7 inches of water were recorded which is about equal to the average for the past 14-years and 60% greater than 1946. An April-September runoff of 23,000 acre feet is forecast for this year. This is equal to the average runoff for the past ten years. July-September runoff should be approximately 3,900 acre feet which compares with a ten-year average runoff of 3,700.

UPPER GREEN RIVER DRAINAGE

Black's Fork and Henry's Fork:

The snow cover at Hewinta Ranger Station measures 9.2 inches of water. The measurement last year was 10.4 and the 15-year average is 9.0. Runoff in this area should be only slightly less than a year ago and should hold up well through the summer months.

Beaver Creek and Burnt Fork:

The snow survey at Hole-In-The-Rock showed 6.4 inches of water compared with 4.4 inches in 1946 and a 15-year average of 5.0. Water supplies in this area should be somewhat better than last year and should be entirely adequate to meet the demands of irrigators.

Ashley Creek near Vernal:

The snow cover at King's Cabin is almost three times as heavy as a year ago. April-September runoff last season was 36,100 acre feet with 12,100 occurring during July-September. Runoff will be considerably higher this season and should reach 60,000 acre feet during April-September with 18,000 during July-September. This is slightly above the 10-year average at this station.

DUCHESNE RIVER DRAINAGE

Duchesne River at Tabiona:

Snow surveys made at Trial Lake on March 17 showed an accumulation of 25.8 inches of water. Average for 16 years of record at this course is 24.2 inches. At Lakefork Mountain snow cover is very good--the measurement of 12.6 inches water being 35% above the 16-year average. The April-September runoff of the Duchesne River in 1946 was 101,900 acre feet while the 10-year average is 111,200. Runoff during the same period this season is expected to be 110,000 acre feet. At the same station the July-September runoff last season was 17,300 acre feet. The forecast for this season of 25,000 is slightly above the average for the past ten years of 24,000.

Lakefork River below Moon Lake:

No forecast has been made at this station in the past because of an insufficient streamflow record. The flow at this station is affected by storage in Moon Lake Reservoir and any analysis of natural river flow therefore must make correction for this factor. The snow cover at Brown Duck Lake and Lakefork Mountain snow course provide an index of the natural runoff at this station. No survey has been made this year at Brown Duck Lake but the Lakefork Mountain measurement showed 12.6 inches of water which is 35% above average. Runoff at this station last season was 60,800 and 29,000 acre feet during April-September and July-September periods respectively. Runoff this season is expected to be 96,000 and 29,000 for the same periods and should be sufficient to fill Moon Lake Reservoir.

Strawberry River at Duchesne:

The snow cover at Indian Canyon provides the index of water supply for this watershed. The snow cover on April 1 was 12.4 inches compared with 4.0 inches last year and a 17-year average of 9.1 inches. Last year a total runoff of 51,600 acre feet occurred during April-September and 11,600 during July-September. It is expected that the April-September runoff this season will be 98,000 acre feet with 21,000 during July-September.

Uinta River at Neola:

Snow courses at Mosby Mountain, Paradise Park, and Lakefork Mountain provide information necessary to a determination of runoff at this station. Measurements this season show a snow cover of 140-160% of average at these stations. Runoff last

season was rather low being only 65,300 during April-September and 25,800 during July-September. Ten-year averages for these same periods are 110,900 and 46,100 acre feet.

Whiterocks River at Whiterocks:

Runoff at this station is a function of the snow cover at Paradise Park and Mosby Mountain snow courses where measurements this season indicate a snow cover 160% of average. Runoff last season was 40,900 acre feet during April-September and 14,300 during July-September. The average for the past ten years is 80,000 and 23,500 during April-September and July-September. Runoff during the coming season is expected to be 95,000 and 30,000 acre feet during these same periods.

PRICE RIVER DRAINAGE

Price River near Heiner:

The flow at this station is affected by storage water from Scofield reservoir and it is therefore necessary to correct the runoff figures for this factor in an analysis of natural streamflow. During 1946 the natural runoff at Heiner would have been 45,800 acre feet during April-September and 2,400 during July-September. Snow cover this year at Gooseberry reservoir and Huntington Horseshoe courses showed a water content slightly less than last year and about 82% of average. No surveys have been made at the lower-elevation courses near Scofield but it is expected that low elevation snow in this locality is somewhat deficient as in other areas nearby. Runoff during the coming season is expected to be only about 70% of the 10-year average with 50,000 acre feet running off during April-September and 3,000 during July-September. This is only slightly better than a year ago.

Scofield Reservoir:

No report is available on the amount of water in storage at Scofield Reservoir but from early season reports it is estimated that storage does not exceed 7,000 acre feet. Unless snow cover at Clear Creek and other intermediate-elevation courses are better than anticipated the available runoff at Scofield Reservoir during April-September will probably not exceed 35,000 acre feet. This would only bring the reservoir to 60% of capacity, but would provide storage equal to or greater than the capacity of the reservoir before completion of the new dam last year.

SAN RAFAEL RIVER DRAINAGE

Huntington Creek at Huntington:

Runoff from this drainage is reflected in the measurement of snow at Huntington-Horseshoe and Scoley Creek Ranger Station. The snow cover on the Horseshoe course is 19.3 inches--80% of average; and that at Scoley Creek is 14.1 inches or 94% of average. Runoff last season on this watershed was 46,500 during April-September and 12,400 during July-September. During the coming season the April-September runoff is expected to be 50,000 acre feet with 13,000 occurring during July-September. This represents 85% of the 10-year average runoff.

Cottonwood Creek at Orangeville:

The snow cover at the Scoley Creek snow course is measured at 14.1 inches which is 94% of the average at this station. The runoff during 1946 was 45,500 and 7,400 acre feet during April-September and July-September respectively. Supplies are expected to be about 35% better this season with 58,000 and 10,000 running off during the same periods. The 10-year average April-September runoff at this station is 67,800 and July-September is 10,900 acre feet.

VIRGIN RIVER DRAINAGE

Virgin River at Virgin:

Snow storage at high elevations on this stream are fairly good this season. At Cedar Breaks a measurement of 36.8 inches of water represents 140% of the average and more than double the measurement of last year. Snow cover at lower elevations is slightly deficient however and it is expected that April-September runoff will be 80,000 acre feet compared with 36,000 last year and a 10-year average of 96,100. No forecast is made covering the July-September flow but supplies during late summer should be at least 60% greater than last year.

Santa Clara near Central:

Snow cover on Pine Mountain this season is measured at 13.7 inches. This is 70% greater than in 1946 but slightly less than the 10-year average. Runoff will be more than double last year except during late summer which will be about 170% of a year ago. April-September runoff will be about 5,400 acre feet with 1,200 occurring during July-September.

LOWER COLORADO DRAINAGE

LaSal Mountain Area:

Snow cover at the LaSal Mountain course is 18% greater than a year ago but 15% less than the 16-year average. Runoff in the Moab area should be 15 to 25% greater this year than in 1946.

Blue Mountain Area:

Snow measurements at the Buckboard Flat snow course show 10.8 inches of water which represents a storage 50% greater than a year ago but 20% less than the long-time average. Runoff in the vicinity of Monticello should go approximately 40-50% greater than last year.

TABLE II

STATUS OF RESERVOIR STORAGE ABOUT APRIL 1, 1947

BASIN and STREAM	RESERVOIR	USABLE CAPACITY (1000's of Acre Feet)	1000's OF ACRE FT. IN STORAGE APR.1				
			1947	1946	1945	1944	10-YEAR AVERAGE 1936-45
BEAR RIVER SYSTEM							
BEAR RIVER	BEAR LAKE	1420.0	1026.0	821.0	608.7	533.3	480.8
LITTLE BEAR RIVER	HYRUM	15.3	12.0	15.0	14.0	16.2	15.1*
WEBER-OGDEN RIVERS							
OGDEN RIVER	PINE VIEW	44.2	14.2	13.9	7.3	9.4	13.5**
WEBER RIVER	EAST CANYON	28.7	15.4	23.1	24.7	21.7	19.5
WEBER RIVER	ECHO	73.9	55.3	56.0	71.8	74.2	30.0
PROVO RIVER and UTAH LAKE							
PROVO RIVER	DEER CREEK	147.3	76.3	66.5	52.0	24.7	19.0***
SPANISH FORK RIVER	STRAWBERRY	270.0	115.1	120.7	100.8	85.0	75.4
UTAH LAKE	UTAH LAKE	850.2	733.6	689.7	550.0	419.5	373.4
SEVIER RIVER SYSTEM							
SEVIER RIVER	OTTER CREEK	52.6	39.7	52.6	39.9	43.3	36.0
SEVIER RIVER	PIUTE	84.8	61.0	71.5	69.0	61.2	59.7
SEVIER RIVER	SEVIER BRIDGE	236.0	203.0	231.8	213.5	175.8	138.3
BEAVER RIVER							
BEAVER RIVER	ROCKY FORD	25.1	17.2	23.5	23.1	21.3	18.8*-*
DUCHESNE RIVER							
LAKE FORK RIVER	MOON LAKE	35.8	9.0	17.9	14.1	16.7	20.0**
PRICE RIVER							
PRICE RIVER	SCOFIELD	65.9		12.7	9.4	10.8	11.4

*Seven year record
** Eight year record
*** Five year record
- Nine year record

TABLE III
UTAH SNOW SURVEYS - ABOUT APRIL 1, 1947

DRAINAGE BASIN and SNOW COURSE NAME	SNOW COURSE NO.	LOCATION Sec.	Twp.	Range	ELEV.	SNOW COVER MEASUREMENTS Date of Survey 1947	Snow Depth (Inches) 1947	WATER CONTENT (INCHES) About April 1 1947	1946	1945	Past Record Years of Record	Av. Water Content (Inches)
GREAT BASIN DRAINAGE												
Bear River System:												
Franklin Basin (Idaho)	1	1&12	16S *	41E *	8200	4-1	60.1	23.3	30.2	19.8	23	25.3
Emmigrant Summit (Idaho)	1A	21	12S *	42E *	7700	3-29	46.5	17.4	29.1	23.4	11	23.8
Slug Creek Divide (Idaho)	1B	10&15	10S *	44E *	7300	4-3	35.6	12.2	17.2	15.8	11	15.4
Tony Grove Lake	2	5	13N	3E	8200	3-15	80.7	28.0	37.4	27.3	23	32.8
Tony Grove R.S.	3	11	13N	3E	6250	4-3	9.9	3.8	6.8	10.5	19	10.1
Spring Hollow (Lower)	4	26	12N	2E	7000	3-29	28.3	9.9	13.1	12.0	22	14.0
Spring Hollow (Upper)	5	35	12N	2E	8000	3-29	71.9	18.8	30.0	20.2	23	23.9
Mt. Logan	6	3	11N	2E	9000	3-29	69.7	21.0	36.1	22.8	23	28.0
Smithfield Spring	7	2	13N	2E	7000	4-5	56.0	16.9	30.6	23.7	10	22.5
Garden City Summit	9	34	14N	4E	8200	3-26	47.0	15.9	26.1	15.5	16	17.9
Head of Bear River	10	15	2N	10E	8600	3-31	29.9	8.0	4.2	4.9	12	7.7
Goodman Ranch	10A	19	3N	10E	7900	3-31	11.2	3.2	3.2	4.1	9	4.3
Monte Cristo	12	3	8N	4E	8960	3-25	65.5	24.0	30.6	23.9	14	22.0
Weber-Ogden Rivers:												
Monte Cristo	12	3	8N	4E	8960	3-25	65.5	24.0	30.6	23.9	14	22.0
Dry Bread Pond	12A	3	7N	4E	8230	3-26	46.1	16.0	35.7	31.0	10	16.8
Geertsen Creek	12B	8	7N	2E	8200		No Survey		19.8	19.3	11	19.2
Parley's Canyon Summit	15	9&10	1S	3E	7500	3-29	30.2	14.5	17.8	15.0	13	16.6
Beaver Creek R. S.	24	28	2S	7E	7500		No Report		4.9	10.2	15	7.5
Smith & Morehouse	30	25	1N	7E	7600	3-28	31.5	10.7	11.2	12.4	18	12.1
Redden Mine (Upper)	31	1	2S	6E	9000	3-27	48.8	18.7	18.9	18.8	17	19.6
Redden Mine (Lower)	31A	1	2S	6E	8500	3-27	47.0	17.0	18.6	18.2	17	18.1
Snow Basin	72	3	5N	1E	8840		No Report		15.0	16.6	5	25.9

Boise Meridian

TABLE III (Cont'd)
UTAH SNOW SURVEYS - ABOUT APRIL 1, 1947

DRAINAGE BASIN and SNOW COURSE NAME	SNOW COURSE NO.	LOCATION Sec.	Twp.	Range	ELEV.	SNOW COVER MEASUREMENTS Date of Survey 1947	Snow Depth (Inches) 1947	WATER CONTENT (INCHES) About April 1 1947	1946	1945	Past Record Years of Record	Av. Water Content (Inches)
Jordan River & Great Salt Lake:												
Barnard Creek	13A	34	3N	1E	8000	3-27	61.1	22.8	22.5	24.5	11	27.2
Lamb's Canyon	14	19	1S	3E	6600	3-27	38.0	13.2	16.6	11.4	12	15.0
Silver Lake	16	35	2S	3E	8720	3-28	60.6	22.5	23.8	27.5	16	24.2
Mill D. South Fork	16A	18	2S	3E	7400	3-28	41.5	14.6	19.7	15.8	12	19.3
Provo River & Utah Lake:												
Dutchman R. S.	17	27	3S	3E	7500	3-26	43.2	14.9	14.1	22.5	16	17.1
Timpanogas Cave Camp	18	27	4S	2E	5500	3-29	No Snow		No Snow	No Snow	12	0.8
South Fork R. S.	19	24	4S	2E	6100	3-29	Patchy		Patchy	3.3	12	4.1
Camp Altamont	20	29	4S	3E	7300	3-29	35.7	12.8	10.9	20.5	12	16.7
Timpanogas Divide	21	33	4S	3E	8200	3-29	59.0	23.6	15.4	30.3	12	23.3
Hobble Creek Summit	22	20	7S	5E	7300	3-28	28.5	9.6	11.6	14.1	11	13.2
Daniels-Strawberry Summit	23	20	2S*	12W*	8000	3-26	38.8	12.5	11.0	15.7	17	13.7
Soapstone R. S.	25	9	3S	2E	7800	3-17	38.5	12.0	12.0	11.9	16	10.6
Trial Lake	26	5	2S	9E	9800	3-17	78.2	25.8	26.6	24.8	16	24.2
Washington-Long Lake	27	1	2S	8E	10300		No Report		31.2	No Survey	15	28.1
Lost Lake	28	33	1S	9E	9900		No Report		No Survey	22.5	15	22.3
East Portal	33	36	7S	6E	7560	3-28	28.2	9.0	10.4	11.9	13	11.8
Strawberry Divide	33A	34-35	7S	6E	8000	3-28	54.3	18.2	19.0	19.5	13	19.6
Payson R. S.	68	30	10S	3E	8840	3-28	36.9	13.8	No Rec.	19.0	4	18.9
Sevier River:												
Gooseberry Reservoir	41	25	13S	5E	8700	3-27	48.4	16.2	16.4	19.0	19	18.6
Mammoth R.S.-- Cottonwood Creek	42	23	13S	5E	8800	3-27	49.4	15.4	16.9	21.1	18	20.1

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TABLE III (Cont'd)
UTAH SNOW SURVEYS - ABOUT APRIL 1, 1947

DRAINAGE BASIN and SNOW COURSE NAME	SNOW COURSE NO.	LOCATION			ELEV.	SNOW COVER MEASUREMENTS						
						Date of Survey 1947	Snow Depth (Inches) 1947	WATER CONTENT (INCHES) About April 1			Past Record	
		Sec.	Twp.	Range				1947	1946	1945	Years of Record	Av. Water Content (Inches)
Sevier River (Cont'd)												
Huntington-Horseshoe	43	12	14S	5E	9800	3-27	59.4	19.3	21.7	23.3	17	24.4
G.B.E.S. Headquarters	45	21	17S	4E	8700	3-26	45.5	15.4	13.8	16.3	17	15.9
G.B.E.S. Meadows	46	27	17S	4E	10000	3-26	73.1	24.6	21.5	23.1	17	23.1
Seeley Creek R.S. #2	48A	25	17S	4E	10000	3-26	42.9	14.1	12.7	15.4	17	15.0
Pine Creek-Chalk Creek	49	14	22S	4W	8500	3-30	29.6	10.9	7.0	15.1	17	11.7
Gooseberry R.S.	50	32	23S	2E	8400	3-29	29.2	7.6	8.3	10.3	17	9.7
Fish Lake	51	35	26S	1E	8700	3-26	15.8	4.3	5.4	5.0	16	5.4
Kimberly Mine	52A	11	27S	5W	8900	3-30	43.2	13.4	15.4	18.5	12	17.4
Widtsoe-Escalante Summit	53	22	34S	1W	9500	3-25	22.0	8.0	4.1	12.1	15	8.6
Bryce Canyon	54	36	36S	4W	8000	3-30	No Snow		No Snow	8.8	8	7.8
Panguitch Lake	55	4	36S	7W	8200	3-24	11.6	3.9	1.6	6.8	20	5.0
Gravel Springs Junction	56	22	38S	6W	7500	3-30	No Snow		No Snow	11.8	10	6.8
Harris Flat R. S.	57	24	38S	7W	7700	3-30	No Snow		3.1	14.8	16	10.3
Duck Creek R. S.	58	11	38S	8W	8560	3-30	25.4	13.4	8.3	24.4	12	17.6
Cedar Breaks	59	2	37S	9W	10300	3-31	71.0	36.8	16.1	31.6	11	25.3
Big Flat	63B	18	29S	4W	10000	3-28	60.9	19.8	14.2	23.4	11	20.9
Beaver River:												
Merchant's Valley	63	8&9	29S	5W	8200	3-29	27.6	8.0	8.8	14.1	16	11.2
Otter Lake	63A	1	29S	5W	9300	3-29	49.5	15.4	12.0	19.4	11	17.5
Big Flat	63B	18	29S	4W	10000	3-28	60.9	19.8	14.2	23.4	11	20.9
Coal Creek:												
Cedar Breaks	59	2	37S	9W	10300	3-31	71.0	36.8	16.1	31.6	11	25.3
Webster Flat	61	20	37S	9W	9200	3-24	46.3	18.7	11.5	20.9	14	18.8

TABLE III (Cont'd)
UTAH SNOW SURVEYS - ABOUT APRIL 1 1947

DRAINAGE BASIN and SNOW COURSE NAME	SNOW COURSE NO.	LOCATION Sec.	Twp.	Range	ELEV.	SNOW COVER MEASUREMENTS Date of Survey 1947	Snow Depth (Inches) 1947	WATER CONTENT (INCHES) About April 1 1947	1946	1945	Past Record Years of Record	Av. Water Content (Inches)
COLORADO RIVER DRAINAGE												
Upper Green River:												
Newinta R. S.	34	33	3N	13E	9500	3-24	34.6	9.2	10.4	7.4	15	9.0
Hole-In-The-Rock	35	13	2N	15E	9150	3-20	27.5	6.4	4.4	3.6	15	5.0
Kings Cabin (Upper)	39	22	1S	21E	8800	3-26	42.4	11.6	3.7	12.2	17	9.0
Kings Cabin (Lower)	39A	23&26	1S	21E	8600	3-26	39.2	10.6	4.3	11.8	17	8.6
Duchesne River:												
Lakefork Mountain	36	2&3	2N*	5W*	10500	3-27	45.0	12.6	8.4	7.9	16	9.3
Paradise Park	37	7	3N*	1E*	10500	3-25	53.6	17.7	8.1	No Survey	15	10.8
Mosby Mountain (Upper)	38	5	2N*	1E*	9700		No Report		6.2	9.0	17	8.9
Mosby Mountain (Lower)	38A	5	2N*	1E*	9500	3-25	47.4	15.6	6.0	8.4	17	9.6
Brown Duck Lake	73	2	2N*	6W*	10300		No Survey		No Survey	14.6	4	15.4
Indian Canyon	40	2	11S	10E	9100	3-29	38.9	12.4	4.0	10.3	17	9.1
Price River:												
Indian Canyon	40	2	11S	10E	9100	3-29	38.9	12.4	4.0	10.3	17	9.1
Gooseberry Reservoir	41	25	13S	5E	8700	3-27	48.4	16.2	16.4	19.0	19	18.6
Staley Ranch	42A	32	12S	7E	7600		No Report		3.5	6.9	11	6.7
Dry Valley Divide	42B	20	12S	8E	7800		No Report		7.0	9.6	12	8.7
Clear Creek	42C	28	13S	7E	8150		No Report		2.5	8.3	11	8.0
Huntington-Horseshoe	43	12	14S	5E	9800	3-27	59.4	19.3	21.7	23.3	17	24.4
San Rafael River:												
Huntington-Horseshoe	43	12	14S	5E	9800	3-27	59.4	19.3	21.7	23.3	17	24.4
Seeley Creek R.S.	48A	25	17S	4E	10000	3-26	42.9	14.1	12.7	15.4	17	15.0

* Uinta Special Meridian

TABLE III (Cont'd)
UTAH SNOW SURVEYS - ABOUT APRIL 1, 1947

DRAINAGE BASIN and SNOW COURSE NAME	SNOW COURSE No.	LOCATION			ELEV.	SNOW COVER MEASUREMENTS						
						Date of Survey 1947	Snow Depth (Inches) 1947	WATER CONTENT (INCHES) About April 1			Past Record	
		Sec.	Twp.	Range				1947	1946	1945	Years of Record	Av. Water Content (Inches)
Virgin River:												
Gravel Springs Junction	56	22	38S	7W	7500	3-30	No Snow		No snow	11.8	10	6.8
Harris Flat R. S.	57	11	38S	8W	8560	3-30	No Snow		3.1	14.8	16	10.3
Cedar Breaks	59	2	37S	9W	10300	3-31	71.0	36.8	16.1	31.6	11	25.3
Webster Flat	61	20	37S	9W	9200	3-24	46.3	18.7	11.5	20.9	14	18.8
Pine Valley	62	3	40S	15W	9150	3-26	43.8	18.7	10.9	25.2	10	20.4
Lower Colorado River:												
LaSal Mountain	64	5	27S	24E	8800	3-28	26.8	7.2	6.1	12.5	16	8.2
Buckboard Flat	65	36	33S	22E	9000	3-27	35.1	10.8	7.2	19.6	17	13.3