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U. S. DEPT. OF AGRICULTURE  
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CURRENT SERIAL RECORDS

FEDERAL - STATE - PRIVATE  
COOPERATIVE  
SNOW SURVEY and WATER SUPPLY FORECASTS  
for  
MONTANA & NORTHERN WYOMING

UNITED STATES DEPARTMENT of AGRICULTURE...SOIL CONSERVATION SERVICE,  
and  
MONTANA AGRICULTURAL EXPERIMENT STATION

Data included in this report were obtained by the agencies named above in cooperation with the Bureau of Reclamation, U.S. Forest Service, U.S. Geological Survey, National Park Service, State Engineers of Montana and Wyoming and other Federal, State, and private organizations.

AS OF  
MAR. 1, 1961

# UNITED STATES DEPARTMENT OF AGRICULTURE - SOIL CONSERVATION SERVICE

## To Recipients of Cooperative Snow Survey and Water Supply Forecast Reports:

The climate of the cultivated and populated areas of the West is characterized by relatively dry summer months. Such precipitation as occurs falls mostly in the winter and early spring months when it is of little immediate benefit to growing crops. Fortunately, most of this precipitation falls as mountain snow which stays on the ground for months, melting later to sustain streamflow during the period of greatest demand during late spring and summer. Thus, nature provides in mountain snow an imposing water storage facility.

The amount of water stored in mountain snow varies from place to place as well as from year to year and accordingly, so does the runoff of the streams. The best seasonal management of variable western water supplies results from fore-knowledge of the runoff.

A snow survey consists of a series of about ten samples taken with specially designed snow sampling equipment along a permanently marked line, about 1000 feet in length, called a snow course. The use of snow sampling equipment provides snow depth and water equivalent values for each sampling point. The average of these values is reported as the snow survey measurement for a snow course.

Snow surveys are made monthly or semi-monthly beginning in January or February and continue through the snow season until April, May or June. Currently more than 1400 western snow courses are measured each year. These measurements furnish the key data for water supply forecasts.

By relating snow survey measurements taken over a period of years to spring-summer runoff during the same period, relationships have been developed which make it possible to forecast seasonal runoff several months in advance of occurrence. In order to make a forecast, once a forecast relationship has been developed, the maximum snow water content at previously selected key snow courses is usually entered in the forecast relationship. More accurate forecasts are often obtained when other factors such as soil moisture, base flow and spring precipitation are considered and included in the forecast relationships.

Listed below are the Federal-State-Private Cooperative Snow Survey and Water Supply Forecast reports available for the West which contain detailed information on snow survey measurements, streamflow forecasts, reservoir storage, soil moisture and other guide data to water management and conservation decisions.

### PUBLISHED BY SOIL CONSERVATION SERVICE

<u>REPORTS</u>	<u>ISSUED</u>	<u>LOCATION</u>	<u>COOPERATING WITH</u>
<b>RIVER BASINS</b>			
COLORADO AND STATE OF UTAH _____	MONTHLY (JAN.-MAY) _____	SALT LAKE CITY, UTAH _____	UTAH STATE ENGINEER AND OTHER AGENCIES
COLUMBIA _____	MONTHLY (JAN.-MAY) _____	BOISE, IDAHO _____	IDAHO STATE RECLAMATION ENGINEER
UPPER MISSOURI AND STATE OF MONTANA _____	MONTHLY (FEB.-MAY) _____	BOZEMAN MONTANA _____	MONT. AGR. EXP. STATION
WEST-WIDE _____	OCT. 1, APR. 1, MAY 1 _____	PORTLAND, OREGON _____	ALL COOPERATORS
<b>STATES</b>			
ALASKA _____	MONTHLY (MAR.-MAY) _____	PALMER, ALASKA _____	ALASKA S.C.D.
ARIZONA _____	SEMI-MONTHLY (JAN.15 - APR.1) _____	PHOENIX, ARIZONA _____	SALT R. VALLEY WATER USERS ASSOC. ARIZ. AGR. EXP. STATION
COLORADO AND NEW MEXICO _____	MONTHLY (FEB.-MAY) _____	FORT COLLINS, COLORADO _____	COLO. AGR. EXP. STATION COLO. STATE ENGINEER N. MEX. STATE ENGINEER
IDAHO _____	MONTHLY (FEB.-MAY) _____	BOISE, IDAHO _____	IDAHO STATE RECLAMATION ENGINEER
NEVADA _____	MONTHLY (FEB.-APR.) _____	RENO, NEVADA _____	NEVADA DEPT. OF CONSERVATION AND NATURAL RESOURCES DIVISION OF WATER RESOURCES
OREGON _____	MONTHLY (JAN.-MAY) _____	PORTLAND, OREGON _____	ORE. AGR. EXP. STATION OREGON STATE ENGINEER
WASHINGTON _____	MONTHLY (FEB.-MAY) _____	SPOKANE, WASHINGTON _____	WN. STATE DEPT. OF CONSERVATION
WYOMING _____	MONTHLY (FEB. JUNE) _____	CASPER, WYOMING _____	WYOMING STATE ENGINEER

Copies of these various reports may be secured from: Head, Water Supply Forecasting Section  
Soil Conservation Service.  
209 S. W. Fifth Ave., Portland 4, Oregon

### PUBLISHED BY OTHER AGENCIES

<u>REPORTS</u>	<u>ISSUED</u>	<u>AGENCY</u>
BRITISH COLUMBIA _____	MONTHLY (FEB.-JUNE) _____	COMPTROLLER, WATER RIGHTS BR., DEPT. OF LANDS AND FORESTS, PARLIAMENT BLDG., VICTORIA, B.C., CANADA
CALIFORNIA _____	MONTHLY (FEB.-MAY) _____	CALIF. DEPT. OF WATER RESOURCES, SACRAMENTO, CALIF.

FEDERAL-STATE-PRIVATE COOPERATIVE  
SNOW SURVEYS and WATER SUPPLY FORECASTS  
For  
MONTANA AND NORTHERN WYOMING  
(Upper Missouri and Upper Columbia River Basins)

Report Prepared  
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MONTANA  
WATER SUPPLY OUTLOOK  
as of  
March 1, 1961

\* \* \* \* \*  
\*  
\* The 1961 Water Supply Outlook on March first appears \*  
\* to be slightly better than it was on February first. \*  
\*  
\* The far northwest corner of the State looks good. A \*  
\* gradual decline in percentage of averages is indicated \*  
\* along the Continental Divide to the southeast, where \*  
\* the water supply outlook is POOR. \*  
\*  
\* \* \* \* \*

IRRIGATION WATER SUPPLY

The apparent shortage of irrigation water for this season is a reminder to plan crops that mature early, plant acreages that are economical on water use, and irrigate wisely. Suggested cropping and farm planning for a short water supply are indicated in the individual Watershed forecasts.

SNOW COVER

The snow cover in the low elevations is practically gone, so far as runoff is concerned. March first snow surveys in the Kootenai indicate that the present winter pack is 134 percent of last year and 110 percent of normal. Over the Flathead basin the pack is 90 percent of last season and 84 percent average. The Bitterroot basin surveys show 112 percent of last season, but only 75 percent average. The Clark Fork River headwaters is covered with a pack that is 72 percent of last year, which is only 63 percent average.

On the East side of the Continental Divide, March first surveys in the Beaverhead indicate 82 percent of last season's pack and 62 percent average. The Madison and Gallatin basins snow-pack has improved to 120 percent of last year, or 78 percent average. These basins are bright spots on the Missouri. The Yellowstone Park snow-pack also increased during February to 116 percent of last year, or 77 percent average. The Musselshell basin is covered with a snow-pack that is 53 percent of last year and 51 percent average.



### PRECIPITATION

Precipitation at valley stations on the Missouri basin shows a below normal reading. A good portion of the Columbia basin is below normal, except in the extreme northwest corner of the State.

### SOIL MOISTURE

Soil moisture is extremely low in the sub-soils throughout the State. These dry soils will use more water from the snow-pack, which will result in a diminished supply for irrigation.

### WINTER STREAMFLOW CONDITIONS

West of the Continental Divide surface streamflow has been considerably above median, in the range of 141 to 173 percent. East of the Divide, flows are generally close to median in the north and diminish sharply to 65 and 7 percent median in the southern, central and eastern portions of the State.

### IRRIGATION RESERVOIR STORAGE

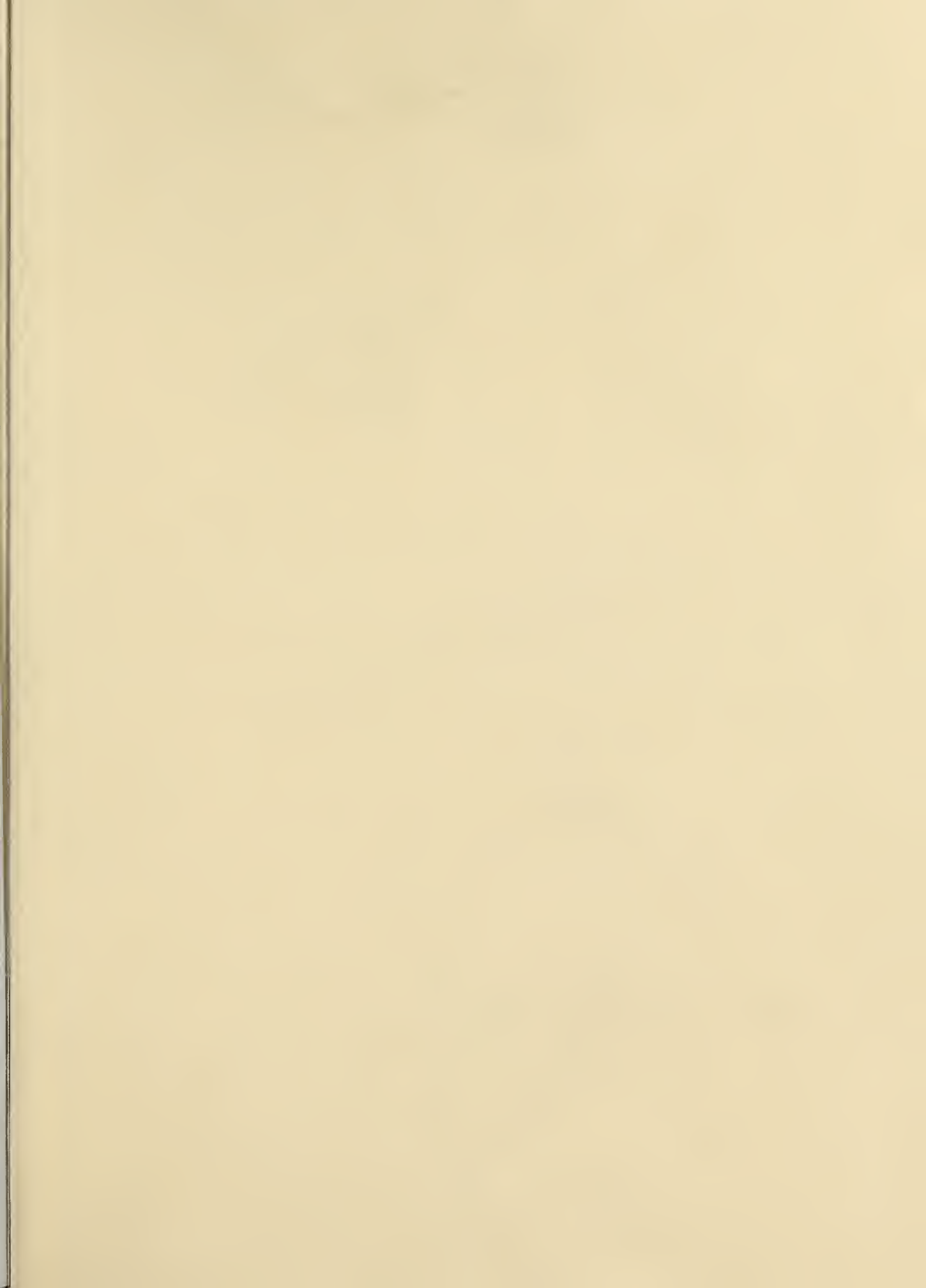
Irrigation reservoirs show a slight gain, but at present are below average for the first of March. Indications are that a critical area may be noted on the Red Rock River above Lima, where the snow-pack is about 50 percent average and is forecast to flow 43 percent average for the runoff season, May-September.

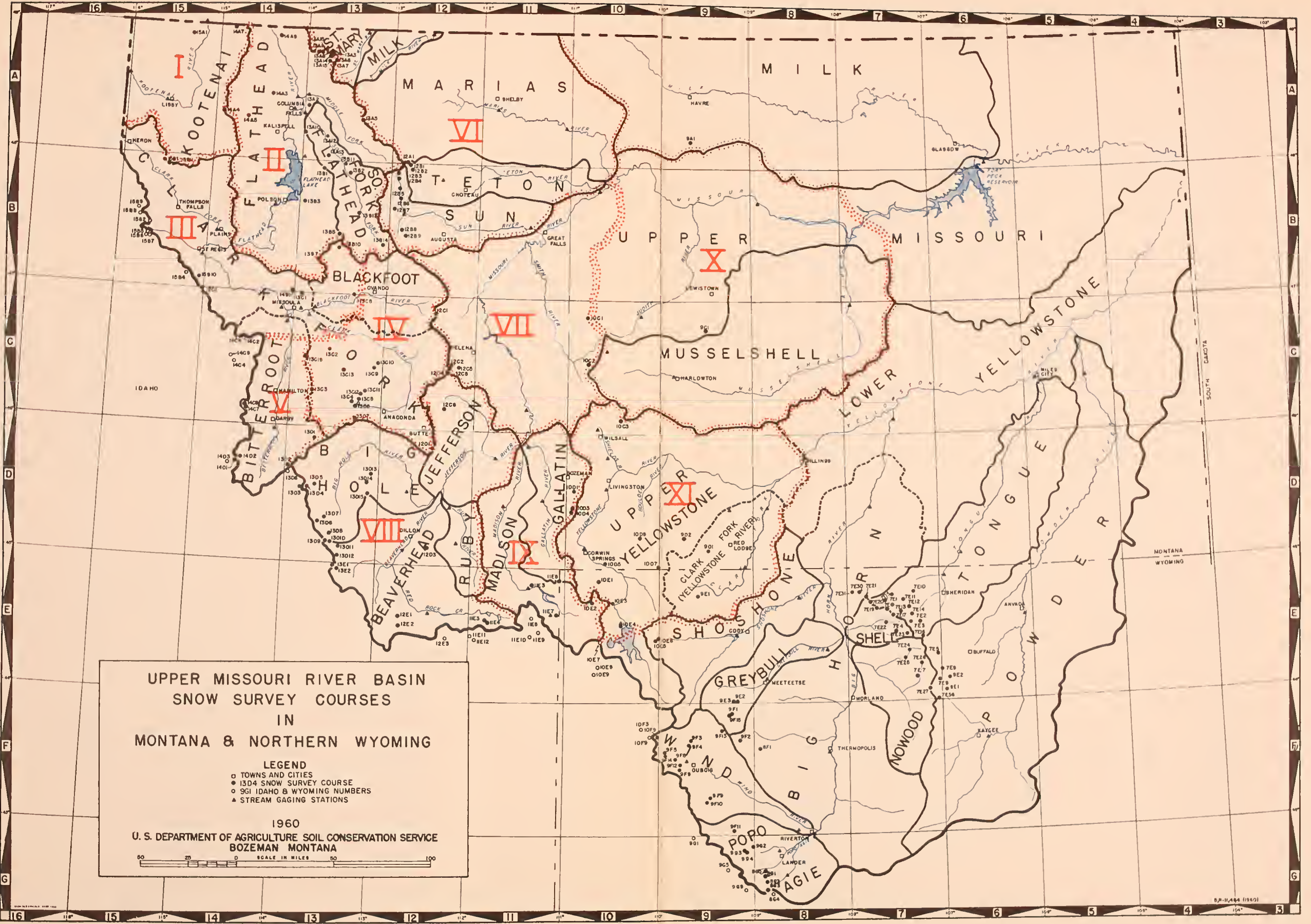
### PRESENT WATER SUPPLY OUTLOOK

Streamflow forecasts prepared for March first are all below average--ranging from 98 percent on the Kootenai and Flathead down to 52 percent on the Upper Clark Fork, 68 percent on the Jefferson, and 60 percent on the Musselshell. Detail figures of volume forecast, percent average and comparison of forecasts with last year's flow are shown on the individual forecast sheets for each Watershed in this bulletin.

Revised forecasts will be prepared for the April and May bulletins.



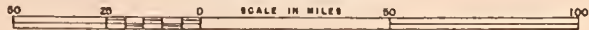




UPPER MISSOURI RIVER BASIN  
SNOW SURVEY COURSES  
IN  
MONTANA & NORTHERN WYOMING

- LEGEND
- TOWNS AND CITIES
  - 1304 SNOW SURVEY COURSE
  - 9G1 IDAHO & WYOMING NUMBERS
  - ▲ STREAM GAGING STATIONS

1960  
U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE  
BOZEMAN MONTANA



# INDEX TO MONTANA & NORTHERN WYOMING SNOW COURSES

Drainage Basin and Course Name	Montana Number	Location				Record Began	Measuring Dates	Measured By	Drainage Basin and Course Name	Montana Number	Location				Record Began	Measuring Dates	Measured By	Drainage Basin and Course Name	Montana Number	Location				Record Began	Measuring Dates	Measured By	
		Elev.	Sec. Lat.	Typ.	Range Long.						Elev.	Sec. Lat.	Typ.	Range Long.						Elev.	Sec. Lat.	Typ.	Range Long.				
MISSOURI RIVER DRAINAGE																											
(ROCK-BE-AVERHEAD)						(UPPER YELLOWSTONE)						(TONGUE RIVER cont.)															
Lakeview Ridge	11E3	7400	27	14S	2W	1948	3,4,5	10	Camp Senia Canyon	9D1	7890	2	8S	18E	1937	4	1	Horse Trail Div.	7E19	9200	29	55N	90W	1956	2,3,4,5	1	
Lakeview Canyon	11E4	6930	26	14S	2W	1948	3,4,5	10	Cook's City	10E3	7750	44'-44'		110°-30'	1938	1,2,3,4,5	6	6	Lake Geneva	7E16	9000	7	52N	86W	1956	2,3,4,5	1
Limoklin	12E2	6950	5	15S	9W	1948	3,4	1	Crooke Mt.	10D7	7000	25	9S	11E	1937	1,2,3,4,5	6	2	North Tongue	7E15	8800	17	55N	89W	1956	2,3,4,5	1
White Pine Ridge	12E1	8850	18	14S	9W	1948	3,4	1	Crooke City	10D5	8000	22	9S	9E	1935	3,4	2	Sibley Lake	7E11	8000	10	55N	88W	1956	2,3,4,5	1	
(HORSE PRAIRIE)						(SNIELDS RIVER)						(POWDER RIVER) Wyoming															
Bloody Dick	13D10	7600	12	8S	16W	1948	3,4	1	Independence	10D6	8000	22	7S	12E	1940	3,4	1	Sucker Creek	7E12	9000	19	55N	87W	1956	2,3,4,5	1	
Gold Stone	13D9	8100	11	8S	16W	1948	3,4	1	Lake Camp	10E4	7850	44'-34'		110°-24'	1934	1,2,3,4,5	6	6	Steamboat Point	7E10	7500	32	56N	87W	1956	2,3,4,5	1
Lumbi Pass	13E1	7400	9	10S	15W	1948	3,4	1	Lupine Creek	10E1	7300	44'-34'		110°-37'	1938	1,2,3,4,5	6	4	Wood Rock G.S.	7E13	8500	3	51N	88W	1956	2,3,4,5	1
Terrell Creek	13D12	6550	14	9S	15W	1948	3,4	1	Lodgepole	9E1	8200	32	56N	1940	2,3,4,5	1,4											
Trail Creek	13E2	7090	15	10S	15W	1948	3,4	1	West Fosebud	9E2	7500	10	7S	16E	1960	1,2,3,4,5	4										
Jelway Junction	13D11	6800	27	8S	15W	1948	3,4	1	(SNIELDS RIVER)				(POWDER RIVER) Wyoming														
(BIO HOLE)						(SNIELDS RIVER)						(POWDER RIVER) Wyoming															
Big Hole Pass	13D3	7240	28	3S	18W	1948	3,4	1	Porcupine	10C3	6500	10	4N	10E	1938	3,4	1	Crazy Woman	6E2	8200	6	47N	84N	1956	2,3,4,5	1	
Big Hole Pass-So.	13D4	6900	24	3S	18W	1948	3,4	1	(WIND RIVER) Wyoming				(POWDER RIVER) Wyoming														
Zant Boundary	13D5	6700	22	3S	17W	1948	3,4	1	Big Warm	9F12	8800	36	42N	109W	1955	2,3,4,5	1	1	Muddy Creek G.S.	6E1	7800	2	46N	84N	1956	2,3,4,5	1
Gibbons Pass	13D2	7100	4	2S	19W	1948	1,2,3,4,5	1,3	Brooke Lake #3	10P8	9200	23	44N	110W	1939	2,3,4,5	1	1	Munkers Pass	7E8	9700	11	48N	85W	1950	2,3,4,5	1
Jahnke Creek	13D8	7340	25	7S	16W	1948	3,4	1	Burroughs Creek	9F4	8800	15	43N	107W	1948	2,3,4,5	1	1	North Powder #2	7E36	8300	20	47N	85W	1956	2,3,4,5	1
Minor Forke	13D6	7300	24	6S	17W	1948	3,4	1	Dinwoodie	9F10	10000	21	39N	105W	1948	2,3,4,5	1	1	Onion Gulch	7E27	8100	31	46N	85W	1956	2,3,4,5	1
Minor Lake	13D7	6720	10	6S	16W	1945	3,4,5	1	Dry Creek	9F9	9500	34	4W	6W	1948	2,3,4,5	1	1	Soldier Park	7E5	8700	36	51N	85W	1950	2,3,4,5	1
(WISSE RIVER)						(SNIELDS RIVER)						(POWDER RIVER) Wyoming															
Anderson Mdw.	13D14	7000	18	3S	12W	1948	3,4	1	DuNoir	9F6	8750	27	42N	108W	1940	2,3,4,5	1	1	Sour Dough	7E6	8500	17	49N	84W	1936	2,3,4,5	1
Elk Horn	13D15	8450	15	4S	12W	1935	3,4,5	3	East Fork	9F13	9200	23	44N	104W	1956	2,3,4,5	1	1	(COLUMBIA RIVER BASIN)								
Wise River	13D13	6300	15	2S	12W	1948	3,4	1	Geyser Creek	9F7	8500	12	41N	108W	1948	2,3,4,5	1	1	(KOOTENAI RIVER)								
(HUBY RIVER)						(SNIELDS RIVER)						(POWDER RIVER) Wyoming															
Flashlight	12D3	6950	22	8S	7W	1945	3,4,5	1	Little Warm	9F8	9500	24	41N	108W	1948	2,3,4,5	1	1	Baree Creek	15B11	5500	6	25N	30W	1956	4,5,5 1/2	2
MADISON RIVER						(SNIELDS RIVER)						(POWDER RIVER) Wyoming															
Hobben	11E5	6550	22	11S	3E	1934	1,2,3,4,5	3	Sheridan R.S. #1	9F5	7500	3	42N	109W	1955	2,3,4,5	1	1	Baree Mountain	15B1	6000	1	25N	31W	1937	4,5,5 1/2	2
West Yellowstone	11E7	6700	34	13S	5E	1934	1,2,3,4,5	3	Sheridan R.S. #2	9F14	7500	3	42N	109W	1955	2,3,4,5	1	1	Red Mountain	15A1	6000	4	36N	29W	1937	3,4,5,5 1/2	1,2
Norris Basin	10E2	7500	44°44'		110°-42'	1936	3,4	6	T-Cross Ranch	9P3	8000	1	43N	107W	1940	2,3,4,5	1	1	Weasel Divide	14A7	5450	8	37N	24W	1955	4,5,5 1/2	1,2
GALLATIN RIVER						(SNIELDS RIVER)						(POWDER RIVER) Wyoming															
Devil's Slide	10D4	8100	14	5S	6E	1935	2,3,4,5	2,1	Togwotee Pass	10P9	9600	29	44N	110W	1936	2,3,4,5	11	1	(FLATHEAD RIVER)								
Hood Meadow	10D3	6600	22	4S	6E	1935	2,3,4,5	2,1	(POPO AGIE RIVER) Wyoming				(FLATHEAD RIVER)														
New World	10D1	6700	24	3S	6E	1939	1,2,3,4,5	7	Blue Ridge	802	9500	23	31N	101W	1939	2,3,4,5	1	1	Basin Creek	13B11A	5000	11	19N	12W	1951	2,3,4,5	2
21-Mile	11E6	7150	1	11S	5E	1934	1,2,3,4,5	3	Bruce's Camp	805	6500	24	32N	101W	1955	2,3,4	1	1	Big Creek	13B3	6750	647	22N	16W	1941	3,4,5	5
MISSOURI RIVER MAIN STEM						(SNIELDS RIVER)						(POWDER RIVER) Wyoming															
Chesman Reservoir	12C5	6200	2	8N	5W	1936	1,2,3,4,5	3	Hobbs Park	903	10000	22	2S	3W	1948	2,3,4,5	1	1	Brush Creek	14A4	5000	13	30N	26W	1937	3,4,5	1,2
Crystal Lake	9C1	6100	19	12N	18E	1941	3,4	1,2	Mosquito Park R.S.	904	9500	23	2S	3W	1940	2,3,4,5	1	1	Cattle Queen	13A1	4700	7	35N	17W	1939	3,4,5	6
Orasshopper	10C2	7000	19	9N	8E	1938	3,4	2	Samwell Olade	801	8500	3	31N	101W	1939	2,3,4,5	1	1	Desert Mountain	13A2M	5600	24	31N	19W	1937	1,2,3,4,5	1,2
Kings Hill	10C1	7950	35	13N	7E	1934	3,4,5	3	South Pass	803	9000	13	30N	101W	1939	2,3,4,5	1	1	Nell Roaring Div.	14A3	5770	35	32N	22W	1942	3,4,5	2
Picnic Grounds	12C6	6500	10	5N	6W	1941	2,3,4,5	4	St. Lawrence	9F11	9000	26	1N	4W	1940	2,3,4,5	1	1	Nolbrook	13B13A	4530	18	21N	13W	1951	1,2,3,4,5	1,2
Pipestone Pass	12D1	7200	10	1N	7W	1938	2,3,4,5	1	Trout Creek	902	8400	5	2S	2W	1948	2,3,4,5	1	1	Kishenehn	14A6	3886	14	37N	22W	1954	4,5	6
Stemple Pass	12C1	6900	16	13N	7W	1934	3,4,5	1	(OWL CREEK) Wyoming				(FLATHEAD RIVER)														
Ten Mile Creek L	12C2	6250	13	8N	6W	1935	1,2,3,4,5	3	Beaver Mill	9F2	8900	6	43N	102W	1948	2,3,4,5	1	1	Basin Creek	13B11A	5000	11	19N	12W	1951	2,3,4,5	2
Ten Mile Creek M	12C3	6800	13	8N	6W	1934	1,2,3,4,5	3	Owl Creek	8F1	8700	36	43N	101W	1948	2,3,4,5	1	1	Big Creek	13B3	6750	647	22N	16W	1941	3,4,5	5
Ten Mile Creek U	12C4	8000	19	8N	5W	1935	1,2,3,4,5	3	(GREYBULL RIVER) Wyoming				(FLATHEAD RIVER)														
(TETON RIVER)						(SNIELDS RIVER)						(POWDER RIVER) Wyoming															
Freight Creek	12A1	6000	13	26N	10W	1948	3,4	1	Timber Creek #1	9E2	8800	25-	47N	103W	1948	2,3,4,5	1	1	Brush Creek	14A4	5000	13	30N	26W	1937	3,4,5	1,2
Waldron Creek	12B2	5600	16	25N	9W	1948	3,4	1	Timber Creek #2	9E3	8800	25	47N	103W	1955	2,3,4,5	1	1	Cattle Queen	13A1	4700	7	35N	17W	1939	3,4,5	6
West Fork	12B1	6000	6	25N	9W	1948	3,4	1	Wood River #1	9F1	8000	28	46N	103W	1939	2,3,4,5	1	1	Desert Mountain	13A2M	5600	24	31N	19W	1937	1,2,3,4,5	1,2
(SUN RIVER)						(SNIELDS RIVER)						(POWDER RIVER) Wyoming															
Benchmark	12B8	5500	9	20N	10W	1948	3,4	1	Wood River #2	9F15	8000	28	46N	103W	1956	2,3,4,5	1	1	Nell Roaring Div.	14A3	5770	35	32N	22W	1942	3,4,5	2
Cabin Creek	12B6	5400	33	23N	10W	1949	3,4	1,2	(SNOSNOWE RIVER) Wyoming				(FLATHEAD RIVER)														
5-Bull	12B9	5600	36	20N	10W	1948	3,4	1,2	East Entrance	10E6	7000	17	52N	109W	1948	1,2,3,4,5	6	6	Northbrook	13B13A	4530	18	21N	13W	1951	1,2,3,4,5	1,2
Oates Park	12B5	5300	31	24N	10W	1949	3,4	1,2	Sylvan Pass	10E5	7100	12	52N	110W	1936	1,2,3,4,5	6	6	Kishenehn	14A6	3886	14	37N	22W	1954	4,5	6
Goat Mountain	12B7	7000	20	22N	10W	1934	3,4	1,2	(NOWOOD CREEK) Wyoming				(FLATHEAD RIVER)														
Wrong Ridge	12B3	6800	17	25N	10W	1949	3,4	1,2	Cold Springs Camp	7E25	8700	1	50N	88W													





COMPARISON OF SNOW COVER WITH THAT OF PREVIOUS YEARS

Summary of Snow Survey Data by Tributary Watersheds March 1, 1961

TRIBUTARY WATERSHED	No. of Courses Averaged	No. Years Used	1961 Snow Water Equivalent Expressed as Percent of	
			1960	1943-57 Average
<u>COLUMBIA RIVER BASIN IN MONTANA</u>				
Kootenai above Libby	12	7-15	134	110
Flathead	16	7-15	90	84
Lower Clark Fork	5	5-15	128	91
Upper Clark Fork	13	5-15	72	63
Bitterroot	6	5-15	112	75
<u>MISSOURI RIVER BASIN IN MONTANA</u>				
Marias, Teton & Sun	9	9-15	105	67
Missouri Main Stem	7	15	51	46
Beaverhead-Jefferson	30	5-15	82	62
Madison-Gallatin	10	10-14	120	78
Judith-Musselshell	5	15	53	51
Upper Yellowstone	14	7-15	116	77



AVAILABLE SOIL MOISTURE  
as of  
March 1, 1961

Drainage Basin and Station	Station No.	Elev.	Soil Profile in Inches		Date	Soil Moisture Content in Inches About 3/1/61				Yr
			Depth	Cap.		1961	1960	1959	Avg.	
<u>GALLATIN</u>										
College Site	11D2M	4856	54	14.5	3/3	9.9	10.7	8.8	8.1	4
<u>MADISON</u>										
Red Bluff	11D4M	4800	40	3.6E	3/1	3.3	-	-	-	-
<u>SHIELDS</u>										
Battle Ridge	10D11M	6020	48	13.3	2/27	11.2	-	-	-	-
Shields River	10C4M	5850	48	15.9	2/28	12.6	-	-	-	-
<u>FLATHEAD</u>										
Desert Mountain	13A2M	6370	54	6.8	2/28	6.4	8.1	8.0	7.5	4
Marias Pass	13A5M	5250	54	8.4	2/26	5.8	6.4	6.8	6.2	7
Spotted Bear R.S.	13B15M	3700	28	5.9	3/3	6.1	4.5	5.0	4.8	4
Trout Lake	13A12M	3600	54	11.8	2/28	12.4	11.7	12.6	12.3	4

AVAILABLE SOIL MOISTURE  
as of  
October 1, 1960

						1960	1959	1958	Avg.	
<u>GALLATIN</u>										
College Site	11D2M	4856	54	14.5	9/30	5.8	8.6	6.8	5.8	4
<u>MADISON</u>										
Red Bluff	11D4M	4800	40	3.6E	New Station	-	-	-	-	-
<u>SHIELDS</u>										
Battle Ridge	10D11M	6020	48	13.3	10/3	10.6	-	-	-	-
Shields River	10C4M	5850	48	15.9	10/3	11.5	-	-	-	-
<u>FLATHEAD</u>										
Desert Mountain	13A2M	6370	54	6.8	9/23	4.5	7.2	5.9	5.5	4
Marias Pass	13A5M	5250	54	8.4	9/26	3.2	5.6	4.5	4.7	6
Spotted Bear R.S.	13B15M	3700	28	5.9	9/23	0.6	4.3	3.7	3.1	4
Trout Lake	13A12M	3600	54	11.8	9/23	6.9	9.8	10.5	7.9	4



# WATER SUPPLY OUTLOOK

KOOTENAI RIVER BASIN

MONTANA

AS OF:  
MARCH 1, 1961

U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE

The Water Supply Outlook for the Kootenai drainage in Montana is Excellent.

Snow survey measurements made near the first of March indicate that this year's snow-pack contains more water than on March first last year. The basin comparison shows that this year's snow-pack in the Canadian portion of the basin and in Montana is 34 percent greater than last year, and 110 percent of the 1943-57 average.

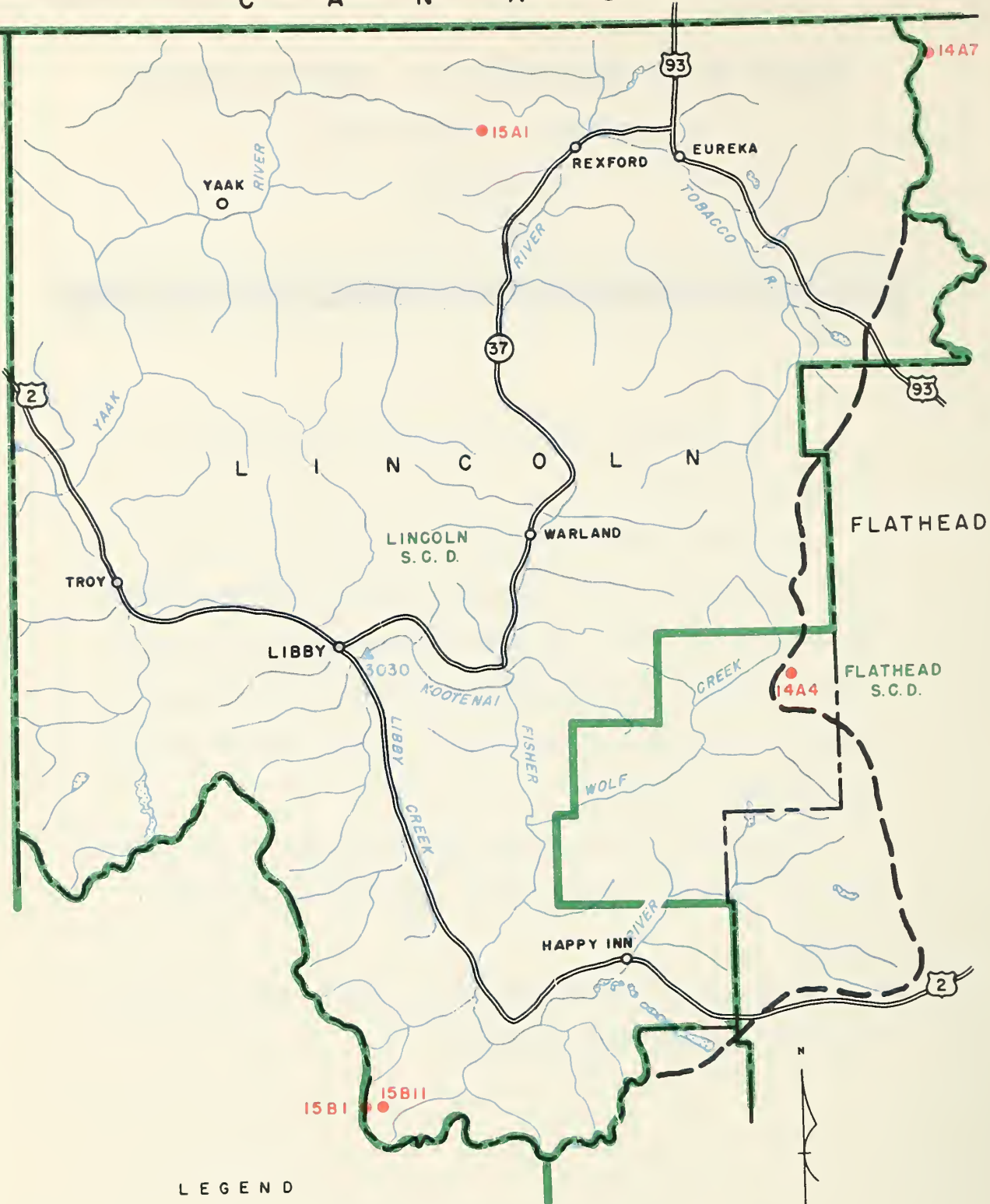
Streamflow in the Kootenai River is forecast to be slightly more than last year's flow for the April through September period.

Streamflow in the Yaak and Tobacco Rivers should be 10 to 20 percent greater than last year.

Report Prepared by

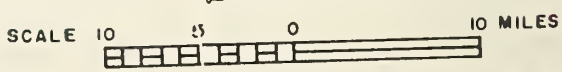
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THE CONSERVATION OF WATER BEGINS WITH THE SNOW SURVEY



LEGEND

- 13 E 2 SNOW SURVEY COURSE
- 12 D 2 M SOIL MOISTURE STATION
- ⊥ 13 B 3 A AERIAL MARKER AT SNOW COURSE
- 0125 STREAM GAGING STATION
- ▲ 0125
- DRAINAGE
- S C D. BOUNDARY
- WATERSHED BOUNDARY
- == HIGHWAY
- TOWN
- COUNTY BOUNDARY
- STATE BOUNDARY



# WATER SUPPLY FORECASTS

AS OF

(1000 Acre Feet)

FORECAST POINT		MARCH 1, 1961 FORECAST	WATERSHED 1 FORECAST		MEASURED	
NO.	NAME	PERIOD	THIS YEAR	NORMAL	LAST YEAR	NORMAL
3030	KOOTENAI RIVER Libby (at)	Apr-Sept	7568	98	7483	7723
		Apr-July	6297	98	6427	6694
3050	Leonia (at)	Apr-Sept	8600	97	8440	8907
		Apr-July	7582	97	7388	7817

+ Provisional data furnished by U. S. Geological Survey.

# RESERVOIR STORAGE DATA

AS OF

(1000 Acre Feet)

NO.	RESERVOIR	USABLE CAPACITY	MEASURED		
			THIS YEAR	LAST YEAR	NORMAL

NOTE: ALL NORMALS BASED ON 1943-1957 (15 YEAR PERIOD)

# SNOW SURVEY DATA

AS OF MARCH 1, 1961

WATERSHED I

SNOW COURSE			CURRENT INFORMATION			PAST RECORD		YEARS OF RECORD
NO.	NAME	ELEVATION	DATE OF SURVEY	SNOW DEPTH (Inches)	WATER CONTENT (Inches)	WATER CONTENT (Inches)		
						LAST YEAR	AVERAGE	
14A4	Brush Creek	5000	2/20	43	10.6	10.1	13.2	9
Can 10	Fernie	3500	2/28	28	7.8	6.7	9.1	15
Can 12A	Field	4200	2/27	24	8.6	5.2	5.5	15
Can 43	Gray Creek	5100	2/27	64	19.2	15.6	16.5	9
Can 33	Kicking Horse	5400	2/27	49	13.5	11.9	13.3	11
Can 20E	Kimberley	3800	2/27	42	10.8	7.3	7.6	15
Can 32	Marble Canyon	5000	2/28	56	18.5	9.6	13.5	11
Can 10A	New Fernie	4100	3/2	54	10.1	8.8	13.4	7
15A1	Red Mountain	6000	2/23	64	19.7	15.1	18.0	15
Can 8A	Sinclair Pass	4500	2/28	29	7.3	6.4	5.6	10
Can 20A	Sullivan Mine	5100	2/27	54	14.8	10.2	13.0	12
Can 41	Upper Elk River	4400	2/27	35	9.1	4.5	8.1	10
14A7	Weasel Divide	5450	2/25	102	34.0	27.6	-	-

NOTE: ALL AVERAGES BASED ON 1943-1957 (15 YEAR PERIOD). "YEARS OF RECORD" INDICATED NUMBER OF YEARS USED IN 1943-1957 PERIOD.



# WATER SUPPLY OUTLOOK

## FLATHEAD RIVER BASIN

### MONTANA

AS OF :

MARCH 1, 1961

U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE

The Water Supply Outlook in the Flathead River drainage is Good.

Snow survey measurements made near the first of March indicate a great variation in the snow-pack over the Flathead Basin. Many of the higher elevation snow courses are above average, while many lower elevation courses are much below average. Over the entire basin, this year's snow-pack is 90 percent of last year and 84 percent of the 1943-57 average.

The North and Middle Forks of the Flathead are forecast to flow 5 to 10 percent more than last year during the April through September period. The South Fork is forecast at 2 percent less than last year. The Swan is expected to flow 14 percent less than last year or 97 percent average. The Flathead at Columbia Falls is forecast to flow 6,224,000 acre feet between April 1 and September 30. This figure is 99 percent average or 5 percent more than last year.

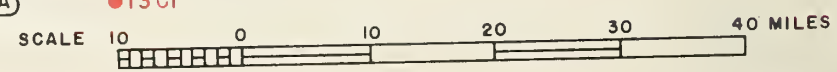
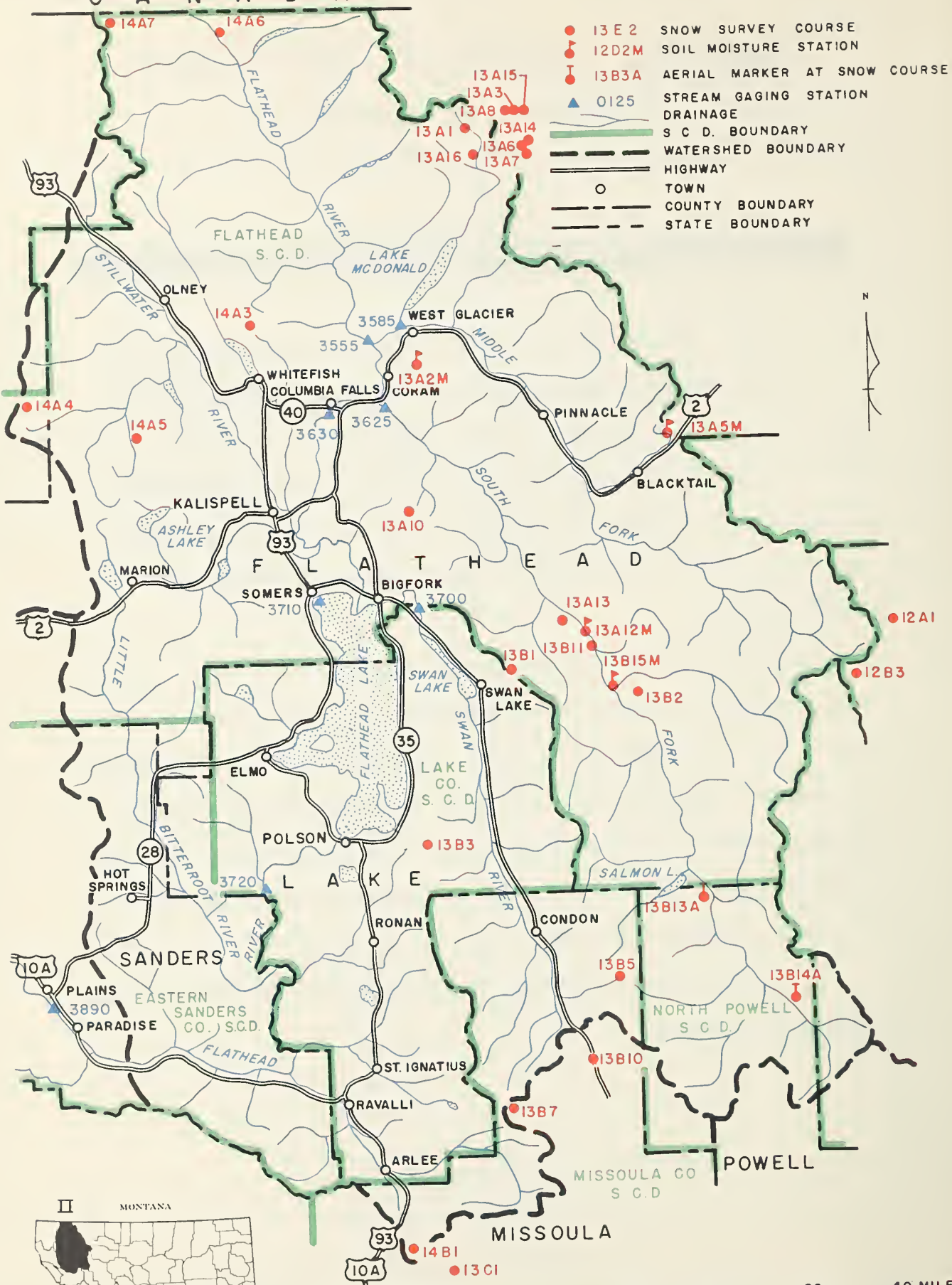
Irrigation Reservoir storage is less than last year but near the March first average.

Report Prepared by

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THE CONSERVATION OF WATER BEGINS WITH THE SNOW SURVEY

- 13 E 2 SNOW SURVEY COURSE
- 12D2M SOIL MOISTURE STATION
- 13B3A AERIAL MARKER AT SNOW COURSE
- ▲ 0125 STREAM GAGING STATION
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- COUNTY BOUNDARY
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# WATER SUPPLY FORECASTS

AS OF MARCH 1, 1961 - WATERSHED II

(1000 Acre Feet)

FORECAST POINT		FORECAST PERIOD	FORECAST THIS YEAR	FORECAST % NORMAL	MEASURED	
NO.	NAME				LAST YEAR*	NORMAL
3555	NORTH FORK FLATHEAD RIVER Columbia Falls (near)	Apr-Sept	2118	109	1905	1942
		Apr-July	1923	109	1735	1769
		Apr-June	1625	109	1470	1491
3585	MIDDLE FORK FLATHEAD RIVER West Glacier (near)	Apr-Sept	1830	97	1742	1881
		Apr-July	1694	97	1614	1747
		Apr-June	1426	96	1359	1487
3625	SOUTH FORK FLATHEAD RIVER Columbia Falls (nr)(17)	Apr-Sept	2112	92	2147	2297
		Apr-July	1997	92	2039	2180
		Apr-June	1766	93	1792	1901
3630	FLATHEAD RIVER Columbia River (at)(17)	Apr-Sept	6224	99	5888	6299
		Apr-July	5678	97	5465	5845
		Apr-June	4893	98	4695	4993
3720	Polson (near)(18)	Apr-Sept	7355	98	7377	7463
		Apr-July	6746	97	6832	6939
		Apr-June	5661	96	5837	5897
3700	SWAN RIVER Big Fork (near)	Apr-Sept	620	97	724	641
		Apr-July	555	97	634	568
		Apr-June	446	97	513	460

(17) Observed flow plus change in storage in Hungry Horse Reservoir.  
 (18) Observed flow plus change in storage in Hungry Horse Res. & Flathead Lake.  
 (+) Provisional data furnished by U. S. Geological Survey.

## RESERVOIR STORAGE DATA

AS OF FEBRUARY 28, 1961

(1000 Acre Feet)

NO.	RESERVOIR	USABLE CAPACITY	MEASURED		
			THIS YEAR	LAST YEAR	NORMAL
3620	Hungry Horse	3428.0	3175.0	2962.0	2199.3
3710	Flathead	1791.0	1078.0	1209.0	768.2
3757	Camas	45.2	25.5	35.0	25.1
3800	Mission Valley	100.3	30.0	49.6	35.5

NOTE: ALL NORMALS BASED ON 1943-1957 (15 YEAR PERIOD)

# SNOW SURVEY DATA

AS OF MARCH 1, 1961

WATERSHED II

SNOW COURSE			CURRENT INFORMATION			PAST RECORD		YEARS OF RECORD
NO.	NAME	ELEVATION	DATE OF SURVEY	SNOW DEPTH (Inches)	WATER CONTENT (Inches)	WATER CONTENT (Inches)		
						LAST YEAR	AVERAGE	
13B14A	Basin Creek	5000	3/4	26	6.6	4.2	8.8	7
14B3	Bassoo Peak	5150	2/28	30	8.2	-	-	-
13B3	Big Creek	6750	3/2	97	36.1	40.2	36.6	15
14A4	Brush Creek	5000	2/20	43	10.6	10.1	13.2	9
13A1	Cattle Queen	4700	2/26	96	24.4	21.8	29.9	13
13A2M	Desert Mountain	5600	2/28	44	12.2	13.9	14.2	9
Can 10	Fernie	3500	2/28	28	7.8	6.7	9.1	15
14A9	Griffin Creek Divide	5150	2/27	35	9.1	11.8	-	-
14A3	Hell Roaring Divide	5770	2/27	87	28.6	29.3	26.8	7
13B13A	Holbrook	4530	3/4	26	8.4	8.6	9.5	7
14A6	Kishenehn	3886	2/27	34	8.0	9.9	10.4	13
14A5	Logan Creek	4300	2/20	23	6.2	7.2	8.9	9
13A5M	Marias Pass	5250	2/28	48	14.1	12.3	17.4	15
13A16	Mineral Creek	4000	2/26	61	16.9	15.4	-	-
Can 10A	New Fernie	4100	3/2	54	10.1	8.8	13.4	7
13B7	North Fork Jocko	6330	3/7	118	40.3	33.3	38.3	15
13B2	Spotted Bear Mt.	7000	3/2	41	11.2	12.5	15.2	10
13A10	Strawberry Lake	6500	2/28	93	26.8	43.1	35.7	7
13B1	Trinkus Lake	6500	2/27	107	34.0	35.1	35.4	8
13A12M	Trout Lake	3600	3/2	32	8.2	13.5	16.4	10
14B1	TV Mountain	6800	2/24	42	10.5	11.4	-	-
13B11	Twin Creeks	3580	3/2	30	8.7	11.1	11.0	7
13B5	Upper Holland Lake	7000	2/28	80	24.6	25.9	31.0	8
14A7	Weasel Divide	5450	2/25	102	34.0	27.6	-	-

NOTE: ALL AVERAGES BASED ON 1943-1957 (15 YEAR PERIOD). "YEARS OF RECORD" INDICATED NUMBER OF YEARS USED IN 1943-1957 PERIOD.

# WATER SUPPLY OUTLOOK

LOWER CLARK FORK RIVER BASIN

MONTANA

AS OF:

MARCH 1, 1961

U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE

The Water Supply Outlook for the Clark Fork River below Missoula and tributary streams is Good.

Snow survey measurements made near the first of March indicate the snow-pack contains 28 percent more water than on March first last year, or 91 percent of the 1943-57 average.

April through September streamflow forecasts for the Clark Fork vary from 80 percent of last year at Missoula to 95 percent of last year at Plains. Tributary streams should flow between 5 to 15 percent more than last year.

Report Prepared by

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THE CONSERVATION OF WATER BEGINS WITH THE SNOW SURVEY



10A  
3920

NOXON GREEN MOUNTAIN S. C. D.

15B1 ● 15B11

THOMPSON FALLS 3910

15B2 SALTSE

3910 THOMPSON FORK

PLAINS

ST. REGIS 3545

SUPERIOR

15B10

15C1

ALBERTON

CLARK MINERAL CO S. C. D.

PARADISE 3890

FLATHEAD

RAVALLI

ARLEE

MISSOULA S. C. D.

14B1

13C1

MISSOULA

3530

3495

3405

3404

LOLO

BITTERROOT R.

93

LOLO HOT SPRINGS

BITTERROOT S. C. D.

3400 BONNER

BONITA

10



MONTANA



SCALE 10 0 10 20 30 40 MILES

13B5 ● NORTH POWELL S. C. D.

13B10

13B7

CLEARWATER R.

CLEARWATER

3385

20

13C8

BONITA

10

# WATER SUPPLY FORECASTS

AS OF MARCH 1, 1961 - WATERSHED III

(1000 Acre Feet)

FORECAST POINT		FORECAST PERIOD	FORECAST THIS YEAR	FORECAST NORMAL	MEASURED	
NO.	NAME				LAST YEAR	NORMAL
3400	BLACKFOOT RIVER Bonner (near)	Apr-Sept	754	76	818	999
		Apr-July	671	74	736	907
		Apr-June	574	74	655	775
3404	CLARK FORK RIVER Milltown (above)(14)	Apr-Sept	428	52	672	815
		Apr-July	366	50	576	716
		Apr-June	304	50	525	609
3405	Missoula (above)	Apr-Sept	1182	65	1490	1814
		Apr-July	1037	64	1312	1620
		Apr-June	886	64	1180	1384
3530	Missoula (below)	Apr-Sept	2400	71	2712	3361
		Apr-July	2172	71	2450	3059
		Apr-June	1818	70	2202	2608
3545	St. Regis (at)	Apr-Sept	3315	73	3645	4549
		Apr-July	2981	72	3286	4140
		Apr-June	2522	71	2951	3551
3890	Plains (near)(18)	Apr-Sept	10809	88	11238	12337
		Apr-July	9958	88	10226	11316
		Apr-June	8470	88	8885	9625
3910	Thompson Falls (at)(18)	Apr-Sept	No Forecasts (A)			
3920	Whitehorse Rapids (at)(19)	Apr-Sept	12205	88	12992	13932
		Apr-July	11231	88	11815	12763
		Apr-June	9518	88	10193	10816

(A) Thompson Falls stream measurements discontinued by U. S. Geological Survey 9/30/59.

(14) Difference in observed flow, Clark Fork above Missoula & Blackfoot at Bonner.

(18) Observed flow plus change in storage in Flathead Lake & Hungry Horse Res.

(19) Observed flow plus change in storage in Hungry Horse Reservoir, Flathead Lake and Noxon Reservoir.

(+) Provisional data furnished by U. S. Geological Survey.

## RESERVOIR STORAGE DATA

AS OF

(1000 Acre Feet)

NO.	RESERVOIR	USABLE CAPACITY	MEASURED		
			THIS YEAR	LAST YEAR	NORMAL

NOTE: ALL NORMALS BASED ON 1943-1957 (15 YEAR PERIOD)

# SNOW SURVEY DATA

AS OF MARCH 1, 1961

WATERSHED III

SNOW COURSE			CURRENT INFORMATION			PAST RECORD		YEARS OF RECORD
NO.	NAME	ELEVATION	DATE OF SURVEY	SNOW DEPTH (Inches)	WATER CONTENT (Inches)	WATER CONTENT (Inches)		
						LAST YEAR	AVERAGE	
13B10	Coyote Hill	4200	2/28	29	8.4	9.0	10.1	11
15C2	Fish Lake Airstrip	5000	3/4	104	36.0	28.7	37.1	5
14C5	Lolo Pass	5230	2/27	84	28.4	18.9	30.5	8
15B2	Lookout	5250	2/28	91	29.8	24.0	34.2	15
13C8	Lubrecht Forest #6	4040	3/1	8	2.8	1.7	4.3	7
13B7	North Fork Jocko	6330	3/7	118	40.3	33.3	38.3	15
14C6	Powell R. S.	4230	2/28	34	9.6	9.6	-	-
14C4	Savage Pass	6600	2/27	67	21.0	18.0	-	-
14B1	TV Mountain	6800	2/24	42	10.5	11.4	-	-

NOTE: ALL AVERAGES BASED ON 1943-1957 (15 YEAR PERIOD). "YEARS OF RECORD" INDICATED NUMBER OF YEARS USED IN 1943-1957 PERIOD.



# WATER SUPPLY OUTLOOK

UPPER CLARK FORK RIVER BASIN

MONTANA

AS OF:  
MARCH 1, 1961

U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE

The Water Supply Outlook in the Upper Clark Fork basin is Fair to Poor.

Farmers who depend upon natural streamflow for irrigation should give serious consideration to planting early maturing crops, such as grains and millet for hay. Starting new stands of hay and pasture should be deferred, as the water supply may be most critical later in the irrigation season. Those dependent upon a limited water supply should consider summer fallowing part of their cropland for weed control, or defer cropping to facilitate land leveling or revision of irrigation systems.

Good water management and proper application will be necessary to obtain the most beneficial use of the limited water supply.

Snow surveys made near the first of March indicate a deficient snow-pack in the headwaters of the Clark Fork and Blackfoot basins. All snow course measurements are below the 1943-57 average.

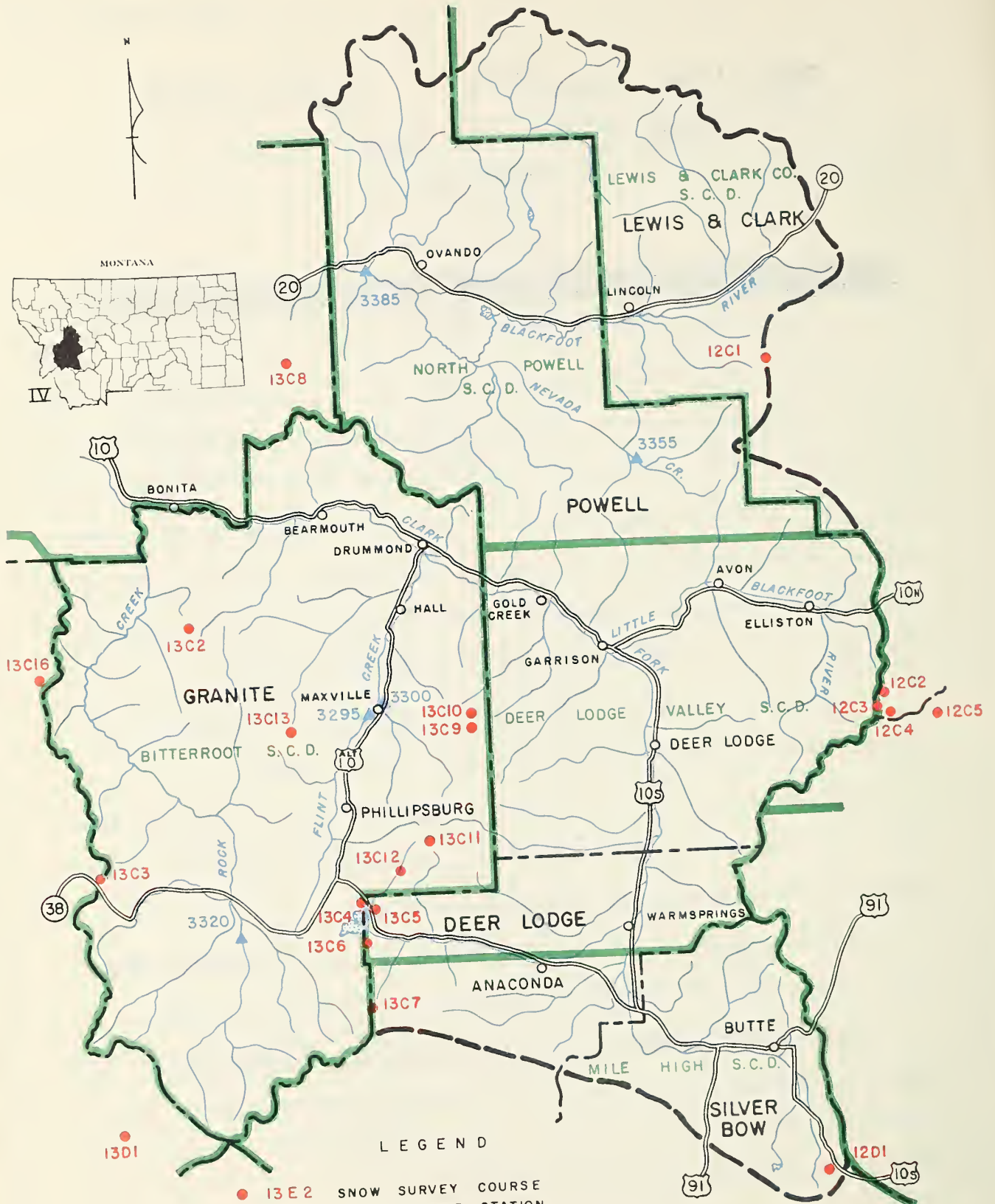
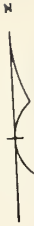
Over the headwaters of these two basins, the water stored in this year's snow pack is 72 percent of last year and 63 percent average.

April through September streamflow is forecast 40 percent below average on Flint Creek and Boulder Creek. The Clark Fork above Milltown is forecast at 64 percent of last year. The Blackfoot River is expected to flow about 10 percent less than last year.

Report Prepared by \_\_\_\_\_

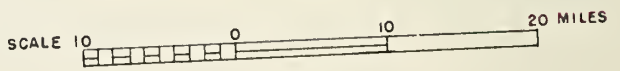
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THE CONSERVATION OF WATER BEGINS WITH THE SNOW SURVEY



LEGEND

- 13E2 SNOW SURVEY COURSE
- ▲ 12D2M SOIL MOISTURE STATION
- 13B3A AERIAL MARKER AT SNOW COURSE
- ▲ 0125 STREAM GAGING STATION
- DRAINAGE
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# WATER SUPPLY FORECASTS

AS OF MARCH 1, 1961 - WATERSHED IV

(1000 Acre Feet)

FORECAST POINT		FORECAST PERIOD	FORECAST THIS YEAR	%	MEASURED	
NO.	NAME				NORMAL	LAST YEAR
3295	FLINT CREEK Maxville (at)	Apr-Sept	27.2	59		46.4
		Apr-July	21.2	60		35.4
3300	BOULDER CREEK Maxville (at)	Apr-Sept	17.2	61		28.2
		Apr-July	15.6	60		25.8
3320	MIDDLE FORK ROCK CREEK Philipsburg (near)	Apr-Sept	54.1	68		82.2
		Apr-July	50.0	69		72.1
3400	BLACKFOOT RIVER Bonner (near)	Apr-Sept	754	76	818	999
		Apr-July	671	74	736	907
		Apr-June	574	74	655	775
3404	CLARK FORK RIVER Milltown (above) (14)	Apr-Sept	428	52	672	815
		Apr-July	366	50	576	716
		Apr-June	304	50	525	609

(14) Difference in observed flow, Clark Fork above Missoula & Blackfoot at Bonner.  
 (+) Provisional data furnished by U. S. Geological Survey.

## RESERVOIR STORAGE DATA

AS OF FEBRUARY 28, 1961

(1000 Acre Feet)

NO.	RESERVOIR	USABLE CAPACITY	MEASURED		
			THIS YEAR	LAST YEAR	NORMAL
3250	Georgetown Lake	31.0	23.3	28.2	23.0
3365	Nevada Creek	12.6		7.3	7.0

NOTE: ALL NORMALS BASED ON 1943-1957 (15 YEAR PERIOD)

# SNOW SURVEY DATA

AS OF MARCH 1, 1961

WATERSHED IV

SNOW COURSE			CURRENT INFORMATION			PAST RECORD		YEARS OF RECORD
NO.	NAME	ELEVATION	DATE OF SURVEY	SNOW DEPTH (Inches)	WATER CONTENT (Inches)	WATER CONTENT (Inches)		
						LAST YEAR	AVERAGE	
13C16	Ambrose	6475	2/28	38	9.2	8.6	-	-
13C13	Black Pine	7100	2/28	33	7.8	8.2	-	-
12C5	Chessman Reservoir	6200	2/27	1	0.2	4.1	4.3	15
13C9	El Dorado Mine	7800	2/27	42	11.8	16.1	16.3	5
13C11	Fred Burr Pass	8000	3/2	60	17.1	17.4	-	-
13C10	Gold Creek Lake	7200	2/27	34	9.0	9.6	13.3	5
13C4	Intergaard	6450	3/1	21	5.0	5.8	6.6	15
13C8	Lubrecht Forest #6	4040	3/1	8	2.8	1.7	4.3	7
12D1	Pipestone Pass	7200	2/20	11	3.0	5.5	4.4	15
13C12	Red Lion	7000	3/2	45	10.6	9.6	-	-
13C3	Skalkaho Summit	7259	2/28	66	19.6	14.7	-	-
13C2	Slide Rock Mountain	7100	3/1	34	8.8	9.8	-	-
13C5	Southern Cross	6500	3/1	13	3.8	4.5	5.0	15
12C1	Stemple Pass	6900	2/27	22	4.7	7.2	9.2	15
13C7	Storm Lake	7780	3/3	38	9.4	9.2	11.2	5
13C6	Stuart Mill	6500	3/1	12	3.5	4.6	5.6	15
12C2	Tenmile, Lower	6250	2/26	14	3.2	6.0	6.3	15
13C3	Tenmile, Middle	6800	2/25	22	4.9	8.5	9.2	15
12C4	Tenmile, Upper	8000	2/25	28	6.5	11.0	11.9	15

NOTE: ALL AVERAGES BASED ON 1943-1957 (15 YEAR PERIOD). "YEARS OF RECORD" INDICATED NUMBER OF YEARS USED IN 1943-1957 PERIOD.

# WATER SUPPLY OUTLOOK

## BITTERROOT RIVER BASIN

### MONTANA

AS OF :

MARCH 1, 1961

#### U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE

The Water Supply Outlook in the Bitterroot River drainage is Fair.

Farmers who depend upon natural streamflow for irrigation should give serious consideration to planting early maturing crops, such as grains and millet for hay. Starting new stands of hay and pasture should be deferred, as the water supply may be most critical later in the irrigation season. Those dependent upon a limited water supply should consider summer fallowing part of their cropland for weed control, or defer cropping to facilitate land leveling or revision of irrigation systems.

Good water management and proper application will be necessary to obtain the most beneficial use of the limited water supply.

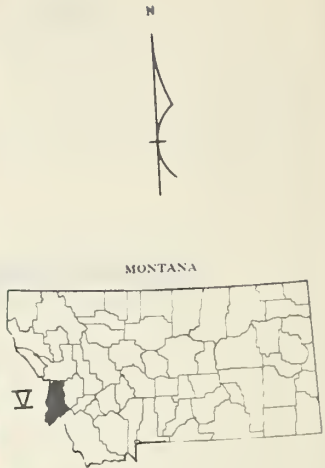
Snow surveys made near the first of March indicate that water stored in the snow-pack is 12 percent greater than last year, but only 75 percent average.

Streamflow in the Bitterroot drainage is forecast to be 20 to 30 percent below the 1943-57 average during the April-September period, with the exception of Blodgett Creek. The Bitterroot River at Darby is expected to flow 462,000 acre feet of water during April through September. This figure is 89 percent of last year's flow and 79 percent average.

Report Prepared by \_\_\_\_\_

A. R. CODD AND P. E. FARNES  
U. S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE  
BOX 855 BOZEMAN, MONTANA

THE CONSERVATION OF WATER BEGINS WITH THE SNOW SURVEY



LEGEND

- 13 E 2 SNOW SURVEY COURSE
- 1202M SOIL MOISTURE STATION
- ⊥ 13B3A AERIAL MARKER AT SNOW COURSE
- ▲ 0125 STREAM GAGING STATION
- DRAINAGE
- S C D. BOUNDARY
- WATERSHED BOUNDARY
- HIGHWAY
- TOWN
- COUNTY BOUNDARY
- STATE BOUNDARY



# WATER SUPPLY FORECASTS

AS OF MARCH 1, 1961 - WATERSHED V

(1000 Acre Feet)

FORECAST POINT		FORECAST PERIOD	FORECAST THIS YEAR	%	MEASURED	
NO.	NAME				LAST YEAR	NORMAL
3425	WEST FORK BITTERROOT RIVER Conner (near) (15)	Apr-Sept	123	70		176
		Apr-July	112	68		164
3440	BITTERROOT RIVER Darby (near)	Apr-Sept	462	79	521	587
		Apr-July	424	76	480	547
		Apr-June	363	76	434	477
3528	Missoula (near) (16)	Apr-Sept	1218	78	1222	1557
		Apr-July	1132	78	1138	1450
		Apr-June	968	78	1027	1244
3475	BLODGETT CREEK Corvallis (near)	Apr-Sept	43.8	93		46.7
		Apr-July	39.5	90		44.4
3510	BURNT FORK CREEK Stevensville (near)	Apr-Sept	23.0	74		31.2
		Apr-July	19.9	71		28.0

(15) Observed flow plus change in storage in West Fork Bitterroot River Reservoir.  
 (16) Difference in observed flow, Clark Fork above and below Missoula.  
 (+) Provisional data furnished by U. S. Geological Survey.

## RESERVOIR STORAGE DATA

AS OF

(1000 Acre Feet)

NO.	RESERVOIR	USABLE CAPACITY	MEASURED		
			THIS YEAR	LAST YEAR	NORMAL

NOTE: ALL NORMALS BASED ON 1943-1957 (15 YEAR PERIOD)

# SNOW SURVEY DATA

AS OF

MARCH 1, 1961

WATERSHED V

SNOW COURSE			CURRENT INFORMATION			PAST RECORD		YEARS OF RECORD
NO.	NAME	ELEVATION	DATE OF SURVEY	SNOW DEPTH (Inches)	WATER CONTENT (Inches)	WATER CONTENT (Inches)		
						LAST YEAR	AVERAGE	
13C16	Ambrose	6475	2/28	38	9.2	8.6	-	-
13D1	East Fork R. S.	5400	2/24	14	4.6	5.3	5.6	5
13D2	Gibbons Pass	7100	2/27	55	15.4	14.9	22.2	15
14C5	Lolo Pass	5230	2/27	84	28.4	18.9	30.5	8
14C7	Lost Horse	5940	2/27	79	25.0	19.3	-	-
13D16	Moose Creek	6200	2/27	40	10.6	10.8	16.1	15
14D2	Nez Perce Camp	5580	2/23	32	9.2	9.1	12.6	12
14D1	Nez Perce Pass	6575	2/23	32	9.3	10.2	16.7	13
14C6	Powell R. S.	4230	2/28	34	9.6	9.6	-	-
14C4	Savage Pass	6600	2/27	67	21.0	18.0	-	-
13C3	Skalkaho Summit	7259	2/28	66	19.6	14.7	-	-
14C8	Twin Lakes	6510	2/27	99	31.8	24.7	-	-

NOTE: ALL AVERAGES BASED ON 1943-1957 (15 YEAR PERIOD). "YEARS OF RECORD" INDICATED NUMBER OF YEARS USED IN 1943-1957 PERIOD.



# WATER SUPPLY OUTLOOK

MARIAS, TETON, & SUN RIVER BASINS

MONTANA

AS OF:  
MARCH 1, 1961

## U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE

The Water Supply Outlook in this area is Good to Fair.

Farmers who depend upon natural streamflow for irrigation should give serious consideration to planting early maturing crops, such as grains and millet for hay. Starting new stands of hay and pasture should be deferred, as the water supply will be most critical later in the irrigation season. Those dependent upon a limited water supply should consider summer fallowing part of their cropland for weed control, or defer cropping to facilitate land leveling or revision of irrigation systems.

Good water management and proper application will be necessary to obtain the most beneficial use of the limited water supply.

Snow survey measurements made near the first of March indicate that water stored in the snow-pack is 5 percent greater than last year, but is 67 percent of the 1943-57 average.

The April through September inflow into Gibson Reservoir is forecast at 484,000 acre feet, which is 10 percent more than last year or 82 percent average. The Marias River is expected to flow 15 percent more than last year.

Measurements at Cabin Creek and Wrong Creek snow courses could not be obtained this month, but will be measured near the first of April.

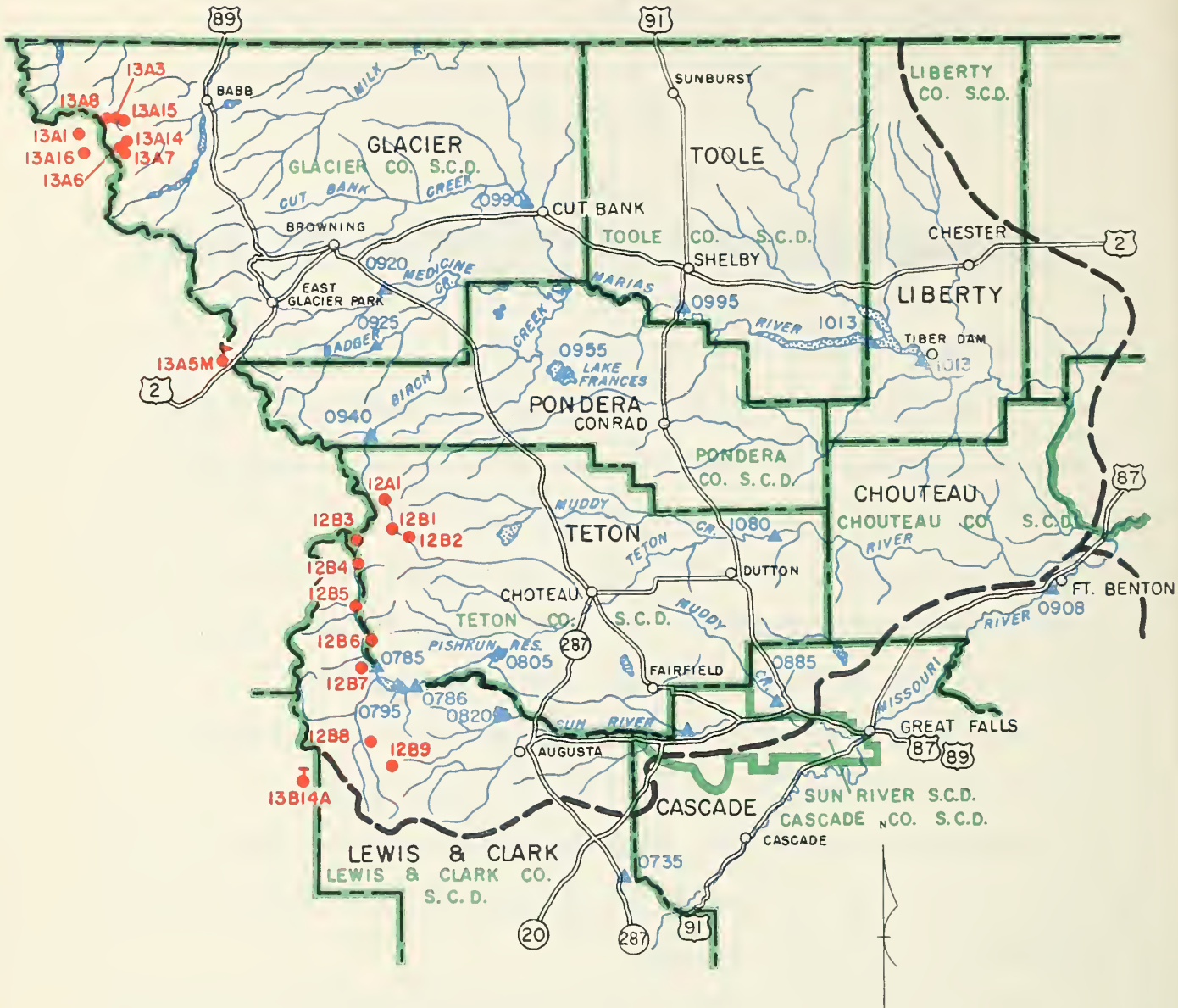
Storage in irrigation reservoirs is below average.

Report Prepared by \_\_\_\_\_

A. R. CODD AND P. E. FARNES  
U. S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE  
BOX 855 BOZEMAN, MONTANA

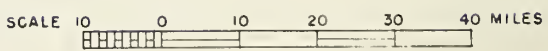
THE CONSERVATION OF WATER BEGINS WITH THE SNOW SURVEY

C A N A D A



LEGEND

- 13E2 SNOW SURVEY COURSE
- ⊥ 12D2M SOIL MOISTURE STATION
- ⊥ 13B3A AERIAL MARKER AT SNOW COURSE
- ▲ 0125 STREAM GAGING STATION
- DRAINAGE
- S C D BOUNDARY
- WATERSHED BOUNDARY
- HIGHWAY
- TOWN
- COUNTY BOUNDARY
- STATE BOUNDARY



# WATER SUPPLY FORECASTS

AS OF MARCH 1, 1961 - WATERSHED VI

(1000 Acre Feet)

FORECAST POINT		FORECAST PERIOD	FORECAST THIS YEAR	% NORMAL	MEASURED	
NO.	NAME				LAST YEAR <sup>+</sup>	NORMAL
0785	N. FORK OF N. FORK SUN Augusta (near)	Apr-Sept	196	82		239
		Apr-July	182	82		222
0786	SUN RIVER Gibson Dam (at)	Apr-Sept	484	82	436	588
		Apr-July	441	82	395	538
0995	MARIAS RIVER Shelby (near)	Apr-Sept	502	76	436	659
		Apr-July	461	76	408	605

(10) Difference in observed flow, North Fork of North Fork Sun near Augusta, and Sun at Gibson Dam.  
 (+) Provisional data furnished by U. S. Geological Survey.

## RESERVOIR STORAGE DATA

AS OF FEBRUARY 28, 1961

(1000 Acre Feet)

NO.	RESERVOIR	USABLE CAPACITY	MEASURED		
			THIS YEAR	LAST YEAR	NORMAL
1013	Tiber	1316.0	631.8	636.1	
0955	Lake Francis	112.0	77.7	96.3	94.6
0805	Pishkun	32.0	16.8	21.6	18.8
0795	Gibson	105.0	37.4	70.8	63.3
0820	Willow Creek	32.3	15.1	14.4	19.2
0940	Swift	30.0	14.3	27.0	23.1

NOTE: ALL NORMALS BASED ON 1943-1957 (15 YEAR PERIOD)

# SNOW SURVEY DATA

AS OF MARCH 1, 1961

WATERSHED VI

SNOW COURSE			CURRENT INFORMATION			PAST RECORD		YEARS OF RECORD
NO.	NAME	ELEVATION	DATE OF SURVEY	SNOW DEPTH (Inches)	WATER CONTENT (Inches)	WATER CONTENT (Inches)		
						LAST YEAR	AVERAGE	
12B8	Benchmark	5500	2/21	14	5.1	5.2	9.0	9
12B6	Cabin Creek	5400	Not measured			5.6	6.8	9
12B9	Five-Bull	5600	2/21	8	2.3	4.2	7.0	9
12A1	Freight Creek	6000	2/23	37	10.8	10.0	15.6	10
12B5	Gates Park	5300	3/4	28	7.0	6.2	10.1	9
12B7	Goat Mountain	7000	2/28	31	7.5	7.9	10.7	15
13A5M	Marias Pass	5250	2/28	48	14.1	12.3	17.4	15
12B2	Waldron Creek	5600	2/23	10	2.8	3.7	6.9	10
12B1	West Fork	6000	2/23	25	8.5	9.0	14.9	10
12B4	Wrong Creek	5700	Not measured			9.5	15.1	9
12B3	Wrong Ridge	6800	3/4	61	18.0	14.0	21.2	9

NOTE: ALL AVERAGES BASED ON 1943-1957 (15 YEAR PERIOD). "YEARS OF RECORD" INDICATED NUMBER OF YEARS USED IN 1943-1957 PERIOD.

# WATER SUPPLY OUTLOOK

MISSOURI RIVER (MAIN STEM) BASIN

MONTANA

AS OF :

MARCH 1, 1961

U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE

The Water Supply Outlook for the tributary streams to the Missouri Main Stem is Poor.

Farmers who depend upon natural streamflow for irrigation should give serious consideration to planting early maturing crops, such as grains and millet for hay. Starting new stands of hay and pasture should be deferred, as the water supply will be most critical later in the irrigation season. Those dependent upon a limited water supply should consider summer fallowing part of their cropland for weed control, or defer cropping to facilitate land leveling or revision of irrigation systems.

Good water management and proper application will be necessary to obtain the most beneficial use of the limited water supply.

Snow surveys made near the first of March indicate that water stored in the snow-pack is 51 percent of last year and 46 percent of the 1943-57 average.

Streamflow in the Missouri River is expected to be nearly the same as last year. Tributary streams, such as Prickly Pear Creek, Tenmile Creek, Sheep Creek and Smith River, are forecast to flow 40 to 60 percent of average. Prickly Pear Creek is expected to flow about 40 percent less than last year, or 50 percent average.

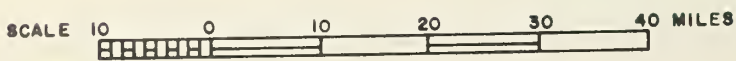
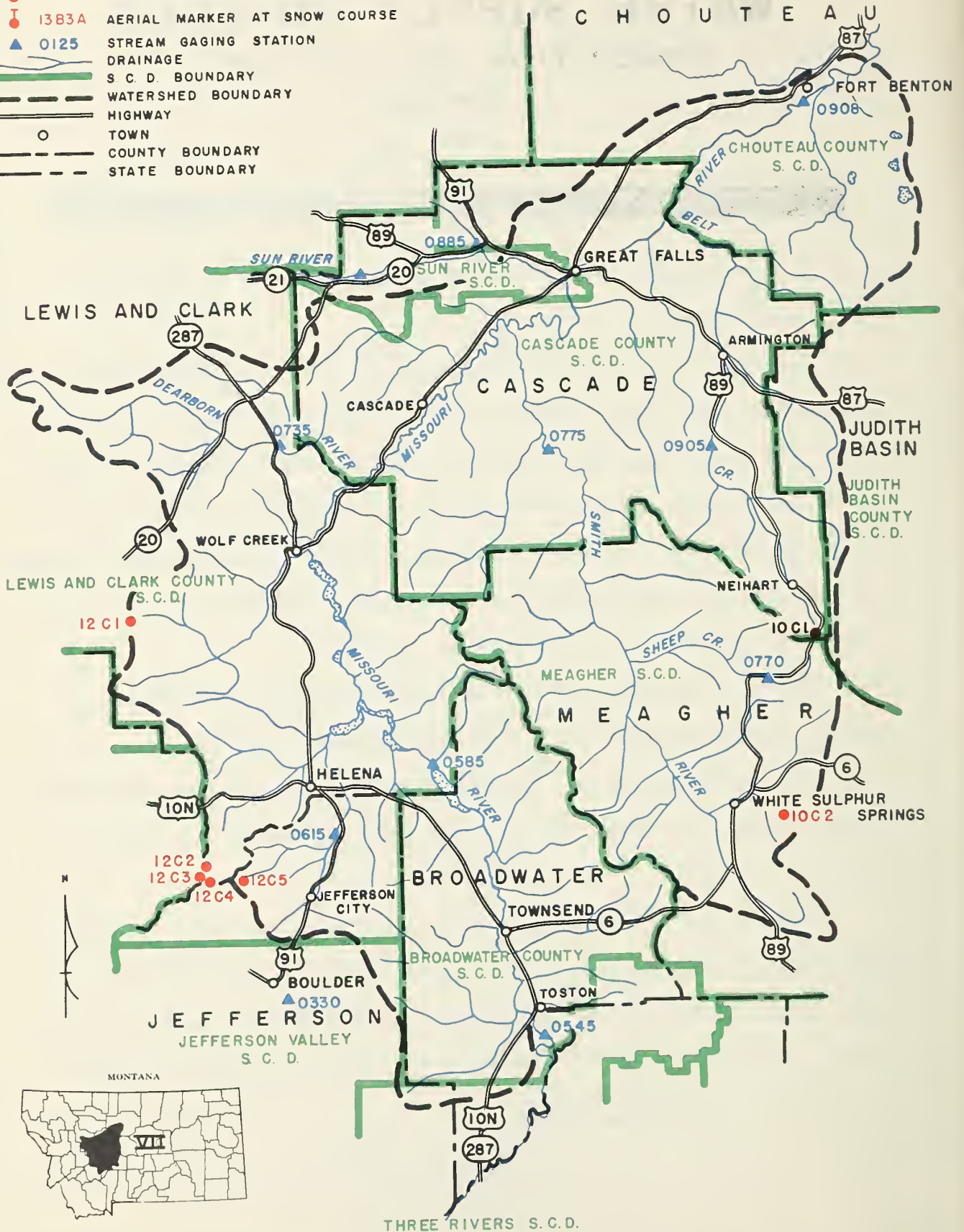
*Report Prepared by*

A. R. CODD AND P. E. FARNES  
U. S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE  
BOX 855 BOZEMAN, MONTANA

THE CONSERVATION OF WATER BEGINS WITH THE SNOW SURVEY

LEGEND

- 13 E 2 SNOW SURVEY COURSE
- 12 D 2 M SOIL MOISTURE STATION
- 13 B 3 A AERIAL MARKER AT SNOW COURSE
- ▲ 0125 STREAM GAGING STATION
- DRAINAGE
- S. C. D. BOUNDARY
- WATERSHED BOUNDARY
- HIGHWAY
- TOWN
- COUNTY BOUNDARY
- STATE BOUNDARY



# WATER SUPPLY FORECASTS

AS OF MARCH 1, 1961 - WATERSHED VII

(1000 Acre Feet)

FORECAST POINT		FORECAST PERIOD	FORECAST THIS YEAR	%	MEASURED	
NO.	NAME				LAST YEAR	NORMAL
0545	MISSOURI RIVER Toston (at) (3)	Apr-Sept	1729	74	1774	2342
		Apr-July	1479	73	1528	2030
0908	Fort Benton (at) (5)	Apr-Sept	2591	72		3599
		Apr-July	2215	72		3076
1095	Virgelle (at) (6)	Apr-Sept	3075	70		4393
		Apr-July	2662	70		3803
1150	Zortman (near) (6)	Apr-Sept	3220	67		4806
		Apr-July	2776	67		4143
1320	Ft. Peck Dam (below)(7)	Apr-Sept	3271	69		4761
		Apr-July	2862	69		4181
1770	Wolf Point (near) (7)	Apr-Sept	3559	68		5261
		Apr-July	3142	68		4652
3300	Williston, N. D. (8)	Apr-Sept	7567	60	6280	12562
		Apr-July	6640	60	5633	11101
0615	PRICKLY PEAR CREEK Clancy (near)	Apr-Sept	11.9	50	19.4	23.9
		Apr-July	10.5	50	17.1	20.8

(3) Observed flow plus change in storage in Hebgen and Ennis Lakes.  
 (5) Observed flow plus change in storage in Canyon Ferry.  
 (6) Observed flow plus change in storage in Canyon Ferry and Tiber Reservoirs.  
 (7) Observed flow plus change in storage in Canyon Ferry, Tiber and Fort Peck Reservoirs.  
 (8) Observed flow plus change in storage in Fort Peck, Canyon Ferry, Tiber, Buffalo Bill and Boysen Reservoirs.  
 (+) Provisional data furnished by U. S. Geological Survey.

## RESERVOIR STORAGE DATA

AS OF FEBRUARY 28, 1961

(1000 Acre Feet)

NO.	RESERVOIR	USABLE CAPACITY	MEASURED		
			THIS YEAR	LAST YEAR	NORMAL
0585	Canyon Ferry	2043.0	1487.0	1847.0	1332.0
0645	Lake Helena	10.4	9.6	4.5	8.3
0660	Holter Lake	81.9	9.9	16.0	59.2
0650	Hauser Lake & Lake Helena	61.9	59.6	43.6	54.1
1315	Fort Peck	19410.0	11370.0	10010.0	11178.0

NOTE: ALL NORMALS BASED ON 1943-1957 (15 YEAR PERIOD)

# SNOW SURVEY DATA

AS OF MARCH 1, 1961

WATERSHED VII

SNOW COURSE			CURRENT INFORMATION			PAST RECORD		YEARS OF RECORD
NO.	NAME	ELEVATION	DATE OF SURVEY	SNOW DEPTH (Inches)	WATER CONTENT (Inches)	WATER CONTENT (Inches)		
						LAST YEAR	AVERAGE	
1205	Chessman Reservoir	6200	2/27	1	0.2	4.1	4.3	15
1002	Grasshopper	7000	3/1	5	0.8	4.1	4.3	15
1001	Kings Hill	7950	3/1	32	6.2	10.6	11.5	15
1201	Stemple Pass	6900	2/27	22	4.7	7.2	9.2	15
1202	Tenmile, Lower	6250	2/26	14	3.2	6.0	6.3	15
1203	Tenmile, Middle	6800	2/25	22	4.7	8.5	9.2	15
1204	Tenmile, Upper	8000	2/25	28	6.5	11.0	11.9	15

NOTE: ALL AVERAGES BASED ON 1943-1957 (15 YEAR PERIOD). "YEARS OF RECORD" INDICATED NUMBER OF YEARS USED IN 1943-1957 PERIOD.



# WATER SUPPLY OUTLOOK

## BEAVERHEAD, & JEFFERSON RIVER BASINS

### MONTANA

AS OF:  
MARCH 1, 1961

#### U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE

The Water Supply Outlook in the Red Rock and Beaverhead River drainages is Poor, with a Fair supply anticipated for the Big Hole, Boulder and Jefferson Rivers.

Farmers who depend upon natural streamflow for irrigation should give serious consideration to planting early maturing crops, such as grains, and millet for hay. Starting new stands of hay and pasture should be deferred, as the water supply will be most critical later in the irrigation season. Those dependent upon a limited water supply should consider summer fallowing part of their cropland for weed control, or defer cropping to facilitate land leveling or revision of irrigation systems.

Good water management and proper application will be necessary to obtain the most beneficial use of the limited water supply.

Snow survey measurements made near the first of March indicate that water stored in the snow-pack is 82 percent of last year and 62 percent of the 1943-57 average.

The April through September flow in the Red Rock River is forecast to be 77 percent of last year, or 49 percent average. The flow in the Big Hole and Jefferson River is expected to be slightly less than last year, while the Boulder River is forecast at 74 percent of last year.

Storage in Lima Reservoir is much below average.

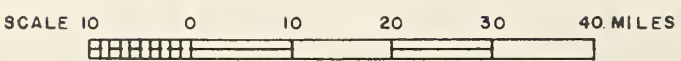
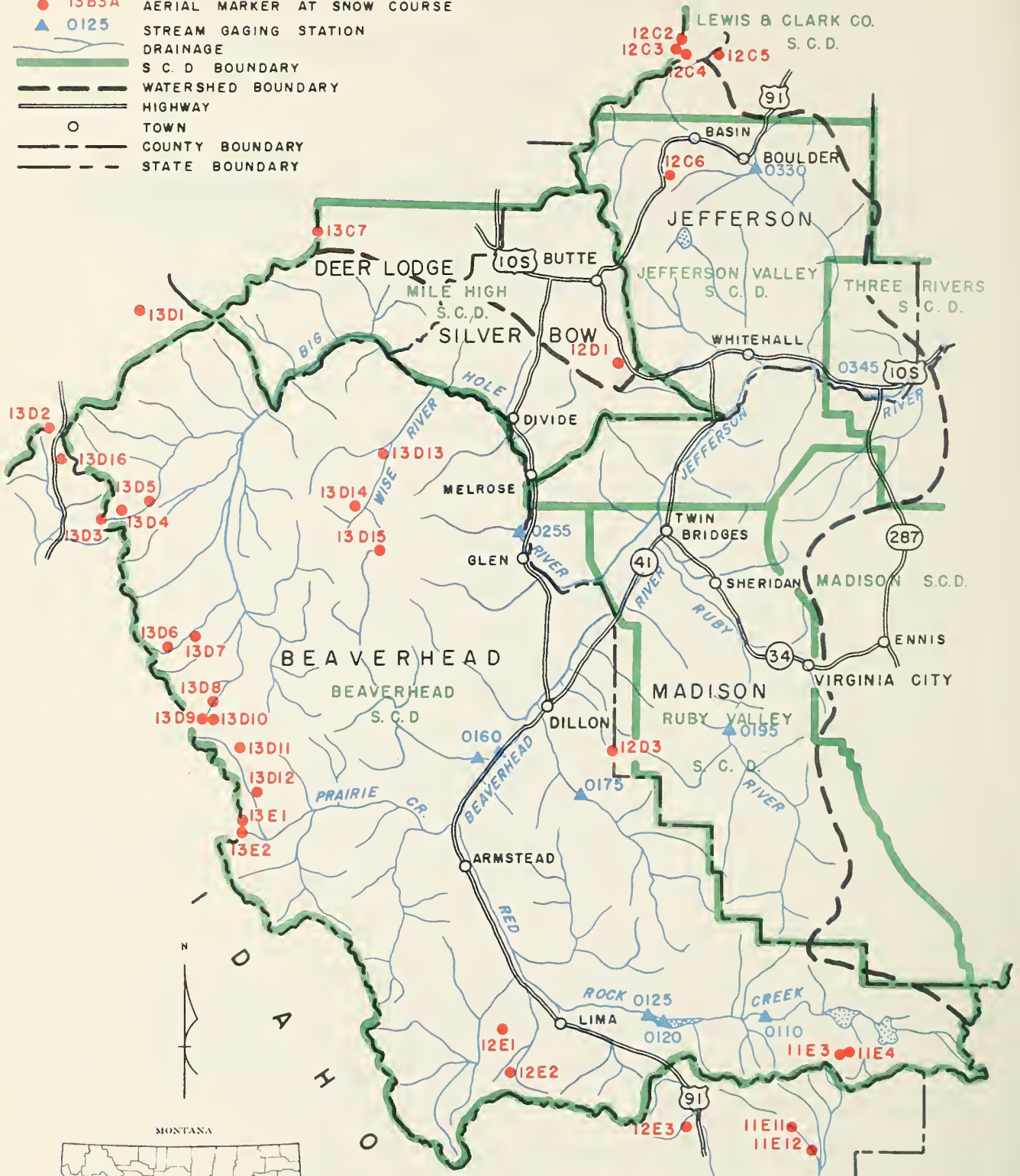
Report Prepared by \_\_\_\_\_

<p>A. R. CODD AND P. E. FARNES U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE BOX 855 BOZEMAN, MONTANA</p>
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THE CONSERVATION OF WATER BEGINS WITH THE SNOW SURVEY

LEGEND

- 13 E 2 SNOW SURVEY COURSE
- 12 D 2 M SOIL MOISTURE STATION
- 13 B 3 A AERIAL MARKER AT SNOW COURSE
- ▲ 0125 STREAM GAGING STATION
- DRAINAGE
- S C D BOUNDARY
- WATERSHED BOUNDARY
- HIGHWAY
- TOWN
- COUNTY BOUNDARY
- STATE BOUNDARY



# WATER SUPPLY FORECASTS

AS OF MARCH 1, 1961 - WATERSHED VIII

(1000 Acre Feet)

FORECAST POINT		FORECAST PERIOD	FORECAST THIS YEAR	s NORMAL	MEASURED	
NO.	NAME				LAST YEAR	NORMAL
0110	RED ROCK RIVER Kennedy Ranch (at)	May-Sept	23.5	43	27.8	54.9
0125	Monida (near) (1)	May-July	21.1	43	25.5	49.1
		Apr-Sept	42.1	49	54.6	86.4
0160	BEAVERHEAD RIVER Barratts (at) (1)	Apr-Sept	40.3	49	53.5	82.2
		Apr-July	No Forecast (B)		82.6	173
0255	BIG HOLE RIVER Melrose (near)	Apr-Sept			59.8	155
		Apr-July	537	70	556	770
0330	BOULDER RIVER Boulder (near)	Apr-Sept	491	69	513	714
		Apr-July	54.4	68	73.0	79.9
0345	JEFFERSON RIVER Sappington (at)	Apr-Sept	52.4	69	69.9	76.5
		Apr-July	736	68	760	1074
		Apr-July	644	67	677	958

(B) Forecasts discontinued at this station because the large number of unmeasured diversions above the station determine the flow.  
 (1) Observed flow plus change in storage in Lima Reservoir.  
 (+) Provisional data furnished by U. S. Geological Survey.

## RESERVOIR STORAGE DATA

AS OF FEBRUARY 28, 1961

(1000 Acre Feet)

NO.	RESERVOIR	USABLE CAPACITY	MEASURED		
			THIS YEAR	LAST YEAR	NORMAL
0120	Ruby Lima	38.8 84.0	21.2 9.4	32.0 -	21.2 (8) 32.8

NOTE: ALL NORMALS BASED ON 1943-1957 (15 YEAR PERIOD)

# SNOW SURVEY DATA

AS OF MARCH 1, 1961

WATERSHED VIII

SNOW COURSE			CURRENT INFORMATION			PAST RECORD		YEARS OF RECORD
NO.	NAME	ELEVATION	DATE OF SURVEY	SNOW DEPTH (Inches)	WATER CONTENT (Inches)	WATER CONTENT (Inches)		
						LAST YEAR	AVERAGE	
13D14	Anderson Meadow	7000	3/2	22	3.7	3.9	7.4	10
13D4	Below Big Hole Pass	6900	3/1	35	6.0	8.9	13.0	10
13D3	Big Hole Pass	7240	3/1	41	9.7	8.7	15.1	10
13D10	Bloody Dick	7600	2/27	31	6.2	7.4	10.3	10
12E3	Camp Creek	6800	2/27	21	4.5	7.0	9.2	15
12C5	Chessman Reservoir	6200	2/27	1	0.2	4.1	4.3	15
13D5	East Boundary	6700	3/1	16	3.2	4.7	7.1	10
13D15	Elk Horn	8450	3/1	27	5.4	5.7	9.1	15
13D2	Gibbons Pass	7100	2/27	55	15.4	14.9	22.2	15
13D9	Gold Stone	8100	2/27	38	9.1	9.0	13.1	10
13D8	Jahnke Creek	7340	2/27	28	5.1	7.0	9.7	10
11E12	Kilgore	6200	2/26	32	7.9	7.4	9.5	15
11E4	Lakeview Canyon	6930	2/24	29	6.1	7.3	10.2	10
11E3	Lakeview Ridge	7400	2/24	25	5.0	6.6	8.5	10
13E1	Lemhi Pass	7480	2/23	22	4.7	6.6	7.4	10
12E2	Limekiln	6950	2/21	0	0	1.8	1.2	10
13D6	Miner Forks	7300	2/28	39	8.2	8.2	10.7	10
13D7	Miner Lake	6720	2/28	25	5.0	5.7	7.0	13
13D16	Moose Creek	6200	2/27	40	10.6	10.8	16.1	15
12C6	Picnic Grounds	6500	3/1	10	2.3	2.5	4.7	11
12D1	Pipestone Pass	7200	2/20	11	3.0	5.5	4.4	15
13D11	Selway Junction	6800	2/22	24	3.1	5.4	7.2	10
13C7	Storm Lake	7780	3/2	38	9.4	9.2	11.2	5
12C2	Tenmile, Lower	6250	2/26	14	3.2	6.0	6.3	15
12C3	Tenmile, Middle	6800	2/25	22	4.9	8.5	9.2	15
12C4	Tenmile, Upper	8000	2/25	28	6.5	11.0	11.9	15
13D12	Terrell Creek	6650	2/22	19	3.3	2.6	4.3	10
13E2	Trail Creek	7090	2/23	19	3.7	6.6	6.7	10
12E1	White Pine Ridge	8850	2/21	16	3.3	4.0	4.4	10
13D13	Wise River	6300	3/2	13	2.3	3.6	4.9	10

NOTE: ALL AVERAGES BASED ON 1943-1957 (15 YEAR PERIOD). "YEARS OF RECORD" INDICATED NUMBER OF YEARS USED IN 1943-1957 PERIOD.

# WATER SUPPLY OUTLOOK

MADISON, & GALLATIN RIVER BASINS

MONTANA

AS OF:  
MARCH 1, 1961

U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE

The Water Supply Outlook for the Madison and Gallatin River basins is fair to poor.

Farmers who depend upon natural streamflow for irrigation should give serious consideration to planting early maturing crops, such as grains, and millet for hay. Starting new stands of hay and pasture should be deferred, as the water supply will be most critical later in the irrigation season. Those dependent upon a limited water supply should consider summer fallowing part of their cropland for weed control, or defer cropping to facilitate land leveling or revision of irrigation systems.

Good water management and proper application will be necessary to obtain the most beneficial use of the limited water supply.

Snow survey measurements made on or near the first of March indicate that the snow-pack on the headwaters of the two basins is 120 percent of last year and 78 percent average.

Two new snow courses have been established on Jack Creek and North Meadow Creek in the lower Madison; measurements indicate a deficient snow-pack in this area.

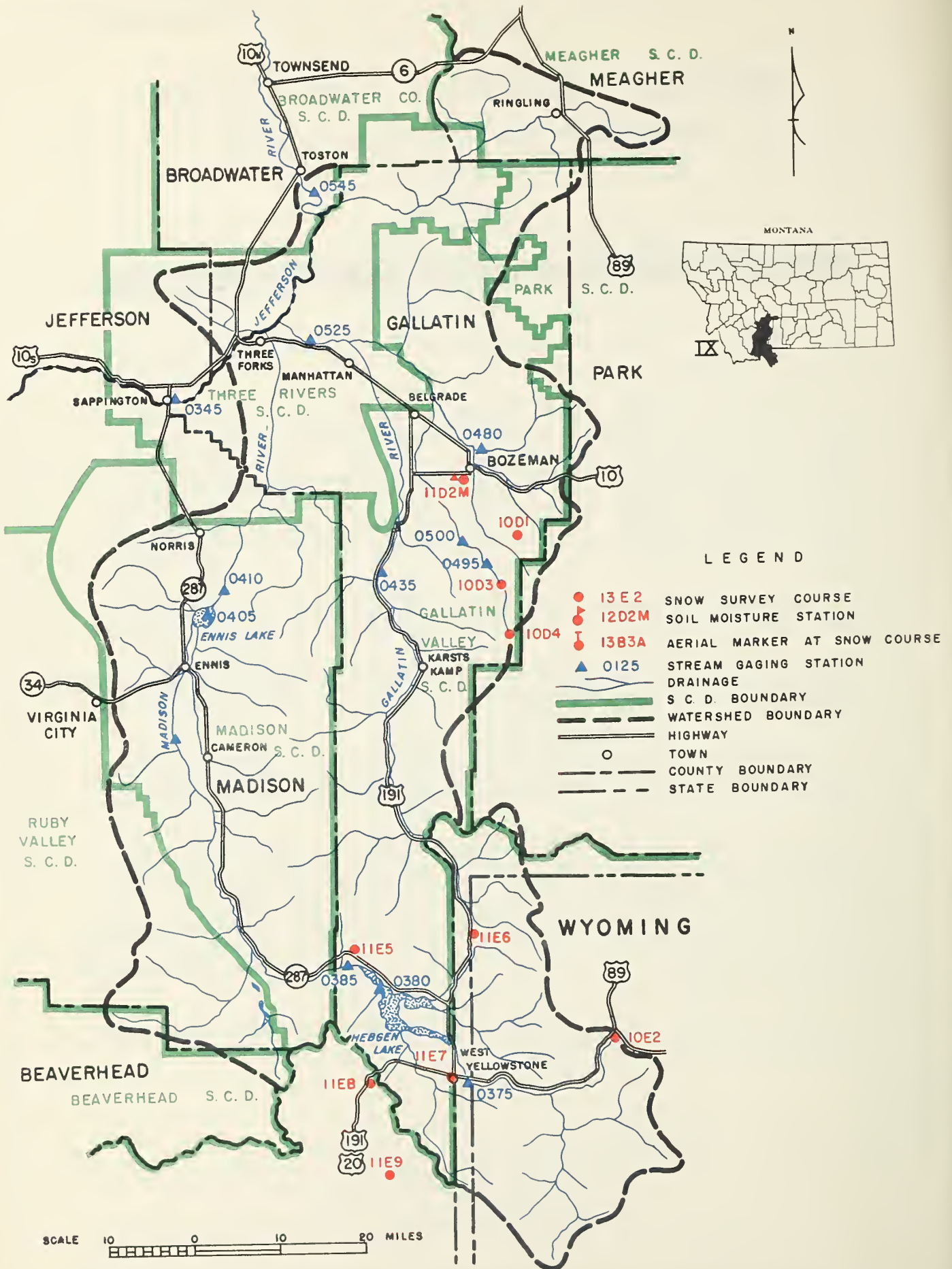
The Madison River is forecast to flow about 5 percent more water this year than last year for the April through September period. The West Gallatin is expected to flow about 6 percent less than last year or 35 percent average. The most severe shortage in the Madison-Gallatin area is expected to occur on the East Gallatin, where the April through September streamflow is forecast to be 40 percent less than last year or 57 percent average.

Soil moisture conditions have improved in the valleys, but soils underlying the snow-pack are dry.

Report Prepared by

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U. S. DEPARTMENT OF AGRICULTURE  
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THE CONSERVATION OF WATER BEGINS WITH THE SNOW SURVEY



LEGEND

- 13 E 2 SNOW SURVEY COURSE
- ▲ 12D2M SOIL MOISTURE STATION
- ⊥ 13B3A AERIAL MARKER AT SNOW COURSE
- ▲ 0125 STREAM GAGING STATION
- DRAINAGE
- S C D. BOUNDARY
- - - WATERSHED BOUNDARY
- HIGHWAY
- TOWN
- - - COUNTY BOUNDARY
- · - · STATE BOUNDARY

SCALE 10 0 10 20 MILES

# WATER SUPPLY FORECASTS

AS OF MARCH 1, 1961 - WATERSHED IX

(1000 Acre Feet)

FORECAST POINT		FORECAST PERIOD	FORECAST THIS YEAR	FORECAST NORMAL	MEASURED	
NO.	NAME				LAST YEAR	NORMAL
0375	MADISON RIVER West Yellowstone (nr)	Apr-Sept	182	84	171	216
		Apr-July	137	83	128	165
0385	Grayling (near) (2)	Apr-Sept	377	84	327	448
		Apr-July	296	83	247	357
0410	McAllister (near) (3)	Apr-Sept	652	86	620	756
		Apr-July	524	85	480	613
0435	WEST GALLATIN RIVER Gateway (near)	Apr-Sept	389	85	416	459
		Apr-July	336	85	353	395
0500	Hyalite Cr. R.S.(at) (4)	Apr-Sept	30.6	85	35.4	36.1
		Apr-July	26.4	85	30.6	31.0
0480	EAST GALLATIN RIVER Bozeman (at)	Apr-Sept	26.5	57	42.7	46.4
		Apr-July	23.2	57	36.9	40.7
0525	GALLATIN RIVER Logan (at)	Apr-Sept	384	78	420	492
		Apr-July	325	77	352	422

(2) Observed flow plus change in storage in Hebgen Lake.  
 (3) Observed flow plus change in storage in Hebgen and Ennis Lakes.  
 (4) Observed flow plus change in storage in Hyalite Reservoir.  
 (+) Provisional data furnished by U. S. Geological Survey.

## RESERVOIR STORAGE DATA

AS OF FEBRUARY 28, 1961

(1000 Acre Feet)

NO.	RESERVOIR	USABLE CAPACITY	MEASURED		
			THIS YEAR	LAST YEAR	NORMAL
0380	Hebgen Lake	345.0	133.7	25.8	213.9
0405	Ennis Lake	41.0	39.0	37.7	35.9
0500	Middle Creek	8.0		4.2	3.6

NOTE: ALL NORMALS BASED ON 1943-1957 (15 YEAR PERIOD)

# SNOW SURVEY DATA

AS OF

MARCH 1, 1961

WATERSHED IX

SNOW COURSE			CURRENT INFORMATION			PAST RECORD		YEARS OF RECORD
NO.	NAME	ELEVATION	DATE OF SURVEY	SNOW DEPTH (Inches)	WATER CONTENT (Inches)	WATER CONTENT (Inches)		
						LAST YEAR	AVERAGE	
11E9	Big Springs	6500	2/26	53	16.5	10.0	20.4	15
10D4	Devil's Slide	8100	3/2	55	14.4	19.0	16.3	15
11E5	Hebgen	6550	2/27	37	8.1	7.9	11.2	15
10D3	Hood Meadow	6600	3/1	25	6.2	7.1	7.2	15
11E10	Island Park	6315	2/25	45	12.5	7.9	15.8	15
11D5	Jack Creek	7600	2/17	6	1.1	-	-	-
10D1	New World	6700	2/25	24	6.6	8.8	8.7	14
10E2	Norris Basin	7500	2/28	34	7.5	4.0	9.4	10
11D3	North Meadow	7500	2/17	23	4.8	-	-	-
10D10	Sacajawea	6550	2/27	29	7.6	12.5	-	-
11E6	Twenty-One Mile	7150	2/27	47	12.3	8.8	16.0	15
11E8	Valley View	6500	2/26	39	10.1	6.9	12.9	12
11E7	West Yellowstone	6700	2/27	33	7.5	5.2	11.3	15

NOTE: ALL AVERAGES BASED ON 1943-1957 (15 YEAR PERIOD). "YEARS OF RECORD" INDICATED NUMBER OF YEARS USED IN 1943-1957 PERIOD.



# WATER SUPPLY OUTLOOK

## JUDITH, & MUSSELHELL RIVER BASINS

### MONTANA

AS OF:  
MARCH 1, 1961

#### U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE

The Water Supply Outlook in the Judith and Musselshell drainages is Poor.

Farmers who depend upon natural streamflow for irrigation should give serious consideration to planting early maturing crops, such as grains and millet for hay. Starting new stands of hay and pasture should be deferred, as the water supply may be most critical later in the irrigation season. Those dependent upon a limited water supply should consider summer fallowing part of their cropland for weed control, or defer cropping to facilitate land leveling or revision of irrigation systems.

Snow surveys made near the first of March indicate the snow-pack is 53 percent of last year and 51 percent of the 1943-57 average.

Soil moisture underlying the snow-pack is below average and will have a significant effect on the spring and summer streamflow.

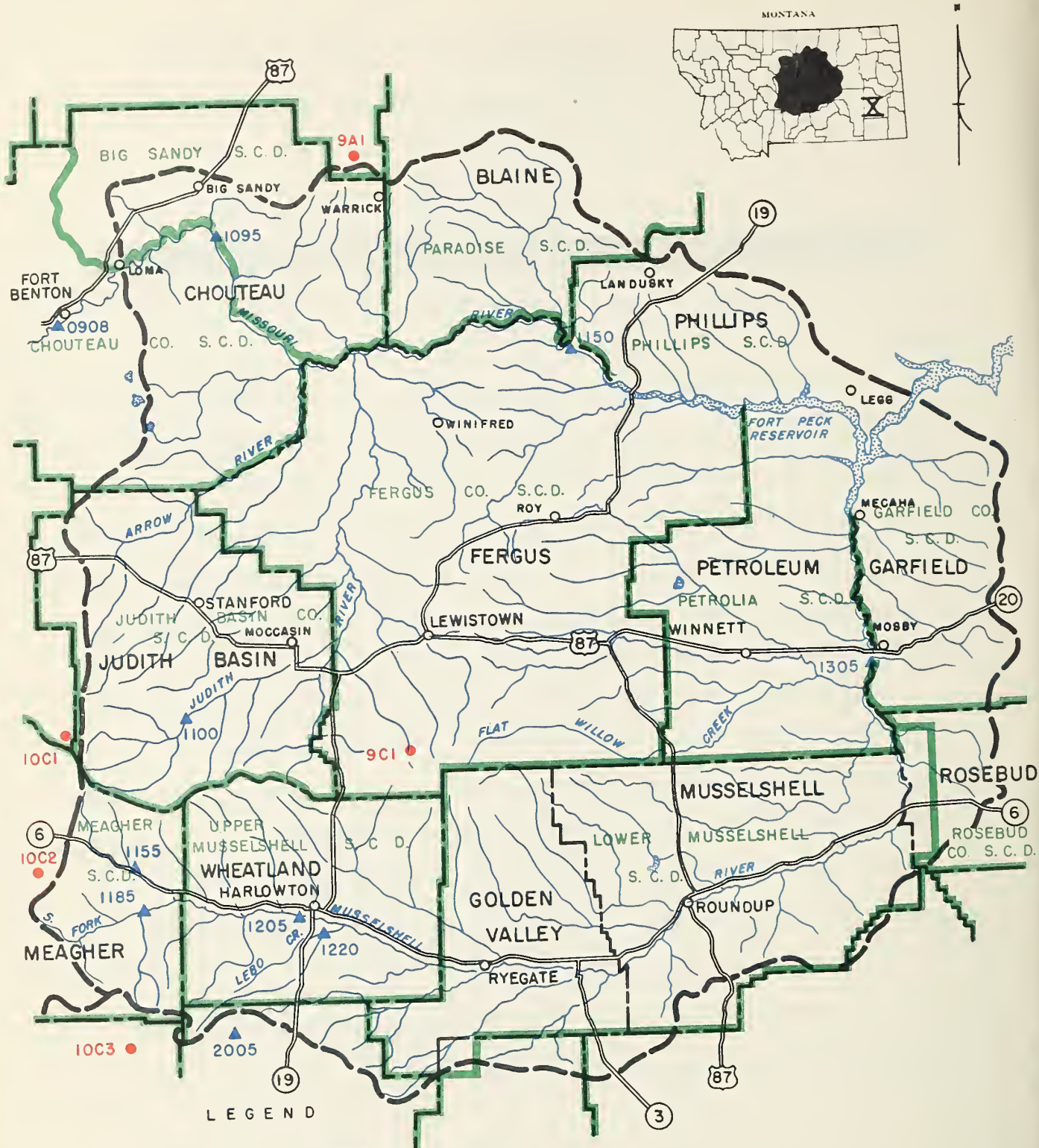
The South Fork of the Musselshell above Martinsdale is expected to flow 60 percent of average during the April through September period. This is slightly more than last year's flow.

Other streams and creeks in this area are expected to follow much the same pattern of below-normal streamflow.

Report Prepared by

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THE CONSERVATION OF WATER BEGINS WITH THE SNOW SURVEY

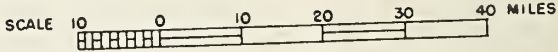


MONTANA



LEGEND

- 13E2 SNOW SURVEY COURSE
- 12D2M SOIL MOISTURE STATION
- 13B3A AERIAL MARKER AT SNOW COURSE
- ▲ 0125 STREAM GAGING STATION
- DRAINAGE
- S. C. D. BOUNDARY
- WATERSHED BOUNDARY
- HIGHWAY
- TOWN
- COUNTY BOUNDARY
- STATE BOUNDARY



# WATER SUPPLY FORECASTS

AS OF MARCH 1, 1961 - WATERSHED X

(1000 Acre Feet)

FORECAST POINT		FORECAST PERIOD	FORECAST THIS YEAR	FORECAST NORMAL	MEASURED	
NO.	NAME				LAST YEAR	+ NORMAL
<b>MUSSELSHELL RIVER</b>						
South Fork						
1185	Martinsdale (above)	Apr-Sept	32.2	60	31.5	53.6
		Apr-July	30.8	60	29.9	51.4
1205	Harlowton (at) (9)	Apr-Sept	48.1	58		83.0
		Apr-July	47.6	58		82.0
<b>MISSOURI RIVER</b>						
1095	Virgelle (at) (6)	Apr-Sept	3075	70		4393
		Apr-July	2662	70		3803
1150	Zortman (near) (6)	Apr-Sept	3220	67		4806
		Apr-July	2776	67		4143
(6) Observed flow plus change in storage in Canyon Ferry and Tiber Reservoirs. (9) Observed flow plus change in storage in Durand and Martinsdale Reservoirs. (+) Provisional data furnished by U. S. Geological Survey.						

## RESERVOIR STORAGE DATA

AS OF FEBRUARY 28, 1961

(1000 Acre Feet)

NO.	RESERVOIR	USABLE CAPACITY	MEASURED		
			THIS YEAR	LAST YEAR	NORMAL
1190	Martinsdale	23.1		6.3	9.8
1165	Durand	7.0		4.6	4.9
1105	Ackley	5.8	4.1	4.1	4.2

NOTE: ALL NORMALS BASED ON 1943-1957 (15 YEAR PERIOD)

# SNOW SURVEY DATA

AS OF

MARCH 1, 1961

WATERSHED X

SNOW COURSE			CURRENT INFORMATION			PAST RECORD		YEARS OF RECORD
NO.	NAME	ELEVATION	DATE OF SURVEY	SNOW DEPTH (Inches)	WATER CONTENT (Inches)	WATER CONTENT (Inches)		
						LAST YEAR	AVERAGE	
10C5	Bald Ridge	7500	2/28	31	7.6	-	-	-
9C1	Crystal Lake	6100	3/1	21	7.0	11.4	9.9	15
10C2	Grasshopper	7000	3/1	5	0.8	4.1	4.3	15
10C1	Kings Hill	7950	3/1	32	6.2	10.6	11.5	15
10C3	Porcupine	6500	2/28	17	4.2	4.8	5.7	15
9A1	Rocky Boy	5200	3/1	6	0.2	3.8	4.8	15

NOTE: ALL AVERAGES BASED ON 1943-1957 (15 YEAR PERIOD). "YEARS OF RECORD" INDICATED NUMBER OF YEARS USED IN 1943-1957 PERIOD.

# WATER SUPPLY OUTLOOK

UPPER YELLOWSTONE RIVER BASIN

MONTANA

AS OF:

MARCH 1, 1961

U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE

The Water Supply Outlook in the Upper Yellowstone area is Fair to Poor.

Farmers who depend upon natural streamflow for irrigation should give serious consideration to planting early maturing crops, such as grains, and millet for hay. Starting new stands of hay and pasture should be deferred, as the water supply may be most critical later in the irrigation season. Those dependent upon a limited water supply should consider summer fallowing part of their cropland for weed control, or defer cropping to facilitate land leveling or revision of irrigation systems.

Good water management and proper application will be necessary to obtain the most beneficial use of the limited water supply.

Snow survey measurements made near the first of March indicate that water stored in the snow-pack is 116 percent of last year and 77 percent of the 1943-57 average.

Deficient soil moisture conditions underlying the light snow-pack in the Shields River drainage are expected to produce a 65 percent average April through September streamflow.

The Yellowstone River is forecast to flow slightly more water than last year. The Stillwater River, Clarks Fork River and Rock Creek are forecast to flow 10 to 30 percent more water than last year.

Report Prepared by

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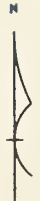
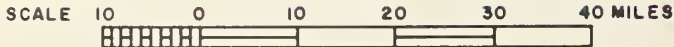
THE CONSERVATION OF WATER BEGINS WITH THE SNOW SURVEY



W Y O M I N G

LEGEND

- 13 E 2 SNOW SURVEY COURSE
- 12D2M SOIL MOISTURE STATION
- 13B3A AERIAL MARKER AT SNOW COURSE
- ▲ 0125 STREAM GAGING STATION
- DRAINAGE
- S C D. BOUNDARY
- WATERSHED BOUNDARY
- HIGHWAY
- TOWN
- COUNTY BOUNDARY
- STATE BOUNDARY



# WATER SUPPLY FORECASTS

AS OF MARCH 1, 1961 - WATERSHED XI

(1000 Acre Feet)

FORECAST POINT		FORECAST PERIOD	FORECAST THIS YEAR	% NORMAL	MEASURED	
NO.	NAME				LAST YEAR	NORMAL
<b>YELLOWSTONE RIVER</b>						
1915	Corwin Springs (at)	Apr-Sept	1518	77	1322	1980
		Apr-July	1240	75	1108	1649
1925	Livingston (near)	Apr-Sept	1713	76	1527	2252
		Apr-July	1383	74	1273	1863
2145	Billings (at)	Apr-Sept	2983	70	2526	4261
		Apr-July	2560	70	2176	3657
3090	Miles City (at) (13)	Apr-Sept	3898	58	2897	6721
		Apr-July	3412	58	2569	5883
3295	Sidney (near) (13)	Apr-Sept	3737	54	2675	6921
		Apr-July	3314	54	2473	6137
<b>SHIELDS RIVER</b>						
1935	Clyde Park (at)	Apr-Sept	72.4	65	63.4	111
		Apr-July	66.9	65	58.7	1103
<b>ROSEBUD CREEK</b>						
2045	Absarokee (near) (12)	Apr-Sept	182	68	131	267
		Apr-July	147	68	107	216
<b>STILLWATER RIVER</b>						
2050	Absarokee (near) (12)	Apr-Sept	432	70	332	620
		Apr-July	366	70	279	523
<b>CLARKS FORK RIVER</b>						
2075	Chance (at)	Apr-Sept	495	80		617
		Apr-July	441	80		552
2085	Edgar (at)	Apr-Sept	515	79		652
		Apr-July	454	79		575
<b>ROCK CREEK</b>						
2095	Red Lodge (near)	Apr-Sept	83.5	75	70.6	112
		Apr-July	64.4	75	51.9	86.3
(12) Observed flow plus change in storage in Mystic Lake. (13) Observed flow plus change in storage in Buffalo Bill & Boysen Reservoirs. (+) Provisional data furnished by U. S. Geological Survey.						

## RESERVOIR STORAGE DATA

AS OF FEBRUARY 28, 1961

(1000 Acre Feet)

NO.	RESERVOIR	USABLE CAPACITY	MEASURED		
			THIS YEAR	LAST YEAR	NORMAL
2040	Mystic Lake	20.8	8.0	6.1	8.6

NOTE: ALL NORMALS BASED ON 1943-1957 (15 YEAR PERIOD)

# SNOW SURVEY DATA

AS OF MARCH 1, 1961

WATERSHED XI

SNOW COURSE			CURRENT INFORMATION			PAST RECORD		YEARS OF RECORD
NO.	NAME	ELEVATION	DATE OF SURVEY	SNOW DEPTH (Inches)	WATER CONTENT (Inches)	WATER CONTENT (Inches)		
						LAST YEAR	AVERAGE	
10C5	Bald Ridge	7500	2/28	31	7.6	-	-	-
9D1	Camp Senia	7890	2/23	12	2.3	3.6	6.0	7
10E3	Canyon	7500	2/28	44	10.1	7.4	12.7	13
10D7	Cooke City	7400	3/1	26	5.5	4.2	7.8	15
10D5	Crevice Mountain	8400	3/1	22	4.8	4.4	8.2	15
10D4	Devil's Slide	8100	3/2	55	14.4	19.0	16.3	15
10E6	East Entrance	7000	2/28	33	7.5	5.3	10.8	9
10D3	Hood Meadow	6600	3/1	25	6.2	7.1	7.2	15
10E4	Lake Camp #1	7850	2/28	34	6.8	4.8	9.3	13
9E1	Lodgepole	8200	3/1	27	5.8	5.0	-	-
10E1	Lupine Creek	7300	2/28	31	7.5	5.6	9.7	14
10D1	New World	6700	2/25	24	6.6	8.8	8.7	14
10E2	Norris Basin	7500	2/28	34	7.5	4.0	8.6	10
10C3	Porcupine	6500	2/28	17	4.2	4.8	5.7	15
10D10	Sacajawea	6550	2/27	29	7.6	12.5	-	-
10E5	Sylvan Pass	7100	3/1	43	9.5	7.6	13.1	14
10E7	Thumb Divide	7900	2/25	54	13.5	10.3	21.2	15

NOTE: ALL AVERAGES BASED ON 1943-1957 (15 YEAR PERIOD). "YEARS OF RECORD" INDICATED NUMBER OF YEARS USED IN 1943-1957 PERIOD.



STATUS OF RESERVOIR STORAGE

February 28, 1961

BASIN & STREAM	RESERVOIR	USABLE CAPACITY 1000 A.F.	USABLE STORAGE - 1000 ACRE FEET			
			1961	1960	1943-57 Average	Years Record Used
<u>MISSOURI RIVER BASIN - WYOMING</u>						
Shoshone River	Buffalo Bill	372.5	129.6	122.5	235.4	15
Wind River	Boysen	560.0AC	98.1	140.5	250.6**	5
Wind River	Pilot Butte	31.6	13.5	15.9	13.3	15
Bull Creek	Bull Lake	152.0	57.9	37.8	63.2	15
Belle Fourche	Key Hole	190.3AC	3.8	0.0	10.9**	5
<u>MISSOURI RIVER BASIN - NORTH DAKOTA</u>						
Heart River	Lake Tschida	68.7AC	48.3	43.5	53.1**	7
Heart River	E. A. Patterson	5.6AC	3.5	4.0	3.8**	6
Missouri River	Garrison Lake	18100.0AC	4988.0	3563.2	-	-
James River	Jamestown	20.0AC	15.6	8.1	-	-
<u>MISSOURI RIVER BASIN - SOUTH DAKOTA</u>						
Belle Fourche	Belle Fourche	185.2AC	29.3	34.3	106.8	15
Cheyenne River	Angostura	90.0AC	4.7	19.2	41.4**	6
Cheyenne River	Deerfield	15.1AC	2.5	1.2	12.9**	10
Grand River	Shadehill	84.0AC	50.2	69.0	76.4**	5
Missouri River	Ft. Randall	3800.0AC	2516.0	2452.5	1376.3**	3
Missouri River	Gavins Point	320.0AC	233.0	313.1	-	-
Missouri River	Oahe	17000.0AC	1836.0T	994.0T	-	-
Cheyenne River	Pactola	55.0AC	15.9	24.1	-	-

\*\* Average for years of record shown in 1943-57 base period.

AC Active Capacity; USBR Billings.

T Total Storage.



WYOMING SNOW SURVEYS ABOUT MARCH 1, 1961

No.	Snow Course Name	Elev.	Current Date of Survey	Information		Past Record Water Content (In.)		Years Record Used in Average
				Snow Depth (In.)	Water Content (In.)	Last Year	15-Year Average 1943-57	
<u>LOWER YELLOWSTONE - WIND RIVER</u>								
9F12	Big Warm	8800	2/24	22	4.7	5.0	6.8**	6
9F4	Burroughs Creek	8800	2/26	34	7.0	6.0	12.8**	12
9F10	Dinwoodie	10000	2/27	29	6.1	8.0	10.6**	12
9F17	Dinwoodie Glaciers	10500	3/1	30	6.0E	N.R.		1
9F9	Dry Creek	9500	2/27	17	3.1	3.7	5.6**	12
9F6	DuNoir	8750	2/24	17	3.0	4.1	7.8	20
9F7	Geysers Creek	8500	2/25	17	3.2	4.0	6.8**	12
9F8	Little Warm	9500	2/25	43	9.5	10.7	14.4**	12
9F14	Sheridan R.S. #2	7500	2/23	18	2.2	3.7	5.7**	6
9F3	T-Cross Ranch	8000	2/26	17	3.3	3.1	6.8	20
#10F9	Togwotee Pass	9600	2/27	67	19.0	19.1	25.7**	11
#9G7	Twenty Lakes	10000	No Report			N.R.		1
<u>LOWER YELLOWSTONE - POPO AGIE RIVER</u>								
8G2	Blue Ridge	9500	2/20	22	4.2	5.3	11.2*	21
8G5	Bruce's Camp	6500	2/22	15	2.8	2.9		3
9G3	Hobbs Park	10000	3/1	40	10.6	11.3	15.4**	12
9G4	Mosquito Park R.S.	9500	3/1	22	4.3	5.8	7.1*	17
8G1	Sawmill Glade	8500	2/21	22	4.3	4.7	6.9	21
#8G3	South Pass	9000	2/20	26	5.7	7.1	13.2	21
9F11	St. Lawrence R.S.	9000	2/28	16	3.3	3.8	6.1*	17
9G2	Trout Creek	8400	3/1	22	4.4	5.6	5.1**	12
#9G7	Twenty Lakes	10000	No Report			N.R.		1
<u>LOWER YELLOWSTONE - OWL CREEK</u>								
#9F19	Kirwin	11000	3/4	25	5.5E	13.5E		
8F1	Owl Creek	8700	2/23	28	5.7	6.9	4.8**	12
<u>LOWER YELLOWSTONE - GREYBULL RIVER</u>								
9E6	Frontier Needle	10000	3/4	24	5.5E			
#9F19	Kirwin	11000	3/4	25	5.5E	13.5E		
9E3	Timber Creek #2	8800	2/28	11	2.2	N.R.	2.5**	6
9E1	Wood River #2	8000	2/27	19	4.4	N.R.	4.0**	6

\* Average for years of record shown in 1943-57 base period.

\*\* Average of all past data. - E Estimated water content.

# Adjacent drainage.



WYOMING SNOW SURVEYS ABOUT MARCH 1, 1961

No.	Snow Course Name	Elev.	Current Information			Past Record		Years Record Used in Average
			Date of Survey	Snow Depth (In.)	Water Content (In.)	Water Content (In.)		
						Last Year	15-Year Average 1943-57	
<u>LOWER YELLOWSTONE - SHOSHONE RIVER</u>								
9E4	Carter Mountain	7800	3/1	13	3.2	4.2		4
10E6	East Entrance	7000	2/28	33	7.5	5.3	10.8**	12
9E5	Ishawooa Cone	9200		No Report		24.0E		1
10E5	Sylvan Pass	7100	3/1	43	9.5	7.6	13.1*	17
10F9	Togwotee Pass	9600	2/27	67	19.0	19.1	25.7**	11
9F18	Younts Peak	8500		No Report		26.0E		
<u>LOWER YELLOWSTONE - NOWOOD CREEK</u>								
#7F1	Bear Trap	8000	3/2	29	6.7	4.1		1
#7F2	Canyon Creek	7400	3/3	36	9.3	8.7		1
7E25	Cold Springs Camp	8700	2/24	22	4.8	4.9		4
7E24	Medicine Lodge Lks.	9500	2/24	30	7.6	8.0		4
#7E8	Munkres Pass	9700	3/1	26	5.5	6.8	7.5**	6
#7E27	Onion Gulch	8100	3/2	27	5.2	5.2		4
7E35	Tyrell R.S.	8300	3/2	28	5.1	N.R.		3
7E26	West Tensleep	9075	2/27	36	8.0E	9.5E		4
<u>LOWER YELLOWSTONE - SHELL CREEK</u>								
#7E21	Bald Mountain	9600	2/23	56	14.8	17.6	16.2**	5
#7E20	Beaver Tongue	9200	2/23	52	13.0	16.3	15.9**	5
#7E18	Bone Spring	9200	2/27	44	12.0E	13.0E	13.9**	5
7E22	Granite Cr. Camp	7800	2/25	6	1.9	N.R.	4.5**	5
#7E17	Granite Pass	8950	2/25	44	12.0	13.2	13.0**	5
7E4	Ranger Creek	8800	2/25	25	4.8	N.R.	7.4**	5
7E23	Shell Creek	9600	2/27	39	10.0E	12.5E		4

\* Average for years of record shown in 1943-57 base period.

\*\* Average of all past data. - E Estimated water content.

# Adjacent drainage.



WYOMING SNOW SURVEYS ABOUT MARCH 1, 1961

No.	Snow Course Name	Elev.	Current Information			Past Record		Years Record Used in Average
			Date of Survey	Snow Depth (In.)	Water Content (In.)	Water Content (In.)		
						Last Year	15-Year Average 1943-57	
<u>LOWER YELLOWSTONE - PORCUPINE CREEK</u>								
7E31	Five Springs Falls	7500	3/1	16	3.8	5.4	5.7**	5
#7E30	Medicine Wheel	9000	2/24	45	11.6	15.2	13.5**	5
<u>LOWER YELLOWSTONE - TONGUE RIVER</u>								
#7E20	Beaver Tongue	9200	2/23	52	13.0	16.3	15.9**	5
7E32	Big Goose #2	7700	2/27	28	6.5	6.6	6.0**	5
#7E18	Bone Spring	9200	2/27	44	12.0E	13.0E	13.9**	5
7E33	Burgess R.S. #2	7900	2/24	26	5.3	7.6	6.3**	5
7E34	Dome Lake #2	8800	2/27	35	8.0E	7.5E	7.5**	5
7E14	Gloom Creek	9300	2/27	47	13.0E	13.0E	10.6**	5
#7E17	Granite Pass	8950	2/25	44	12.0	13.2	13.0**	5
7E11	Sibley Lake	8000	2/25	35	8.2	9.2	8.3**	5
7E10	Steamboat Point	7500	2/25	25	5.7	7.6	6.1**	5
7E12	Sucker Creek	9000	2/27	41	11.0E	12.5E	9.9**	5
7E13	Wood Rock G.S.	8500	2/25	34	7.4	9.3	8.5**	5
<u>LOWER YELLOWSTONE - POWDER RIVER</u>								
#7F1	Bear Trap	8000	3/2	29	6.7	4.1		1
#7F2	Canyon Creek	7400	3/3	36	9.3	8.7		1
7E36	Cloud's Peak	10000	2/27	39	10.0E	7.5E		1
#7E28	Muddy Creek G.S.	7800	2/28	19	3.9	3.4		4
#7E8	Munkres Pass	9700	3/1	26	5.5	6.8	7.5**	6
#7E27	Onion Gulch	8100	3/2	27	5.2	5.2		4
7E5	Soldier Park	8700	3/1	15	3.8	4.3	4.1**	9
7E6	Sour Dough	8500	2/28	24	5.3	4.1		4

\*\* Average of all past data.

E Estimated water content.

# Adjacent drainage.



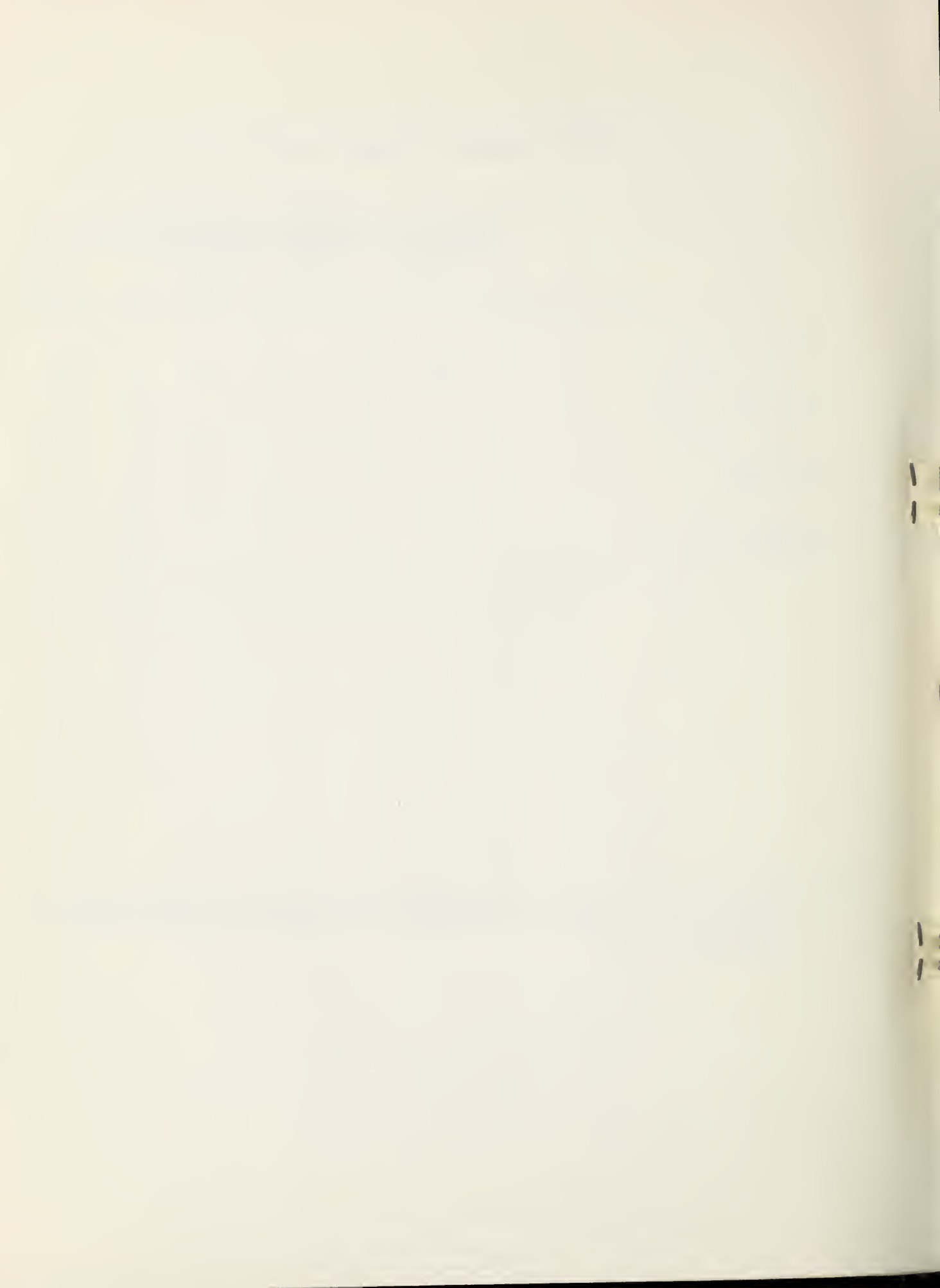


WYOMING STREAMFLOW FORECASTS MARCH 1, 1961

Basin and Tributary	April 1 - September 30			
	Seasonal Streamflow in Thousands of Acre Feet			
	Forecast Runoff	Percent 15-Year Average	Measured Runoff 1959	15-Year Average 1943-57
NORTH POPO AGIE Milford (near)	52	60	55	86*
LITTLE POPO AGIE Lander (near)	30	60	25	49*
WIND RIVER Dubois (at)	72	65	88	110*
SHOSHONE RIVER Buffalo Bill Dam (below) (1)	77	70	397	851

All stream data taken from observed flow records with the following exceptions:  
 (1) Observed flow corrected for storage in Buffalo Bill Reservoir and Heart Mountain diversion.

\* Less than 15 years.



Agencies Cooperating in Collecting Data Contained  
in this Bulletin

U. S. Forest Service  
Region I, Missoula, Montana

U. S. Geological Survey  
Helena, Montana

U. S. Army Corps of Engineers  
Portland, Oregon  
Seattle, Washington  
Omaha, Nebraska  
Riverdale, N. D.

U. S. Indian Irrigation Service  
St. Ignatius, Montana

U. S. Weather Bureau  
Helena, Montana

U. S. Fish & Wildlife Service  
Red Rock Lakes Refuge  
Monda, Montana

U. S. Bureau of Reclamation  
Billings, Montana  
Boise, Idaho

Montana Power Company  
Butte, Montana

Agricultural Experiment Station  
North Montana Branch Station  
Havre, Montana

Montana State Highway Dept.  
East Glacier, Montana

National Park Service  
Yellowstone National Park  
Glacier National Park

Montana Experiment Station  
Montana State College  
Bozeman, Montana

Bonneville Power Administration  
Portland, Oregon

Montana State School of Forestry  
Montana State University  
Missoula, Montana

Soil Conservation Service  
Montana, Wyoming, Idaho

Soil Conservation Districts  
Montana Counties

Johnson Flying Service, Inc.  
Missoula, Montana

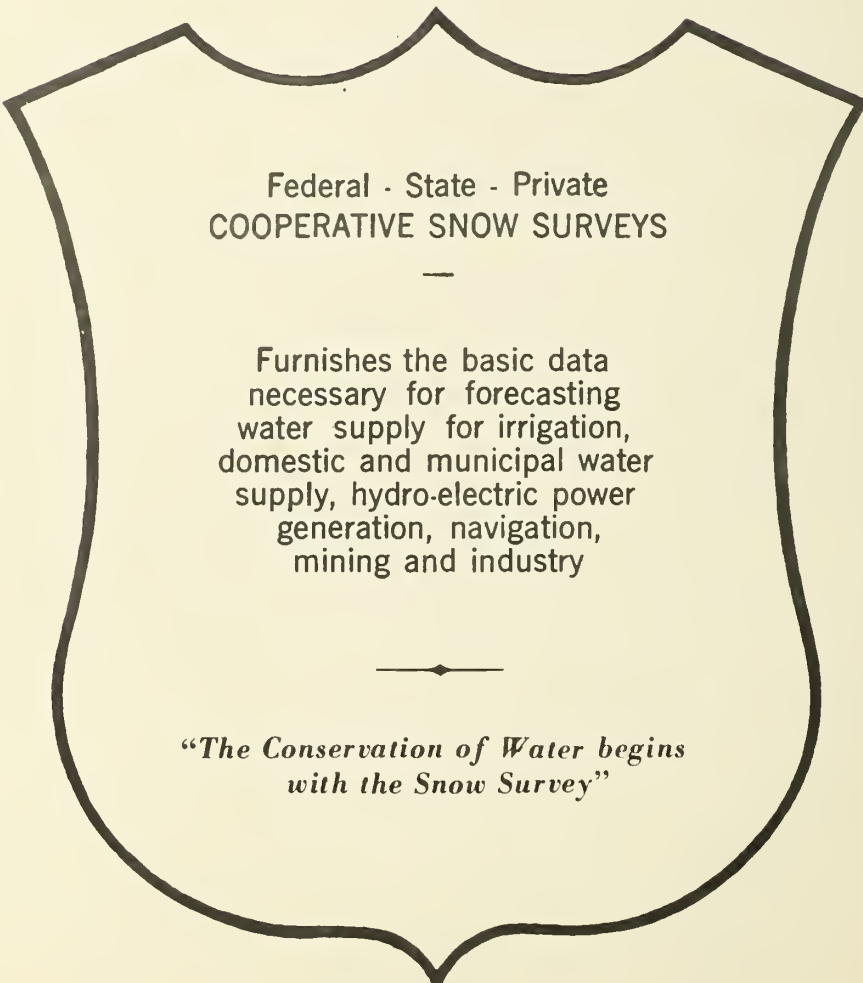
Water Rights Branch  
Dept. of Lands & Forests  
Victoria, British Columbia

Department of Northern Affairs  
& National Resources  
Calgary, Alberta

UNITED STATES DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE  
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COOPERATIVE SNOW SURVEYS

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Furnishes the basic data  
necessary for forecasting  
water supply for irrigation,  
domestic and municipal water  
supply, hydro-electric power  
generation, navigation,  
mining and industry

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*"The Conservation of Water begins  
with the Snow Survey"*