A REPORT TO THE GOVERNOR

DESCRIBING

THE POTENTIAL FOR DROUGHT

IN MONTANA FOR

1992

March 1992

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INTRODUCTION

Montana's Fifty-Second Legislature saw the passage of House Bill 537, titled "An Act Creating a Drought Advisory Committee; and Defining the Committee's Responsibilities; and Providing an Immediate Effective Date." Section 6 of this bill states:

> By March 15th of each year, the Drought Advisory Committee shall submit a report to the governor describing the potential for drought in the coming year. If the potential for drought merits additional activity by the drought advisory committee, the report must also describe:
>
> (a) Activities to be taken by the drought advisory committee for informing the public about the potential for drought;
>
> (b) A schedule for completing activities;
>
> (c) Geographic areas for which the creation of local drought advisory committees will be suggested to local governments and citizens; and
>
> (d) Requests for the use of any available state resources that may be necessary to prevent or minimize drought impacts.

This report includes a section titled "Indicators of Drought," which will examine quantitative data currently available for the state's stored water supply, and soil moisture and mountain snowpack conditions. The report's second section, titled "Responses," will address actions to be taken by the state that correspond to levels of deficit moisture conditions as they develop. The requirements of House Bill 537 concerning "additional activities" also will be presented in the report's "responses" section.

This year, mountain snowpack conditions deteriorated during February. The only areas to report improved snowpack are the Beaverhead and Red Rock River basins in the state's southwestern corner. Snowpack generally is well below average at the lower elevations, below average to well below average at the mid-elevation zones, and near average to below average at the higher elevations.

Snowpack conditions generally range from about 75 to 85 percent of average west of the Continental Divide and from 70 to 80 percent of average east of the divide. The Madison, Boulder, Ruby, Beaverhead, and Big Hole river drainages report snowpack from 85 to 95 percent of average. As of March 17, the three-day weather outlook called for more snowfall in the mountains of the state. Approximately 20 percent of Montana's snowfall occurs in March, according to DNRC records for years 1961-85.

Streamflow

Streamflows are recorded at U.S. Geological Survey (USGS) stream-gauging stations throughout Montana. The February streamflow for the Middle Fork of the Flathead River was 60 percent of normal for the same month over the period during which records have been kept. The Clark Fork River near St. Regis had a February flow of 84 percent of average.

East of the Continental Divide, the Marias River near Shelby had a flow that measures 79 percent of average. The upper Yellowstone River at Corwin Springs was relatively high with a flow measured at 99 percent of average. The Yellowstone River at Billings had a flow measured at 72 percent of average for February.

Reservoir Status

As of the end of February, storage levels at U.S. Bureau of Reclamation Reservoirs ranged from 81 percent of average for Clark Canyon Reservoir near Dillon to 123 percent of average for the Fresno Reservoir located on the Milk River in the state's northcentral section. Clark Canyon Reservoir continued to improve over the past two years and currently contains 26,000 more acre-feet of water than last year at this time. Canyon Ferry Reservoir had a level of 93 percent of average. As of the end of February, U.S. Bureau of Reclamation Reservoirs had a statewide average storage level of about 100 percent of normal.

Storage levels at state-owned reservoirs, as of the end of February, ranged from about 70% to 130% of average. Most state-owned reservoirs are at average levels for this time of the year. Construction at Middle Creek Dam near Bozeman has progressed enough to allow normal spring filling if inflows are sufficient.

during the 90-day outlook should be below normal through the end of May. Average precipitation measures from .50 to 1.0 inches for March, 1.0 to 2.0 inches for April, and 1.5 to 3.0 inches for May. As of March 17, some areas of the state have already received .50 inches of precipitation for the month.

On March 15, a major front of moist pacific air brought measurable precipitation to most of the state. By March 18, the amount of precipitation reported across the state ranged from .80 inches in places west of the divide to .10 inches in the north and the east. The March 18 three-day outlook calls for more precipitation.

El Nino

Current weather patterns suggest that an El Nino event currently is affecting Montana's normal seasonal temperature and precipitation patterns. The NWS cautions that using the data base of past El Nino events is insufficient to project weather forecasts with any degree of confidence. However, some similarities between the current pattern and those from two previous, well-documented El Nino periods merit comparison. Previous El Nino events of 1982-84 and 1986-88 indicate that this phenomenon's effects extend over a period of three years. Both of these previous periods ended with the extremely dry years of 1984 and 1988.

If the current meteorological trend follows the patterns of previous El Nino events, 1991 would be the first year affected, which had above-normal precipitation, and 1992 would be the second year. In the past, the second year has started out dry and ended up with below-normal to normal precipitation. Under this scenario, the worst year of the present trend would be 1993, which would resemble 1984 and 1988 with high deficit moisture deficit conditions.

El Nino seems to affect the timing of precipitation. If 1992's weather patterns continue to resemble those of 1983 and 1987, July would be the wettest month of the year. April of 1983 and 1987 was dry with about 50% below-normal precipitation. A delay in summer precipitation could present several problems. First, precipitation may come too late for the planting of certain crops. Second, rainfall in July commonly takes the form of severe thunderstorms that can cause crop damage from hail. Finally, summer thunderstorms are accompanied by lightning, a major contributor to forest fires in dry areas.

The National Weather Service's efforts to gather data to use in future forecasting of El Nino effects are ongoing. Once again, forecasting the effects of an El Nino event is uncertain at best, but it is important to carefully monitor any major weather changes and make comparisons to similar past events.

Impact Assessment

The Montana state drought plan includes a section on the development of a drought impact assessment program. The purpose of the assessment program is to use monitoring information and weather outlooks to predict possible impacts to various sectors of the economy and to implement mitigation measures in a timely manner. The impact assessment program will address the following areas: Dryland farming, livestock operations, irrigation water supplies, municipal and domestic water supplies, fish and wildlife, forest fires, public land management, energy production, tourism and recreation, and secondary commerce.

A 1988 survey by the League of Cities and Towns indicated that almost one-half of Montana's communities were deeply concerned about the adequacy of municipal water supplies. When moisture conditions and water supplies worsen, agencies will increase their level of monitoring to respond to critical areas of concern. For example, the Department of Health and Environmental Sciences (DHES) will monitor municipal water supplies and forecasts to determine whether supplies will be adequate. In addition to municipal water supplies, instream flows, necessary for compliance with municipal discharge permits must be examined by DHES. Contingency plans for periods of low streamflow must be agreed upon ahead of time.

Response Coordination

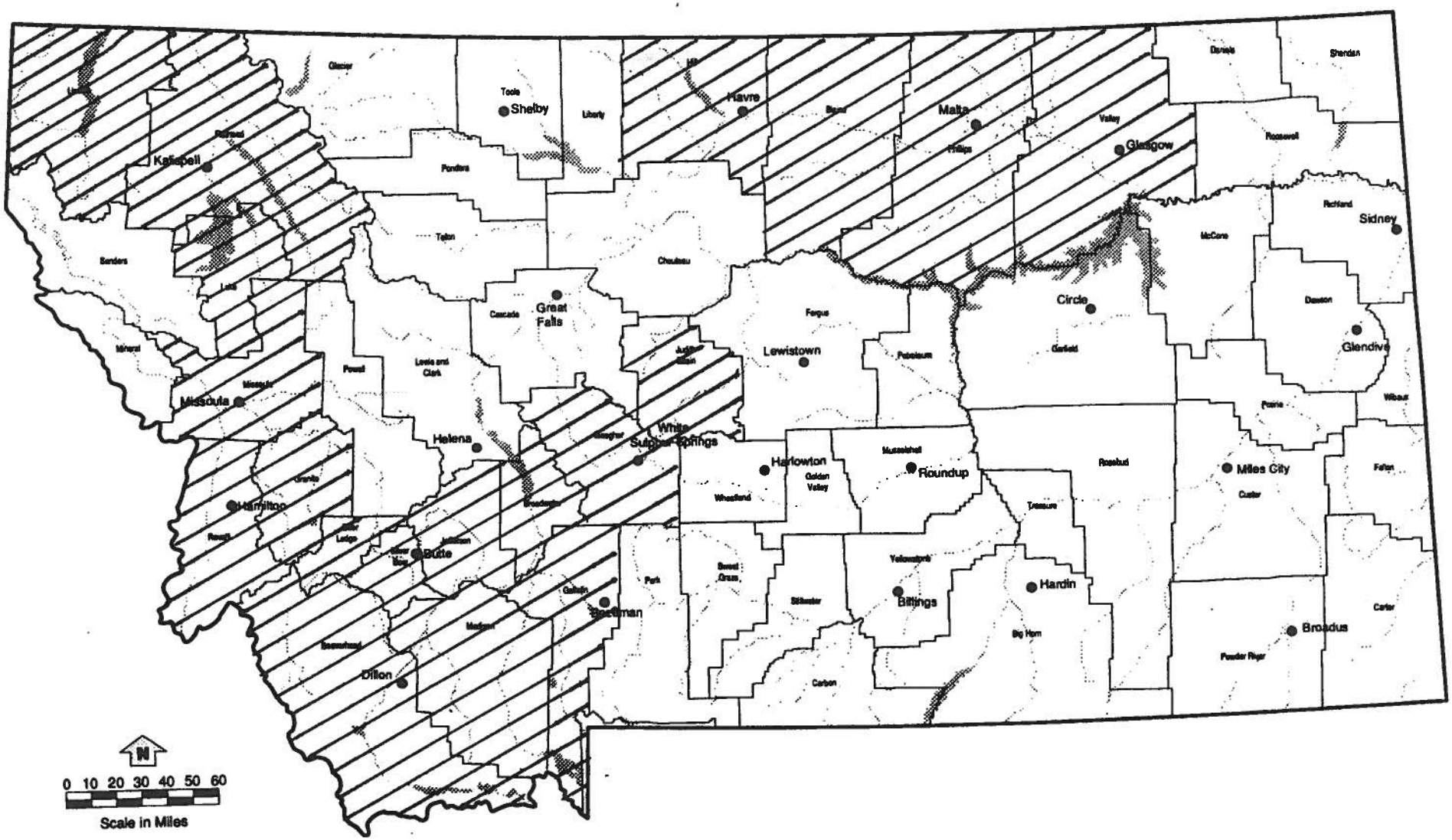
The state water plan's Drought Management section identifies the coordination of governmental action as a major issue in addressing drought effects. Actions recommended for the Drought Advisory Committee include appointing and organizing, upon request, local drought advisory committees to coordinate drought mitigation action. Local drought advisory committees should represent a diverse group of users and management agencies. The plan section states:

> Committee membership should be comprised of state and local government officials, including county disaster services coordinators and conservation district supervisors; local water user groups, including dryland and irrigated agriculture, municipal and rural water suppliers, energy producers, mining and mineral processing, forest products, tourism, recreationists and recreation-based businesses, and interested citizens.

Conclusion

The committee agreed at its last meeting that it would not state that Montana is suffering from drought, but rather try to establish specific quantitative thresholds to activate specific mitigation responses. The committee will examine a wide range of drought indicators before making specific decisions pertaining to response action. Since May and June generally bring Montana most of its annual precipitation, recommending response activities beyond those identified as initial responses may be either premature or inappropriate.

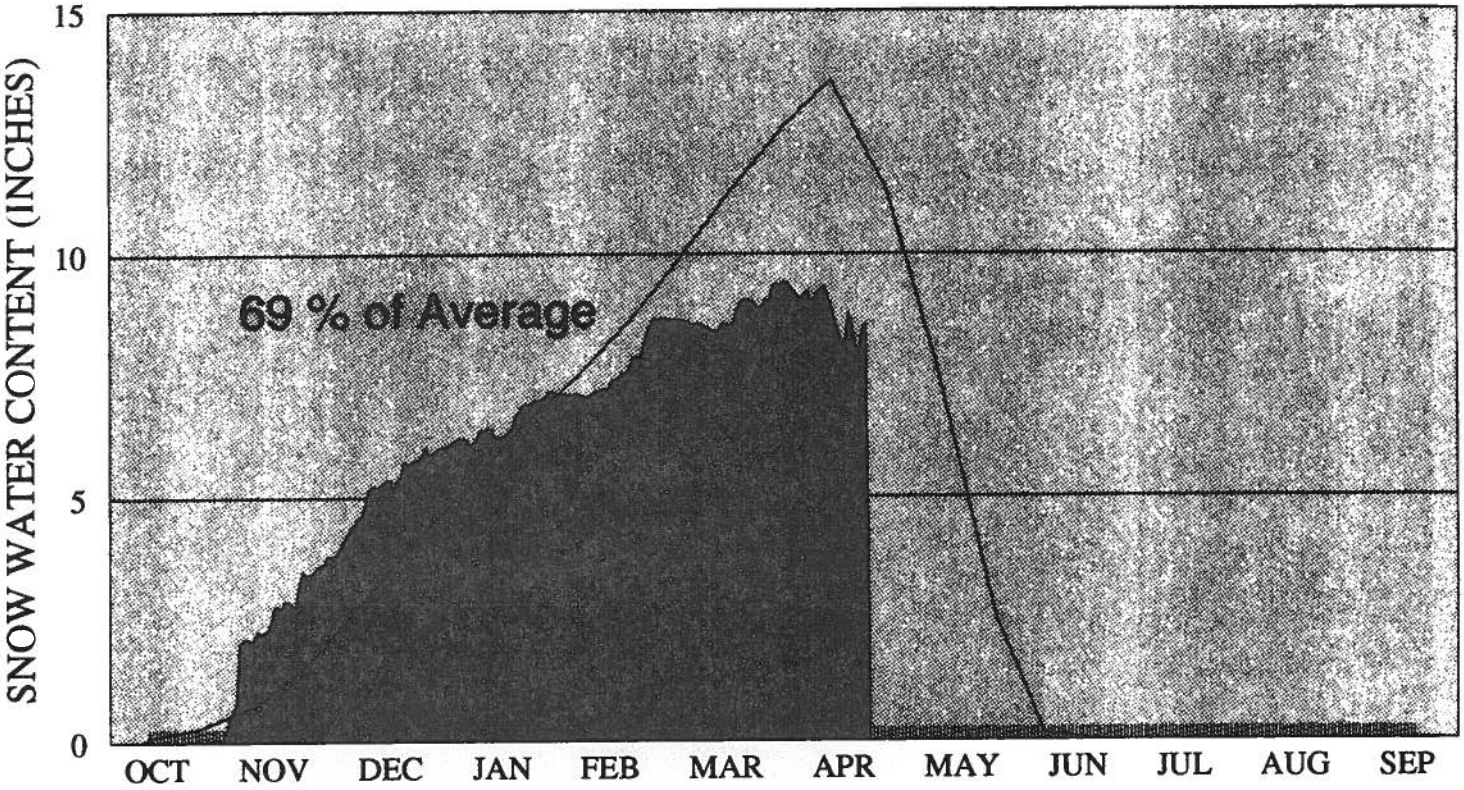
The Drought Advisory Committee is scheduled to meet Monday, April 13, at 9:00 a.m. in the Lee Metcalf Building conference room. The committee will continue to monitor water supply and moisture conditions throughout the state. The committee will address the issue of drought response timing as well as other issues of immediate concern. The Drought Advisory Committee will report to the Governor's Office, through the Office of the Lieutenant Governor, any significant changes which increase the potential for drought in Montana as well as any actions that the committee takes.



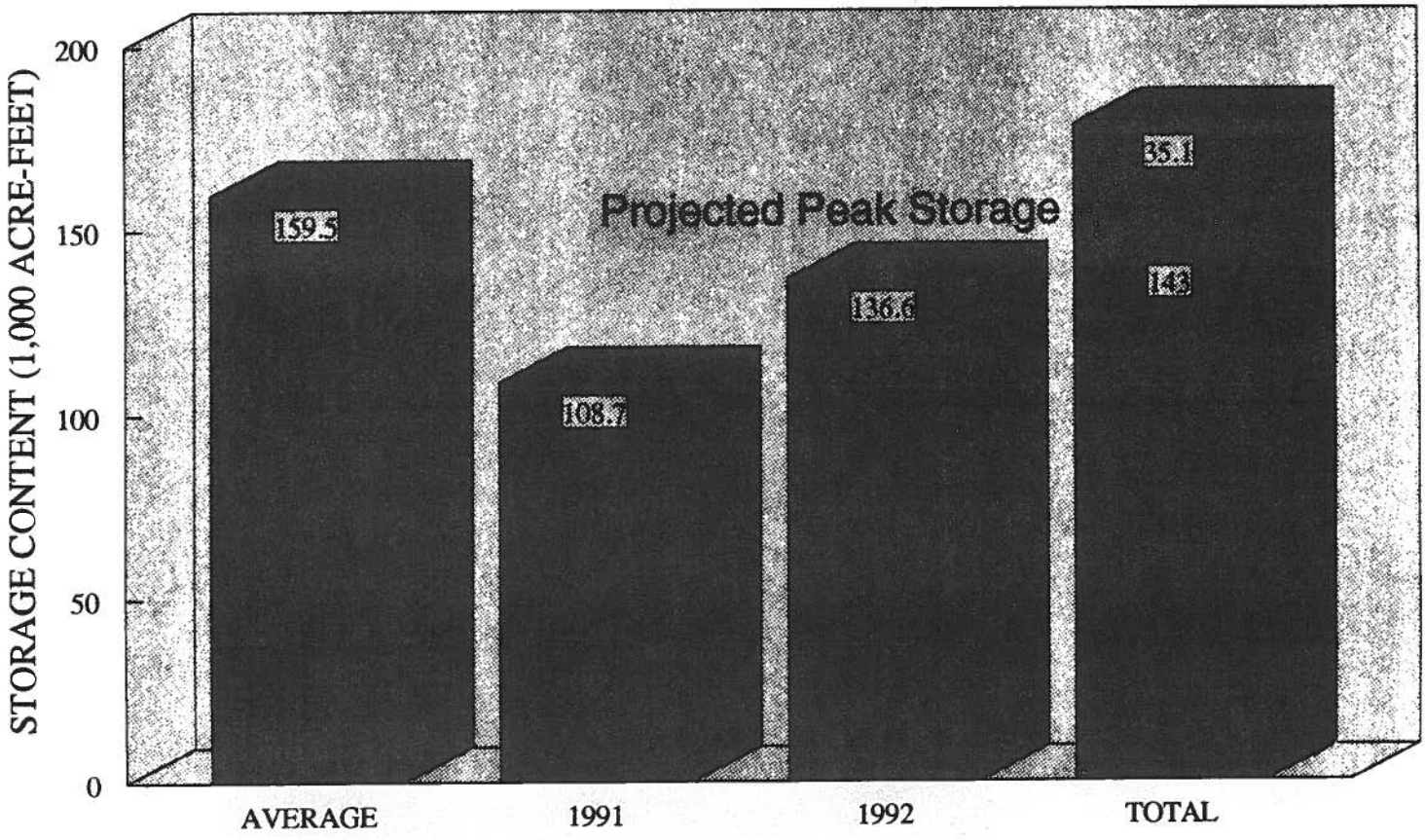
LOCAL DROUGHT ADVISORY COMMITTEEE RECOMMENDATIONS, 4-27

CLARK CANYON RESERVOIR

SNOW WATER CONTENT

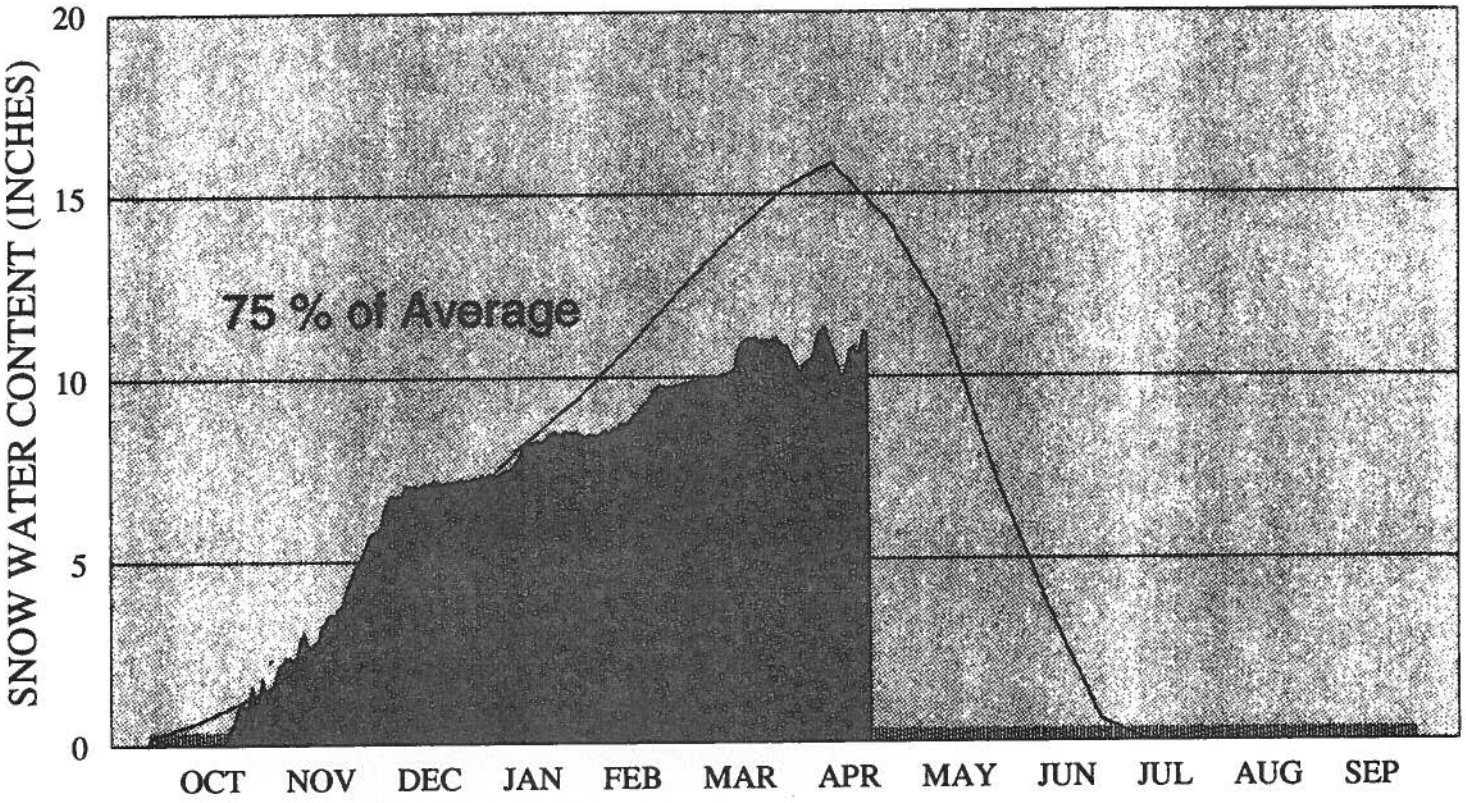


RESERVOIR STORAGE

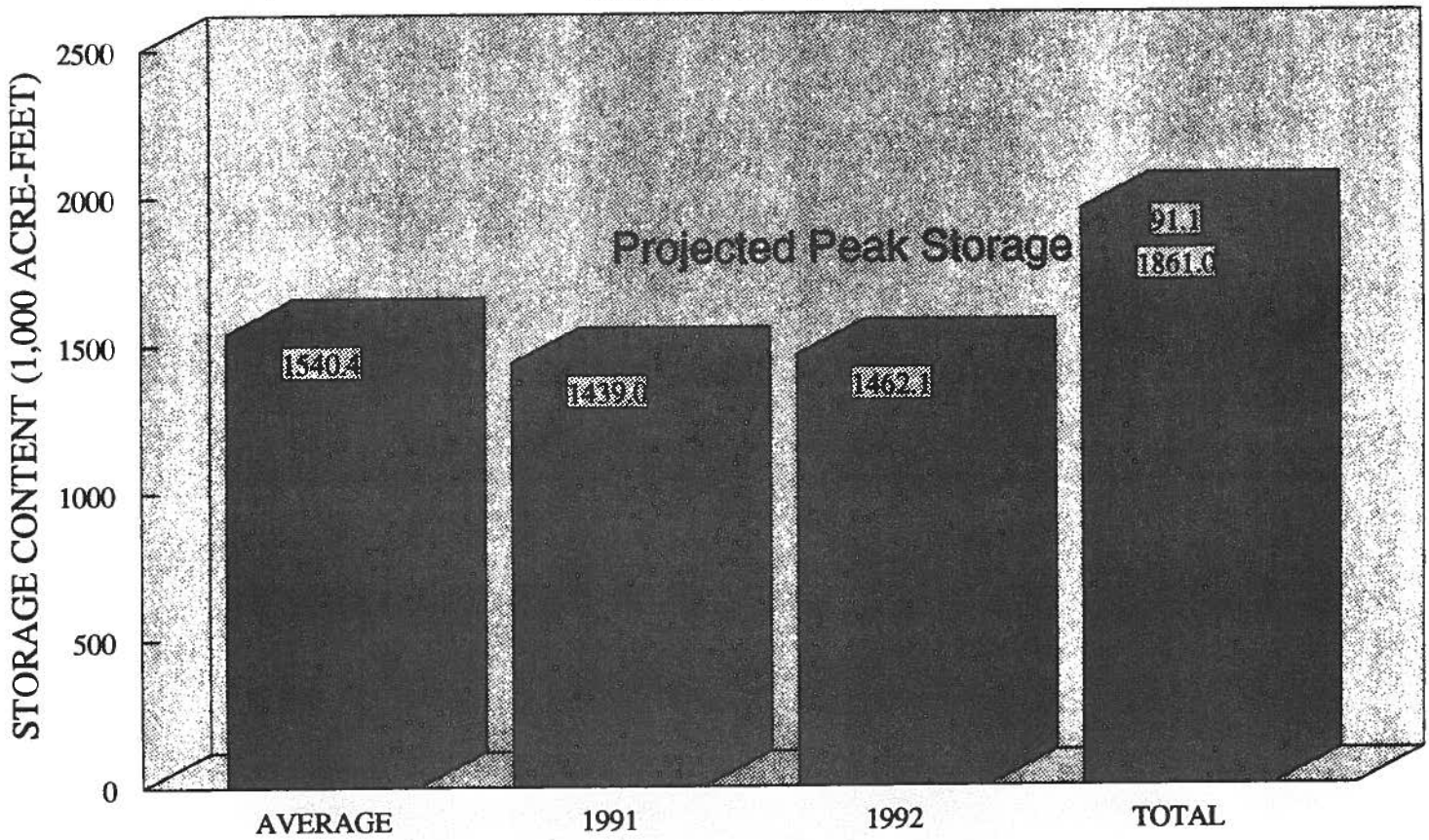


CANYON FERRY RESERVOIR

SNOW WATER CONTENT

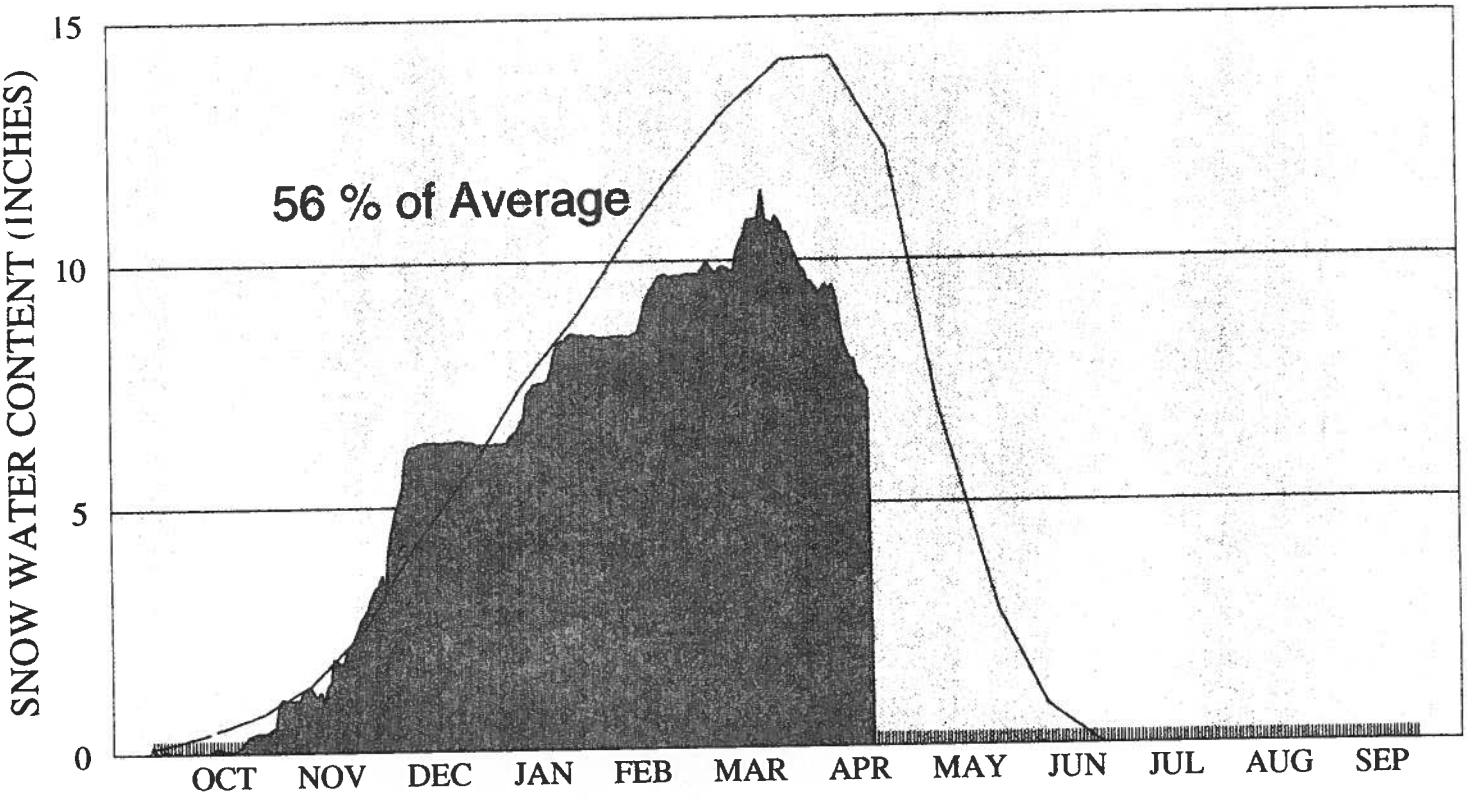


RESERVOIR STORAGE



GIBSON RESERVOIR

SNOW WATER CONTENT



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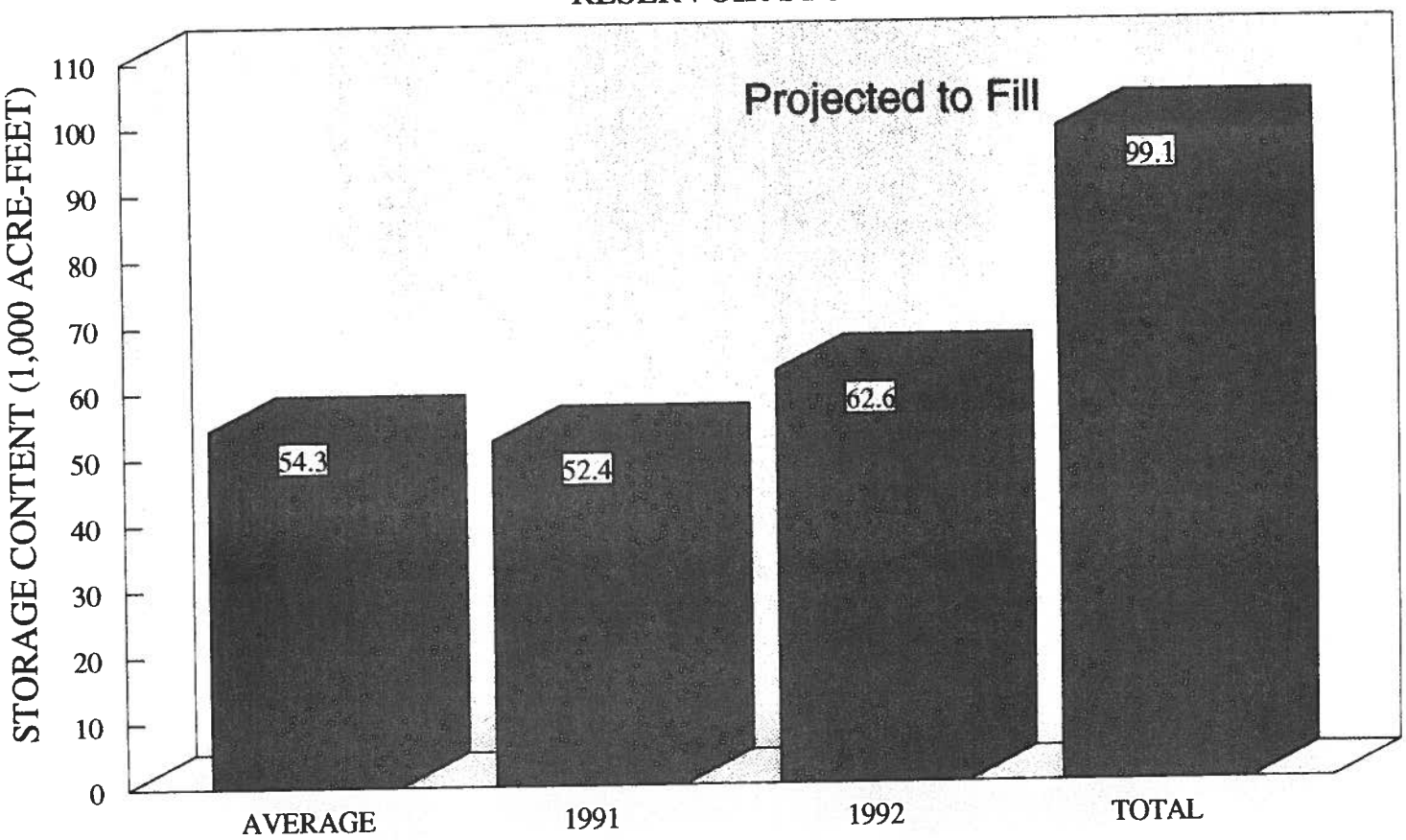
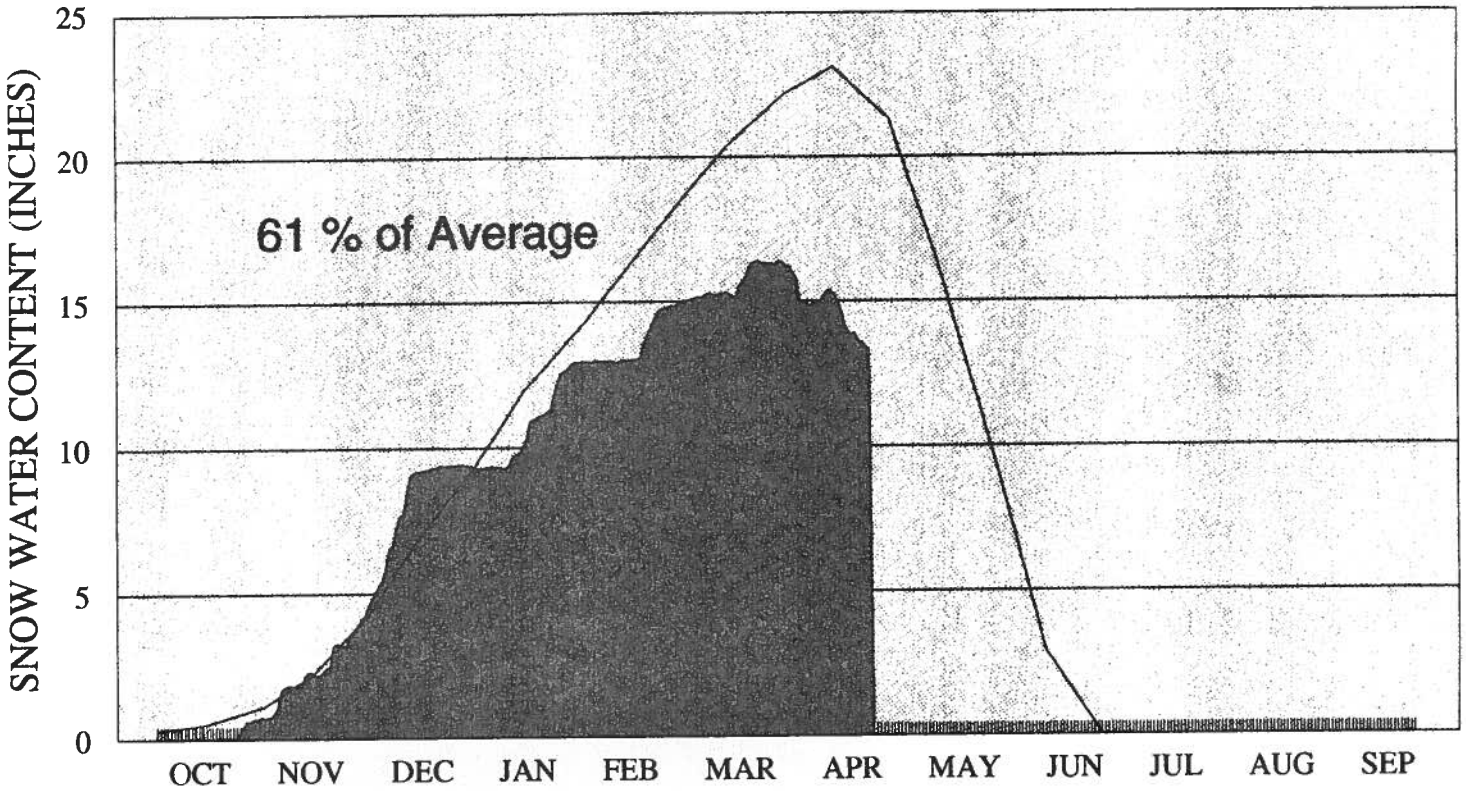


LAKE ELWELL (TIBER DAM)

SNOW WATER CONTENT



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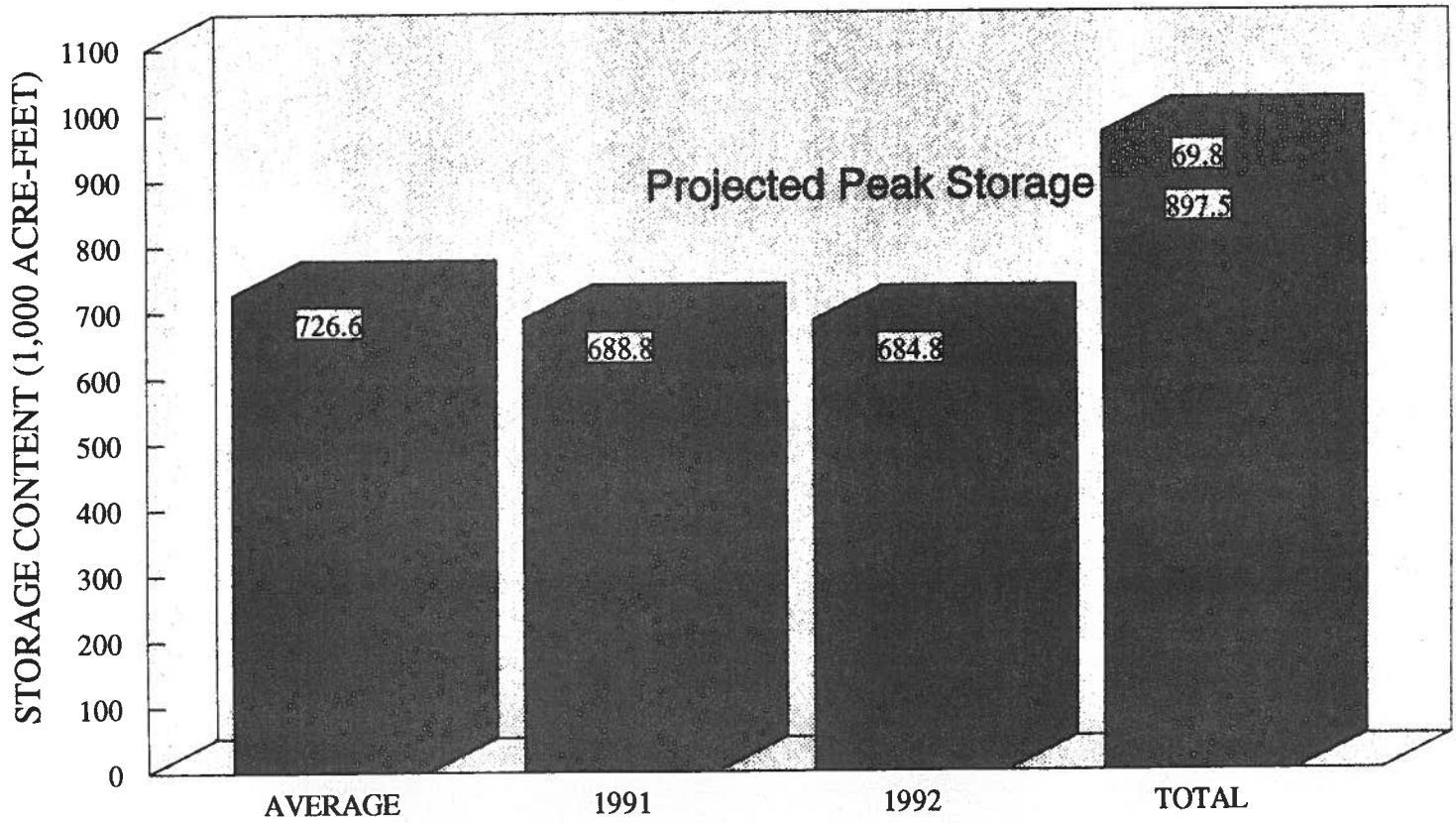
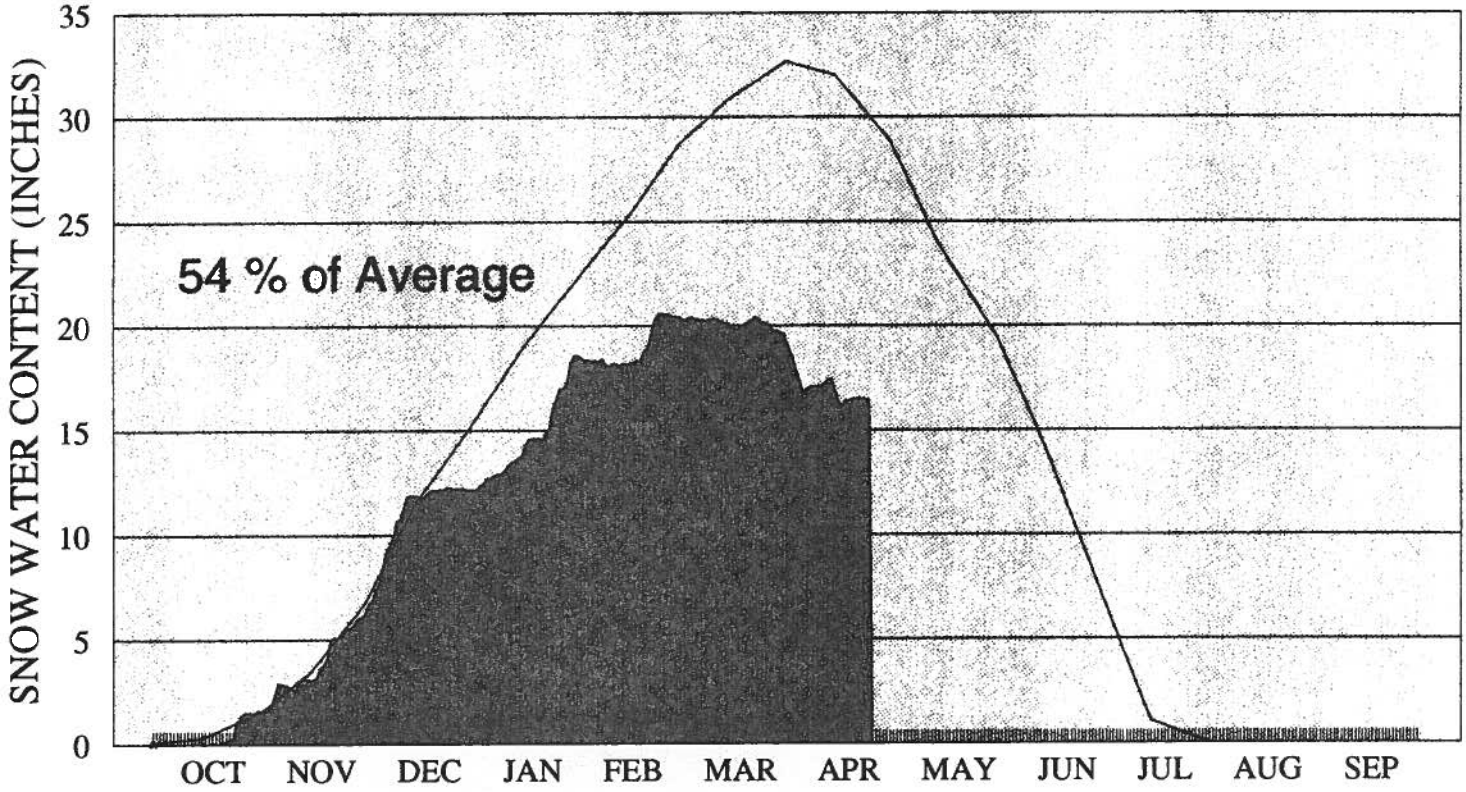
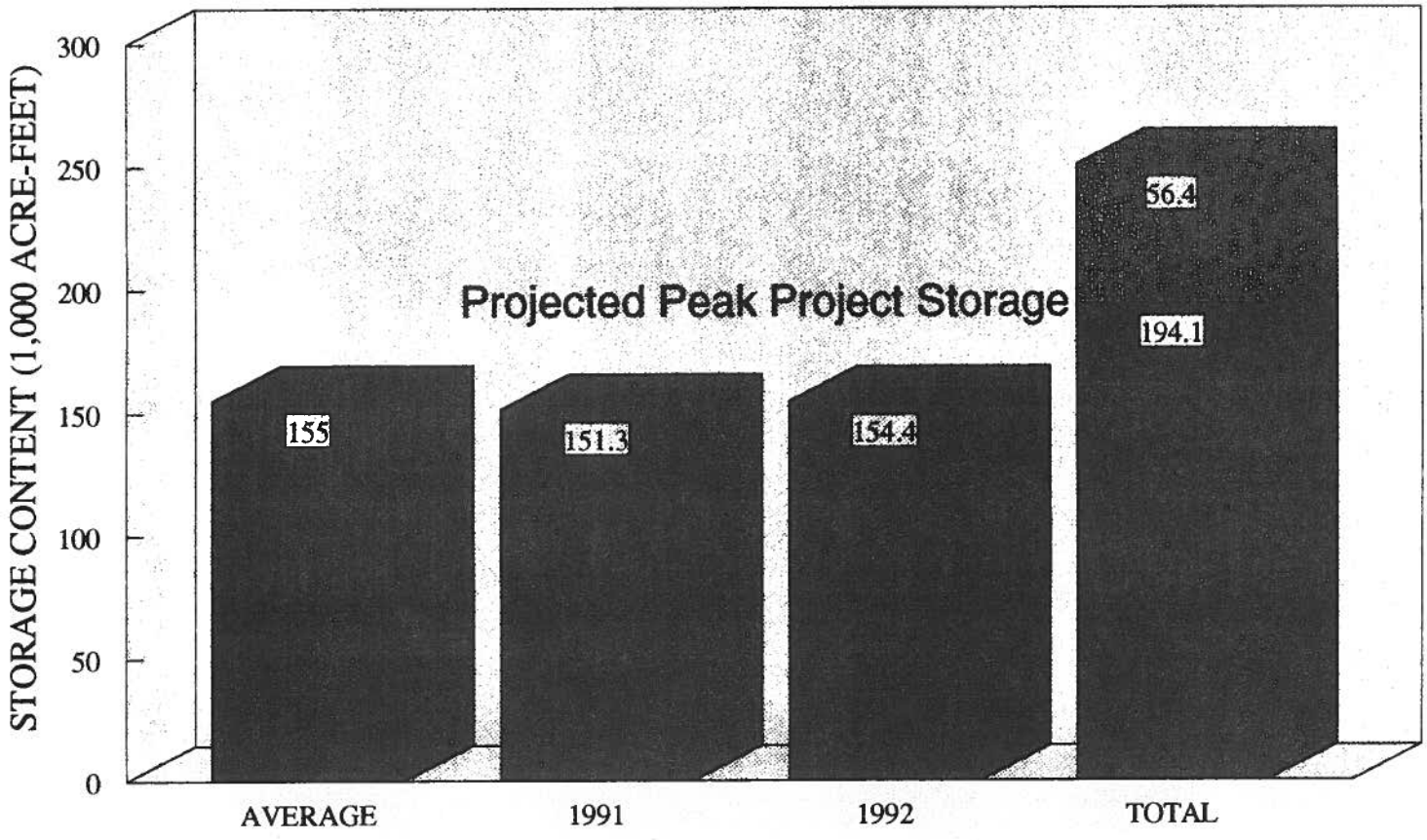


MILK RIVER PROJECT

SNOW WATER CONTENT - SHERBURNE

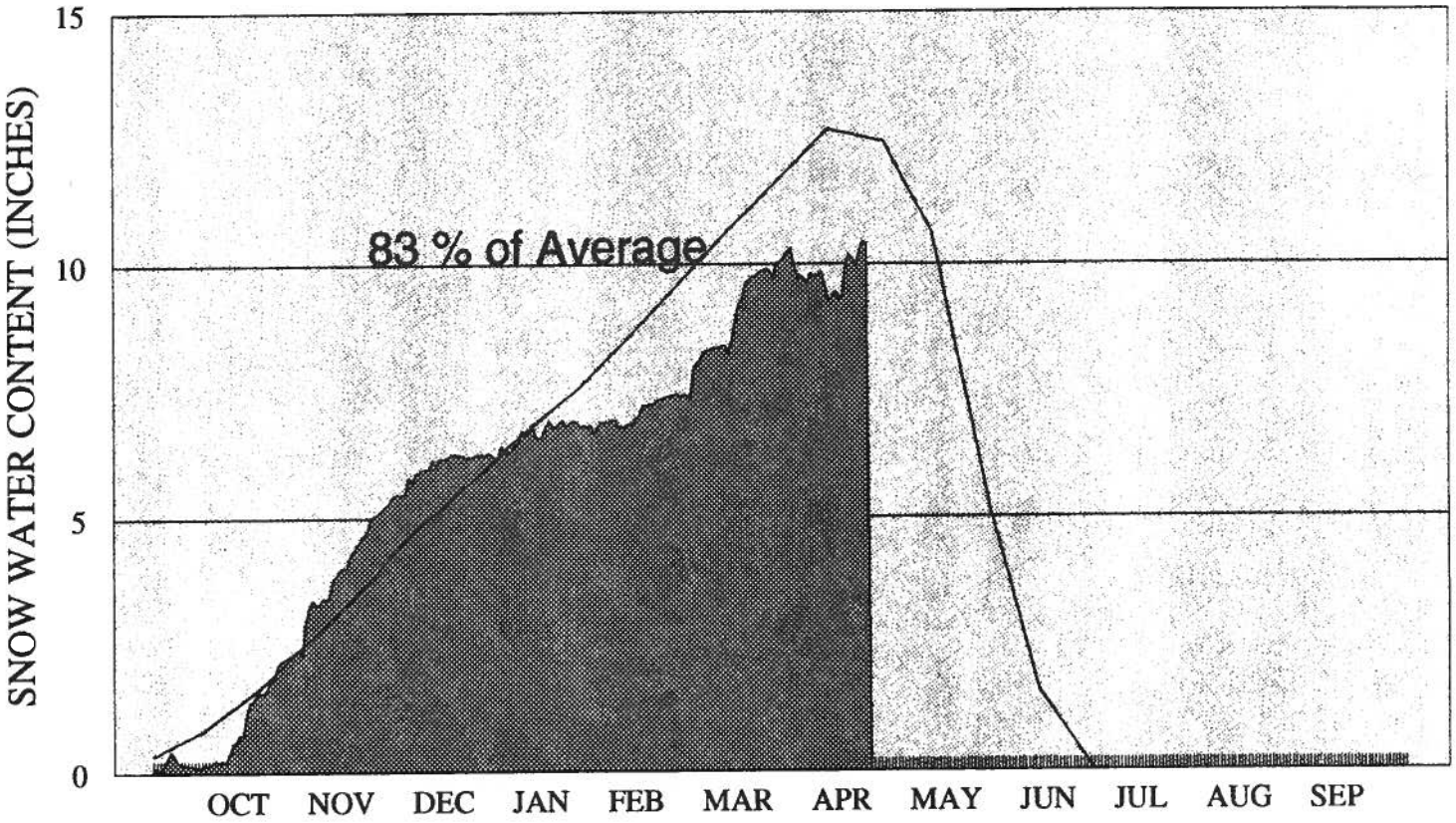


MILK RIVER TOTAL STORAGE



BIGHORN LAKE (YELLOWTAIL DAM)

SNOW WATER CONTENT



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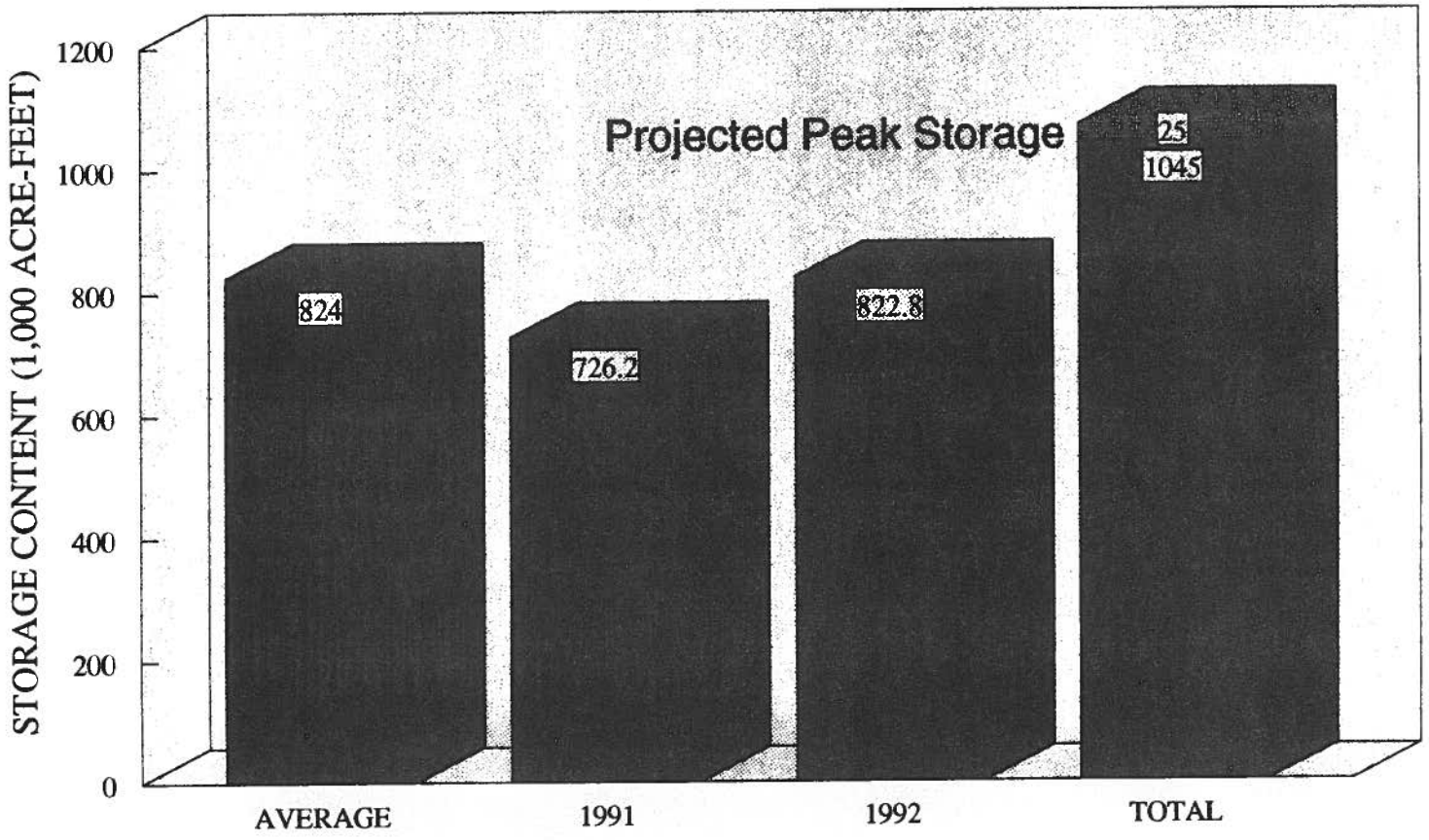

TABLE 1 Remaining Snowpack in Montana and Year-to-Date Precipitation[1] Based on Mountain Data from SCS SNOTEL Sites As of 3/10/92 thru 4/27/92						
	Remaining Snow Water Equivalents[2] (% of average)			Year-to-Date[3] Precipitation (% of average)		
Basin	3/10/92	4/9/92	4/27/92	3/10/92	4/9/92	4/27/92
Kootenai River	76	67	57	75	70	70
Flathead River	81	70	67	82	75	77
Upper Clark Fork River	*	68	67	*	74	77
Bitterroot River	76	59	60	80	77	84
Lower Clark Fork River	*	65	64	83	77	81
Jefferson River	85	77	75	85	77	81
Madison River	85	78	77	82	73	78
Gallatin River	73	70	78	65	62	73
Missouri River above Toston	84	76	75	81	74	79
Mainstem Missouri	78	65	64	73	70	74
Smith, Judith, & Musselshell Rivers	75	58	70	69	66	78
Sun, Teton, & Marias Rivers	77	67	58	75	70	73
St. Mary & Milk Rivers	69	54	57	83	76	78
Upper Yellowstone	77	72	79	79	77	88
Lower Yellowstone	79	76	78	85	83	94

Notes

(1) Information taken from Soil Conservation Service Snow-Precipitation Update.

(2) A "snow water equivalent" is the depth of snow equivalent to one inch of water.

(3) October 1, 1991, to present.

TABLE 7			
Montana Surface Water Supply Indices (SWSIs) April 1, 1992			
Basin	SWSI	Basin	SWSI
Tobacco River	-3.5	Gallatin River	-3.1
Kootenai River below Libby Dam	-0.6	Missouri River above Canyon Ferry	-2.4
Fisher River	-3.3	Missouri River below Canyon Ferry	-2.1
Yaak River	-3.2	Smith River	-3.2
NF Flathead River	-3.4	Sun River	-2.0
Middle Fork Flathead River	-2.9	Teton River	-2.4
SF Flathead River	-2.1	Birch/Dupuyer	-0.5
Flathead River at Columbia Falls	-2.8	Marias River	-2.2
Stillwater/Whitefish Rivers	-3.5	Musselshell River	-1.0
Swan River	-3.2	Missouri above Fort Peck	-2.8
Flathead River at Polson	-2.8	Missouri River below Fort Peck	-2.2
Mission Valley	-3.3	Milk River	-3.7
Little Bitterroot River	-1.6	Yellowstone River above Livingston	-2.8
Blackfoot River	-2.4	Shields River	-3.4
Clark Fork River above Missoula	-2.9	Boulder River (Yellowstone)	-2.6
Bitterroot River	-3.3	Stillwater River	-2.7
Clark Fork River below Bitterroot River	-3.0	Rock/Red Lodge Creeks	-2.5
Clark Fork River below Flathead River	-2.9	Clarks Fork River	-2.5
Beaverhead River	-2.7	Yellowstone above Bighorn River	-2.7
Ruby River	-1.7	Bighorn River	-1.0
Big Hole River	-2.5	Little Bighorn River	-2.5
Boulder River (Jefferson)	-3.2	Yellowstone River below Bighorn River	-1.9
Jefferson River	-2.5	Tongue River	-2.6
Madison River	-1.6	Powder River	-0.6

Explanation: The Surface Water Supply Index (SWSI) is an indicator describing predicted surface water availability during spring and summer months. The April 1, 1992 SWSI describes preliminary conditions prior to the beginning of the 1992 growing season. SWSI values are further illustrated in Figure 2.