MONITOR WEATHER CONDITIONS FOR CLOUD SEEDING CONTROL

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November 1, 1973

Type I Progress Report for Period from September 1, 1973 - October 31, 1973

Prepared for:

Goddard Space Flight Center
Greenbelt, MD 20771

Type I Progress Report
ERTS-A

- Title: Monitor Weather Conditions for Cloud Seeding Control
  ERTS-A Proposal No.: 642

- GSFC ID No. of P.I.: IN 024

- For the period from September 1, 1973, to October 31, 1973: There were no problems impeding the progress of this investigation.

- Progress in reporting period:

Progress during the reporting period proceeded along three separate lines: Wrapping up operations of the spring network of ERTS DCP's, continued operation of the summer network, and planning and operation of the winter network.

I. The Spring 1973 Network

The Spring 1973 network of DCP's in the Colorado River Basin Pilot Project was deactivated after the end of the winter project season when weather modification activities were terminated. Two ERTS DCP's were left in place and operational and constituted the summer network. The other five stations were removed and stored in Durango, Colorado for the summer months. The results of operations of the spring network have been reported in previous Type I & II Progress Reports. The purpose of this section will be to provide final information on the spring network. Deactivation dates for all spring stations are given in Table 1. A map showing the locations of the ERTS sites within the Colorado River Basin Pilot Project is given in Figure 1. Larger scale topographic maps for some of the project sites follow as Figures 2 through 10.

Table 1

Spring Network	Deactivation Dates
Muleshoe	5/25/73
Molas Divide	5/16/73
Pagosa Peak	5/19/73
Devil Mountain	5/30/73
Runlett Park	5/29/73
Wolf Creek Pass	N/A
Wolf Creek North	N/A

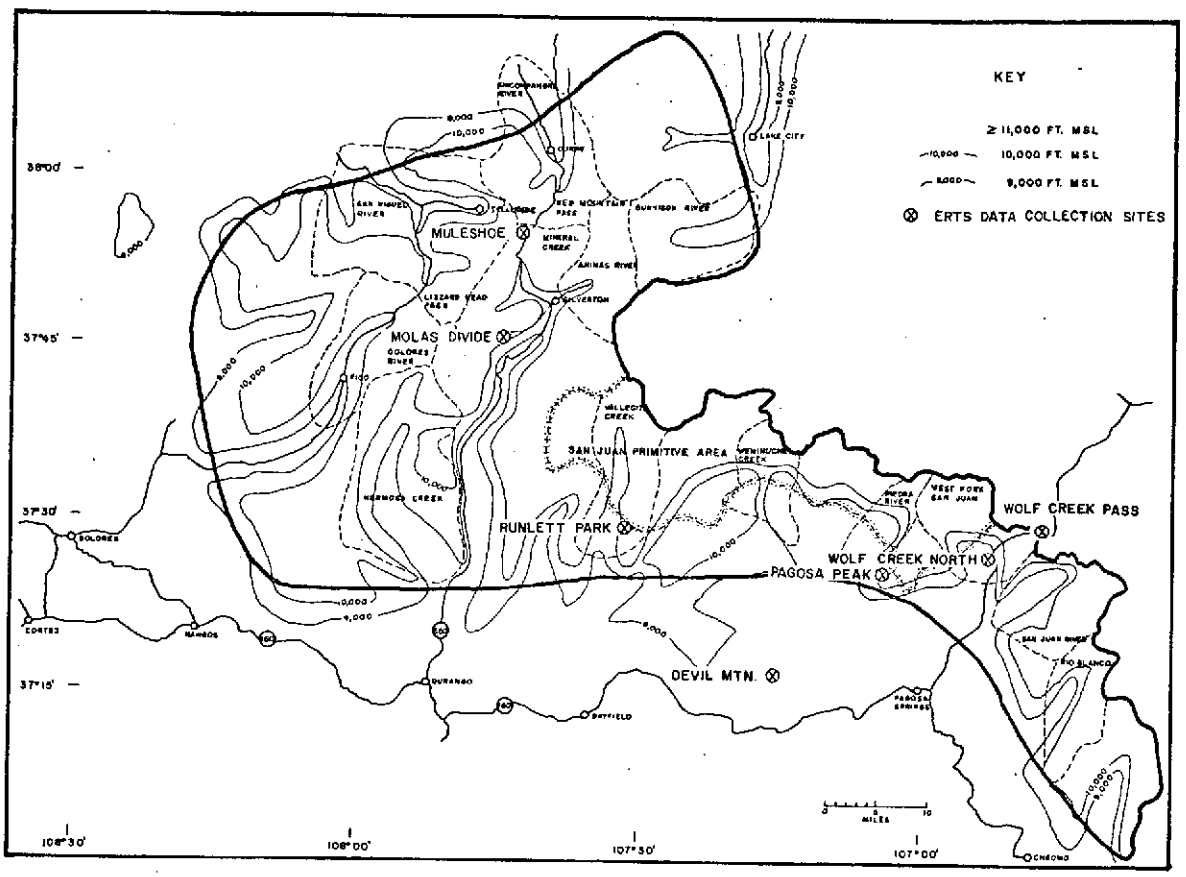
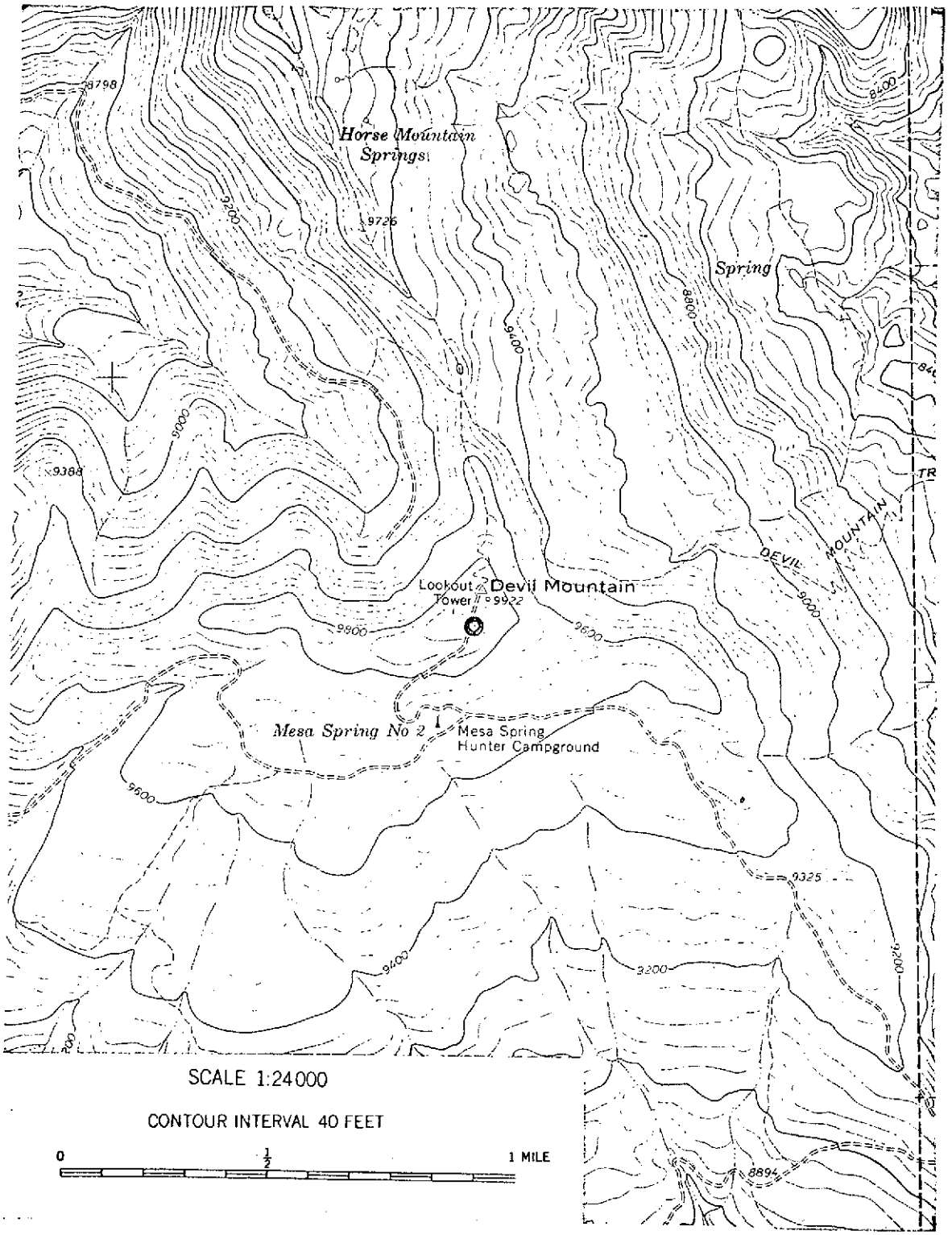
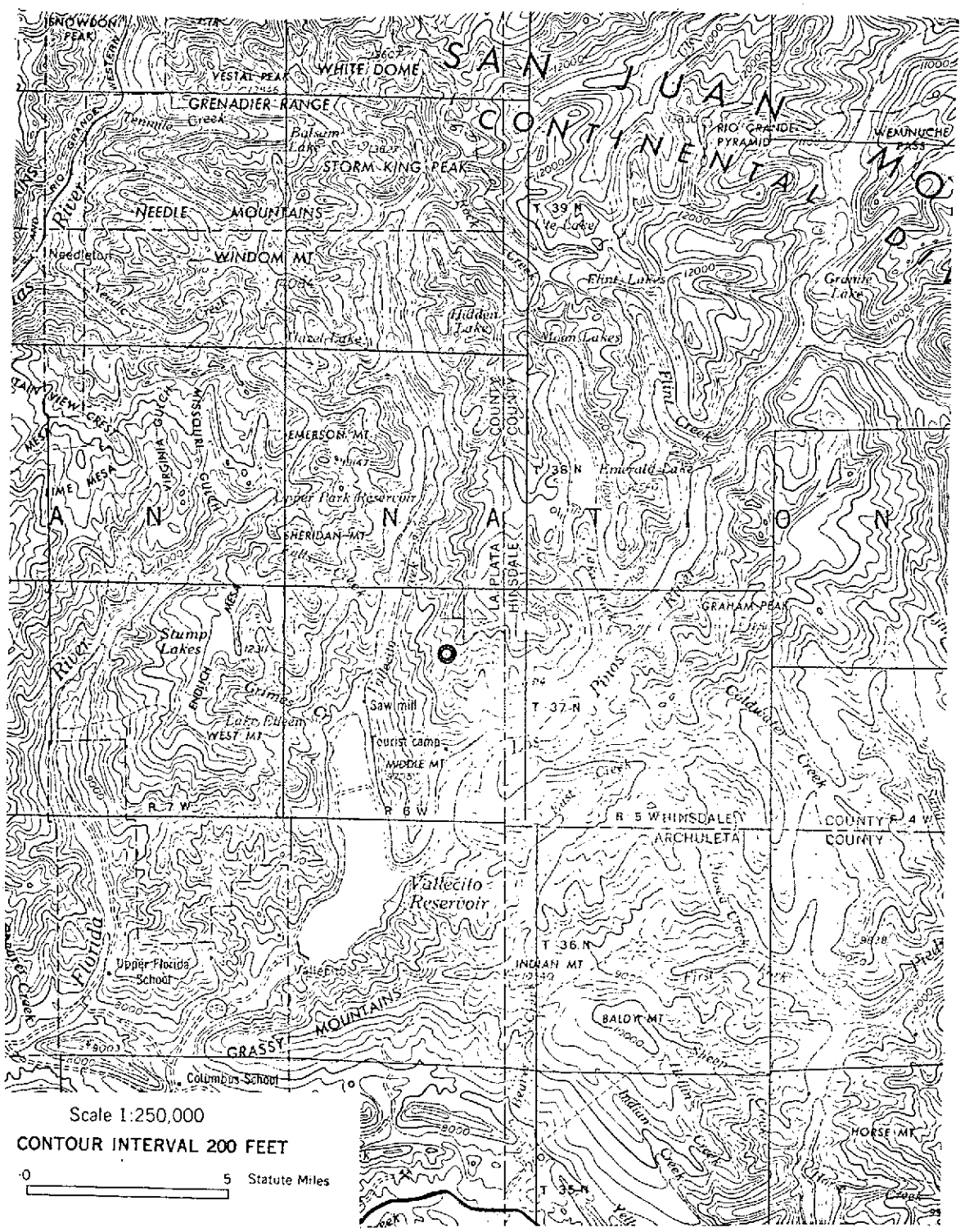


Figure 1: Spring 1973 ERTS Site Locations



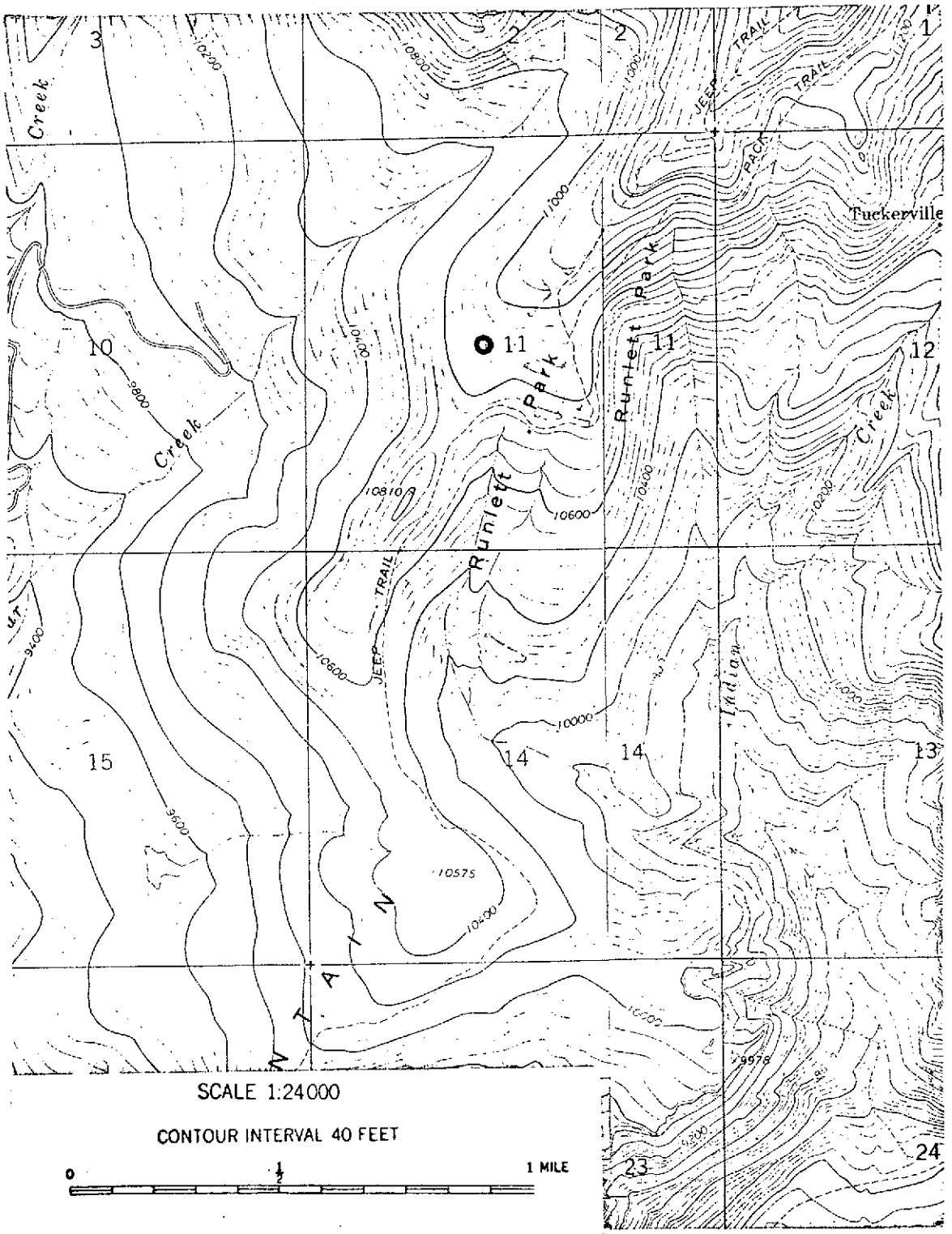
Devil Mountain

Figure 2



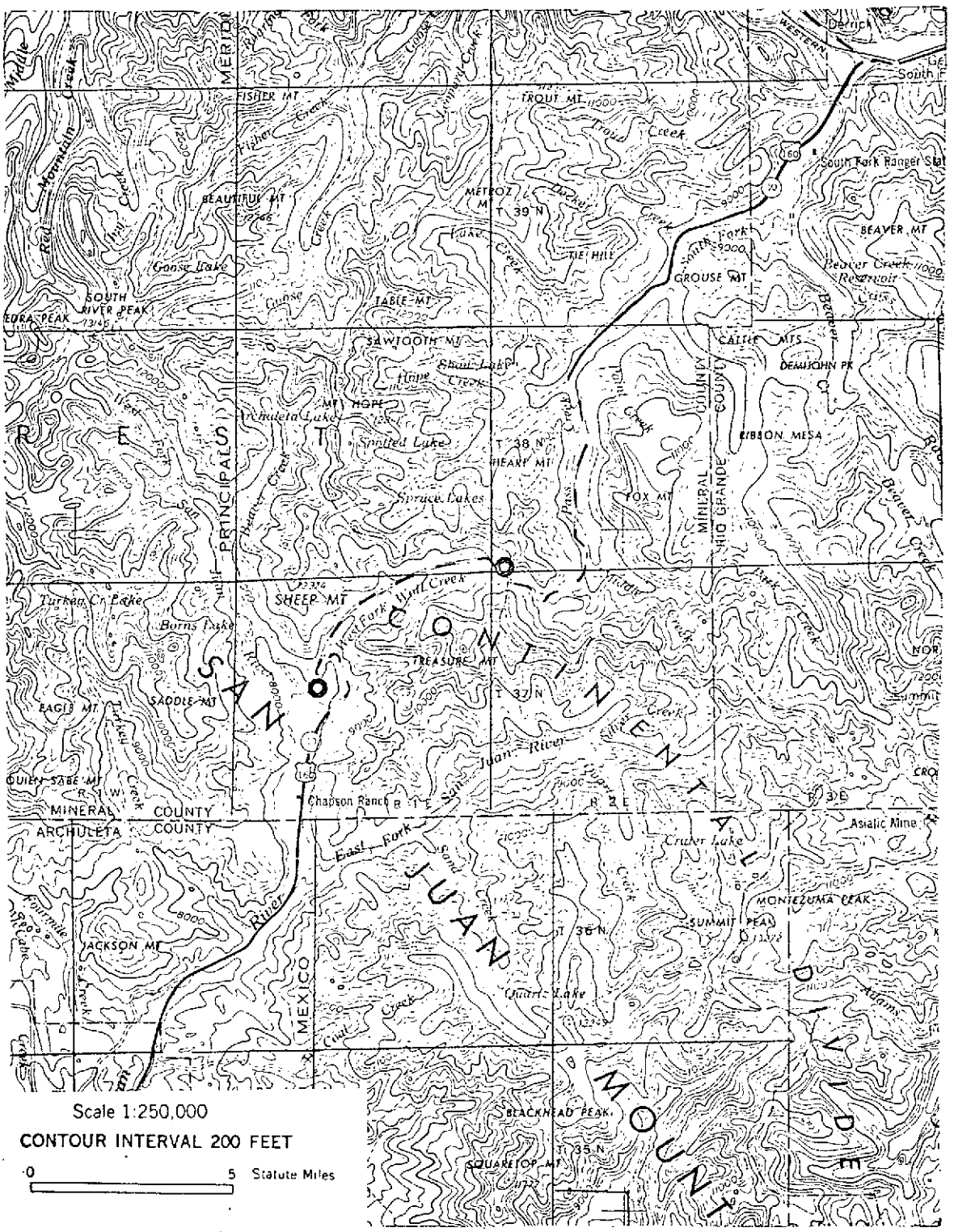
Runlett Park

Figure 3



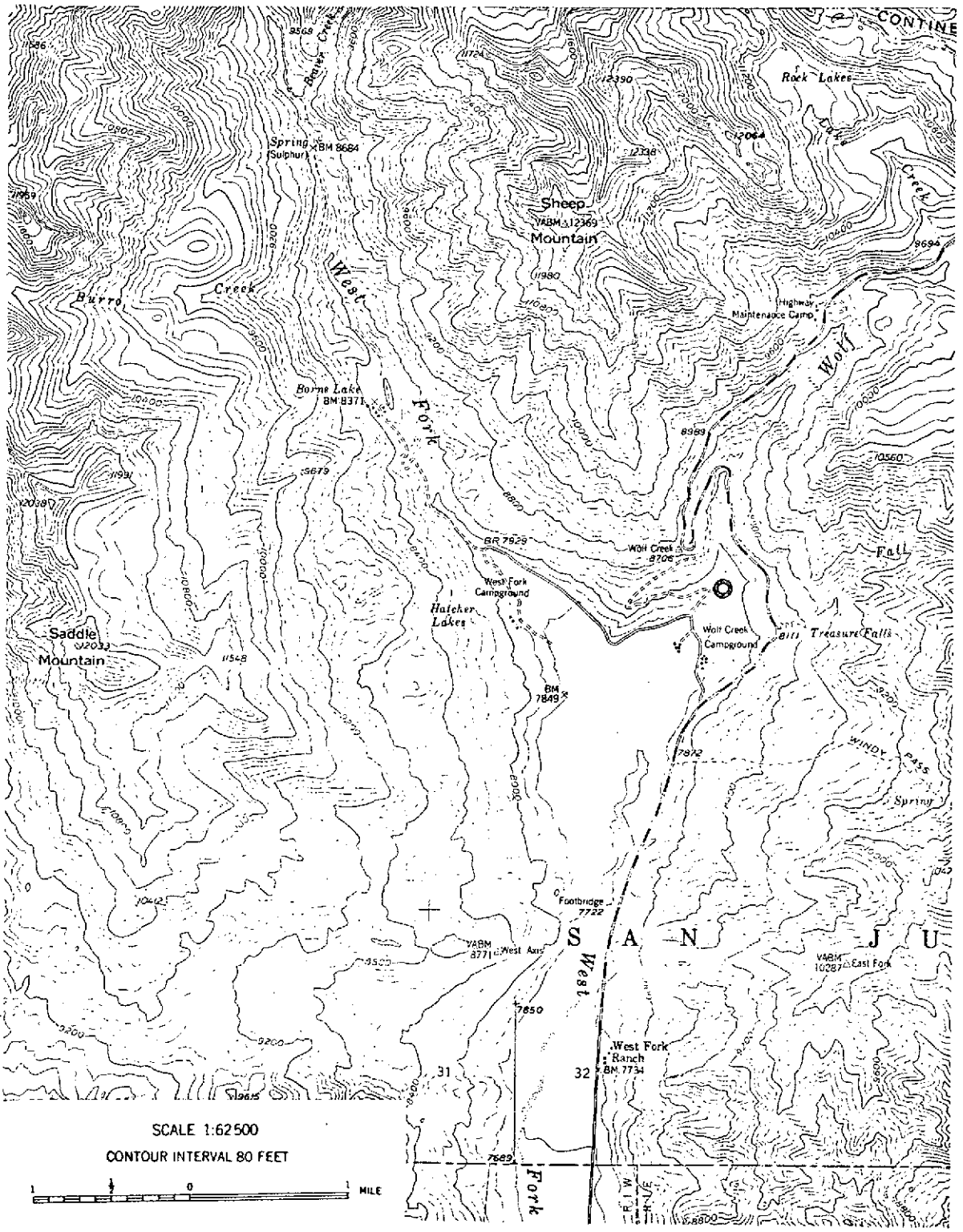
Runlett Park

Figure 4



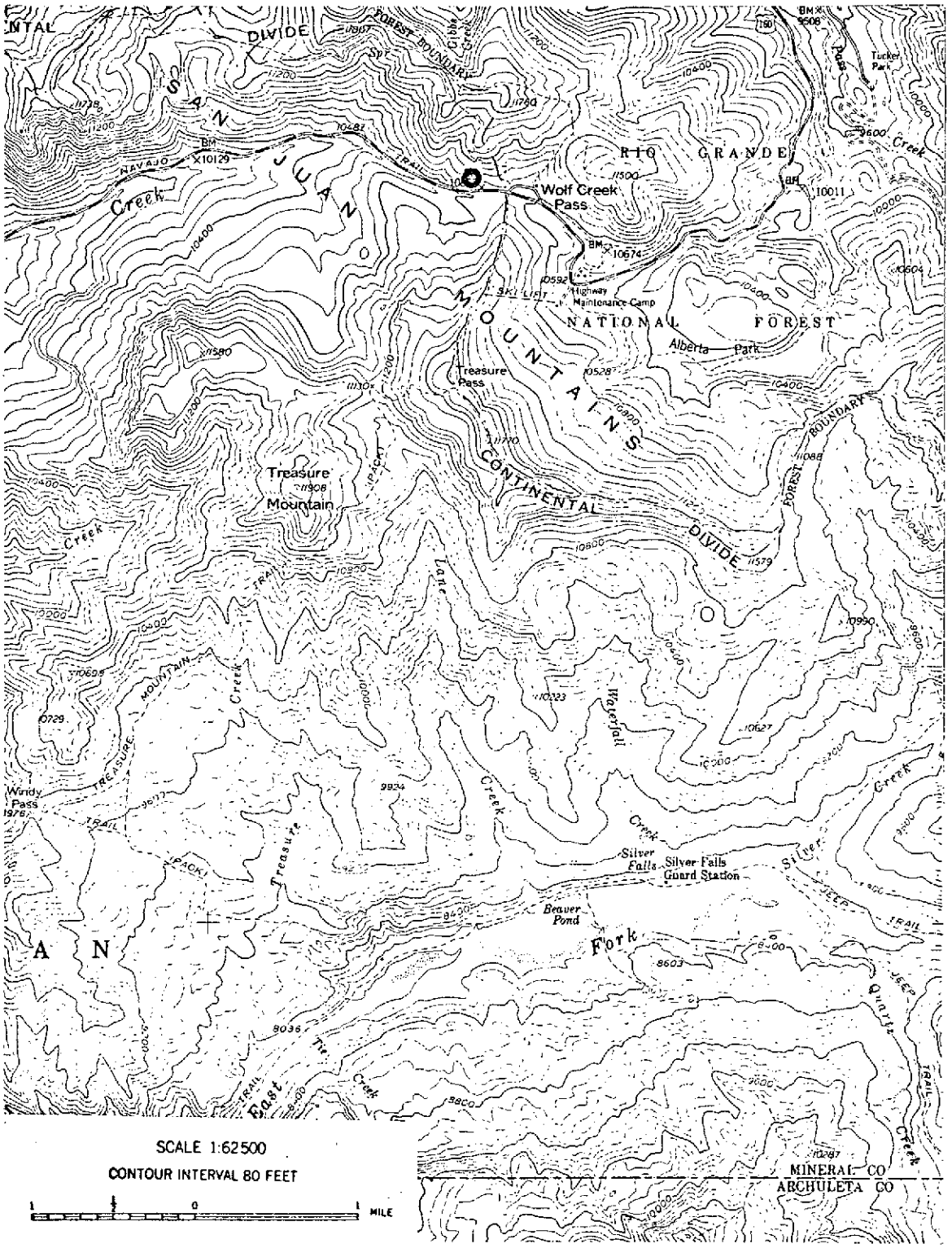
Wolf Creek Pass/Wolf Creek North

Figure 5



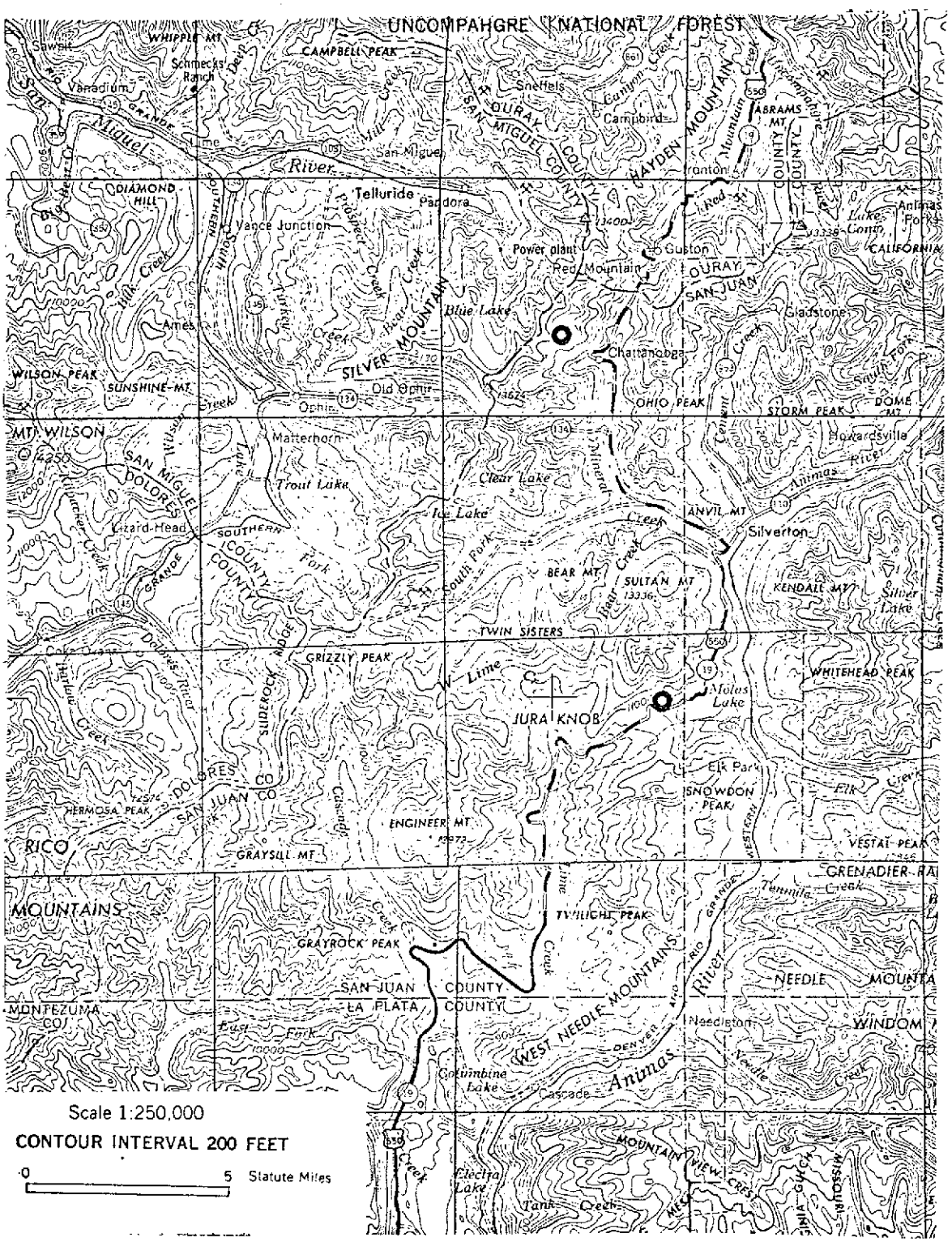
Wolf Creek North

Figure 6



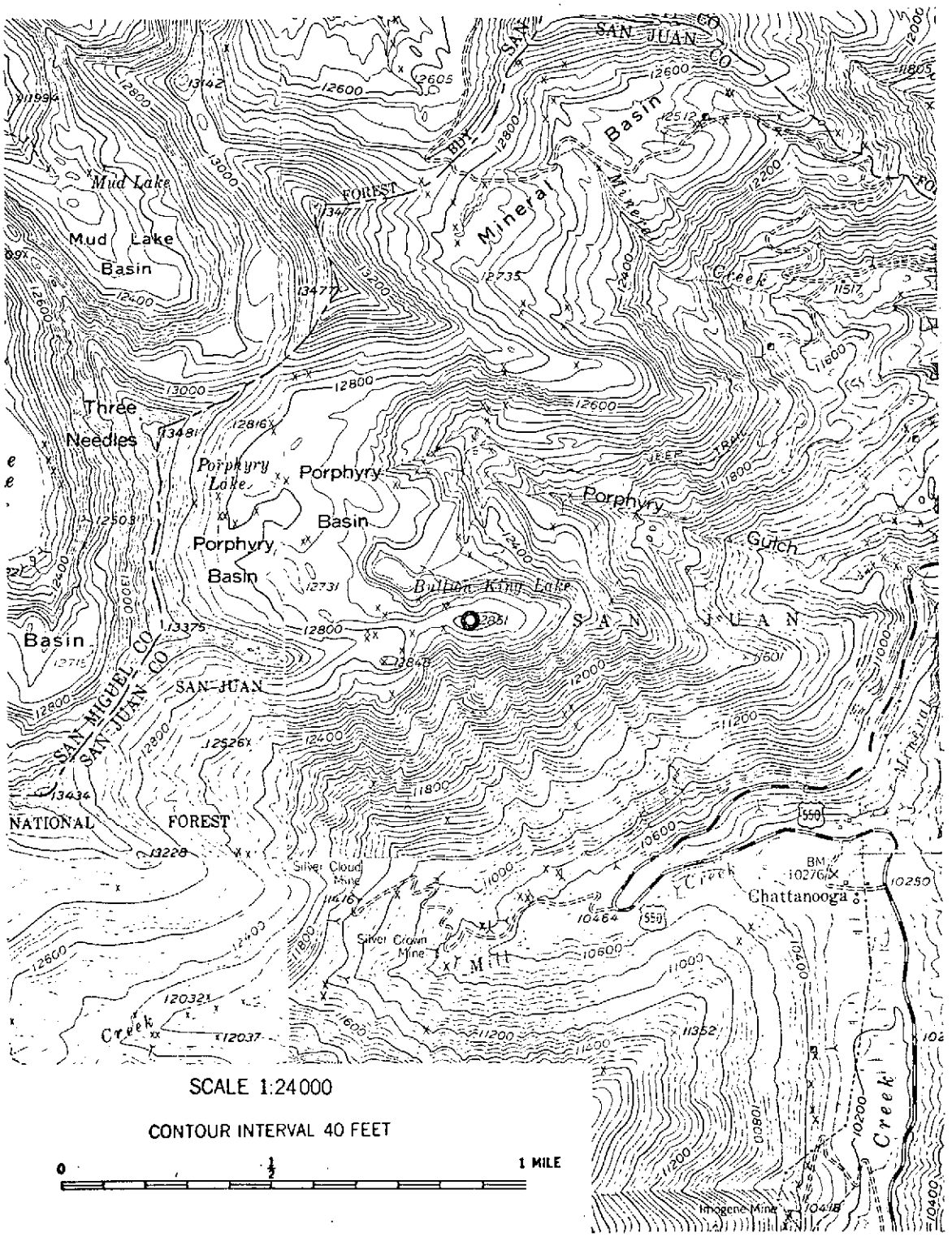
Wolf Creek Pass

Figure 7



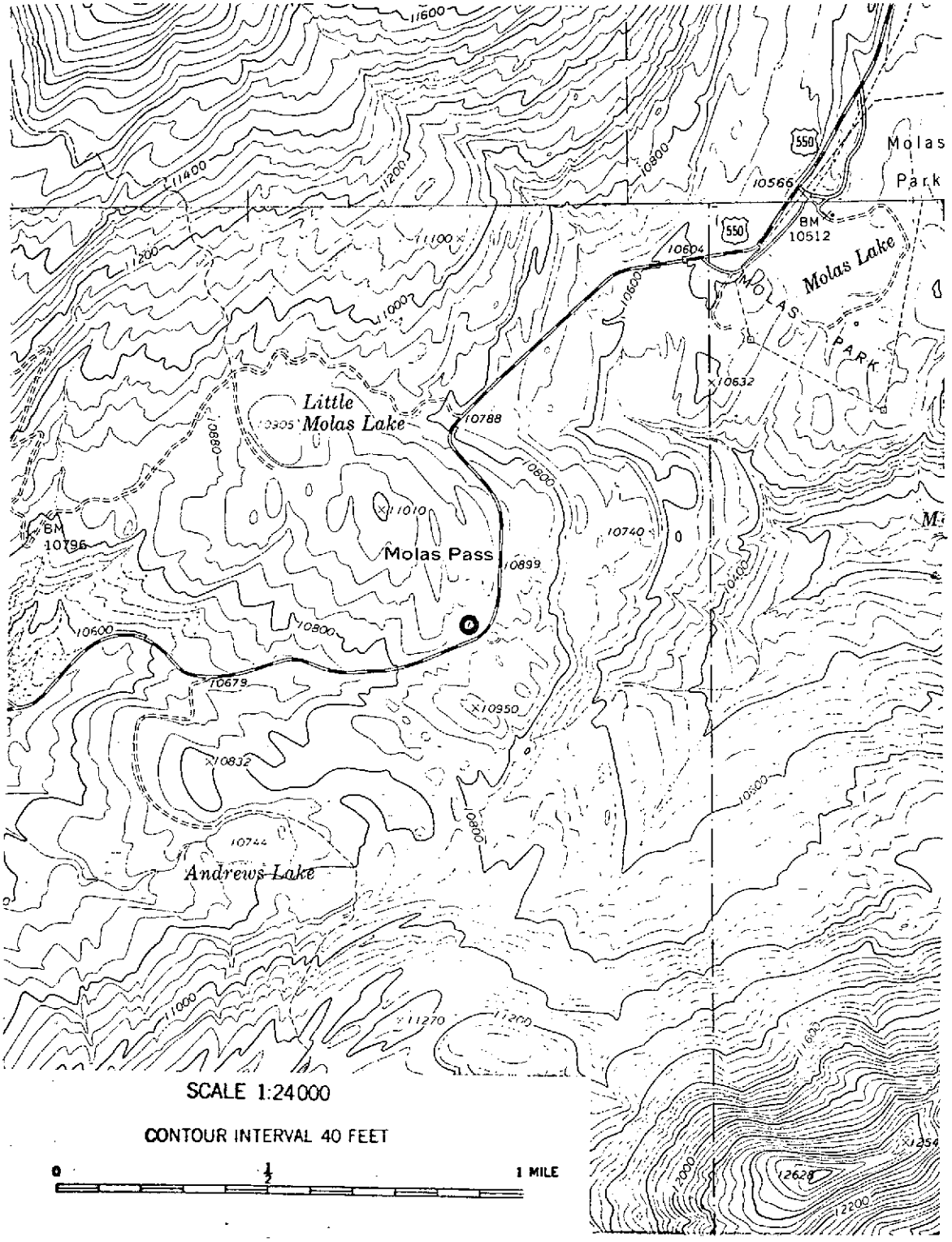
Muleshoe/Molas Pass

Figure 8



Muleshoe

Figure 9



Molas Pass

Figure 10

II. The Summer 1973 Network

Operation of the summer network ran from June 1st through October 31st. See Tables 2 & 3 for data summaries for this time period. The network consisted of two stations - Wolf Creek Pass and Wolf Creek North. These two stations were part of the previous spring network and were simply left in place throughout the summer, while the other spring stations were removed and stored in Durango, Colorado. The objectives of summer network operations were to gain further experience with the ERTS data collection system by monitoring the battery life at the two sites, determining changes in the data throughput efficiency of the DCS, determining the probable lifetime of ERTS stations in high tourist-use areas and in areas having large hunter populations, and comparing data transmitted through the ERTS DCS with data recorded on-site. Another objective of the summer program was to gain further experience on the maintenance requirements of the ERTS stations.

A. Battery life - The battery voltage at both stations was monitored throughout the summer. Data from the two sites was continually checked to see if a drop in battery voltage affected the quality or quantity of data received. No drop in quality or quantity was noticed. The slow drop in battery voltage at Wolf Creek Pass is plotted in Figure 11. This station was installed on March 23, 1973 and has operated continuously up to the present date with no change in batteries and only minor servicing unrelated to battery power. Some difficulty was encountered in calibrating a new temperature sensor at Wolf Creek Pass on November 9, 1973. This indicated that the batteries should probably be replaced at the next opportunity.

The batteries at Wolf Creek North were replaced on November 9, 1973. The voltage curve of Wolf Creek North was similar to that at Wolf Creek Pass with no change in data quality or quantity noted since the batteries were installed on April 27, 1973.

B. Data throughput efficiency - Data throughput efficiency has been monitored for the two summer stations as shown in Tables 4 and 5. In the 153 day period, June 1 through October 31, a total of 455 satellite orbits relayed data from the Wolf Creek North site. While 455 satellite orbits relayed data to Goddard, data was received at the time share terminal in Fort Collins for only 335 orbits. The difference is due to data dropouts in the Goddard-Suitland and Suitland-Denver data links. Twenty-six percent of the data received at Goddard was not received in Fort Collins. Overall, Goddard received data from an average of 2.97 data orbits/day, while Fort Collins received an average of 2.19 data orbits/day. Each orbit produced one or more messages over a period of 12 minutes or less.

Table 2

ERTS Data Summaries

June 1, 1973 - October 31, 1973

WLFCRP Wolf Creek Pass 1973 Data

DATE	HOURS (GMT)	TEMP (°C)	TVO (bits)	TVO (bits)	TVO (bits)	PRECIP (inches)	TVO (bits)	HSV (volts)	BATT (volts)
May 27	0352-0359	-6.2	0	0	0	5.1	0	2.5	12.7
May 27	0533-0540	-7.6	0	0	0	5.1	0	2.5	12.7
May 27	1626-1633	+1.4	0	0	0	5.1	0	2.5	12.7
May 27	1811-1815	+0.4	0	0	0	5.1	0	2.5	12.8
May 28	0357-0404	-3.1	0	0	0	5.1	0	2.5	12.7
May 28	0542-0545	-4.4	0	0	0	5.1	0	2.5	12.7
May 28	1633-1639	+7.2	0	0	0	5.1	0	2.5	12.8
May 29	0405-0409	0.0	0	0	0	5.1	0	2.5	12.8
May 29	0547-0551	-0.2	0	0	0	5.1	0	2.5	12.7
May 29	1639-1646	+10.8	0	0	0	5.1	0	2.5	12.8
May 29	1821-1827	+9.1	0	0	0	5.1	0	2.5	12.8
May 30	1644-1651	+9.2	0	0	0	5.1	0	2.5	12.8
May 30	1828-1831	+9.2	0	0	0	5.1	0	2.5	12.8
May 31	0237	+4.3	0	0	0	5.1	0	2.5	12.8
May 31	0413-0420	+1.0	0	0	0	5.1	0	2.5	12.7
May 31	0602	+0.4	0	0	0	5.1	0	2.5	12.7
May 31	1648-1655	+12.1	0	0	0	5.1	0	2.5	12.8
May 31	1834	+11.4	0	0	0	5.1	0	2.5	12.8
June 1	0240-0243	+1.4	0	0	0	5.1	0	2.5	12.8
June 1	0421-0424	+0.8	0	0	0	5.1	0	2.5	12.7
June 2	0245	-0.5	0	0	0	5.6	0	2.5	12.7
June 2	1701-1708	+0.8	0	0	0	5.8	0	2.5	12.7
June 2	1847	+1.4	0	0	0	5.9	0	2.5	12.7
June 3	0250	+0.4	0	0	0	6.1	0	2.5	12.7
June 3	0617	-2.5	0	0	0	6.1	0	2.5	12.7

Time is GMT. Subtract 6 hrs. for MDT.

DATE	HOURS (GMT)	TEMP (°C)	TVO (bits)	TVO (bits)	TVO (bits)	PRECIP (inches)	TVO (bits)	HSV (volts)	BATT (volts)
June 3	1528	+6.9	0	0	0	6.1	0	2.5	12.8
June 3	1707-1714	+7.3	0	0	0	6.1	0	2.5	12.8
June 4	0257-0300	-1.0	0	0	0	6.5	0	2.5	12.7
June 4	0440-0443	-0.7	0	0	0	6.6	0	2.5	12.7
June 4	0623	-1.2	0	0	0	6.8	0	2.5	12.7
June 4	1532	+2.7	0	0	0	7.1	0	2.5	12.7
June 4	1714	+4.7	0	0	0	7.1	0	2.5	12.7
June 5	Missing Data - unannounced data dump at CSS								
June 6	0308-0311	+3.0	0	0	0	7.2	0	2.5	12.8
June 6	0448-0455	+0.3	0	0	0	7.2	0	2.5	12.7
June 6	1545	+8.9	0	0	0	7.2	0	2.5	12.8
June 6	1724-1730	+11.8	0	0	0	7.2	0	2.5	12.8
June 7	0313-0317	+4.3	0	0	0	7.2	0	2.5	12.8
June 7	0453-0500	+4.3	0	0	0	7.2	0	2.5	12.7
June 7	1548-1551	+10.8	0	0	0	7.2	0	2.5	12.8
June 7	1730-1737	+11.8	0	0	0	7.2	0	2.5	12.8
June 8	0320-0323	+5.9	0	0	0	7.2	0	2.5	12.8
June 8	1555	+14.7	0	0	0	7.2	0	2.5	12.8
June 8	1735-1741	+15.0	0	0	0	7.2	0	2.5	12.8
June 9	0324-0331	+5.3	0	0	0	7.2	0	2.5	12.8
June 9	0507-0510	+4.3	0	0	0	7.2	0	2.5	12.7
June 9	1600-1604	+15.0	0	0	0	7.2	0	2.5	12.8
June 9	1741-1747	+15.3	0	0	0	7.2	0	2.5	12.8
June 10	1605-1608	+16.3	0	0	0	7.2	0	2.5	12.8
June 10	1746-1753	+17.2	0	0	0	7.2	0	2.5	12.8
June 11	0337-0340	+9.1	0	0	0	7.2	0	2.5	12.8
June 11	0516-0523	+5.0	0	0	0	7.2	0	2.5	12.7

Time is GMT. Subtract 6 hrs. for MDT.

WLFCRP Wolf Creek Pass 1973 Data

DATE	HOURS (GMT)	TEMP (°C)	TVO (bits)	TVO (bits)	TVO (bits)	PRECIP (inches)	TVO (bits)	HSV (volts)	BATT (volts)
June 12	0343-0346	+5.3	0	0	0	7.2	0	2.5	12.8
June 12	0526-0529	+2.7	0	0	0	7.2	0	2.5	12.7
June 13	0347-0353	+7.2	0	0	0	7.2	0	2.5	12.7
June 13	0530-0533	+5.3	0	0	0	7.2	0	2.5	12.7
June 13	1622-1629	+11.4	0	0	0	7.2	0	2.5	12.7
June 13	1803-1809	+13.2	0	0	0	7.2	0	2.5	12.8
June 14	0354-0357	+3.7	0	0	0	7.4	0	2.5	12.7
June 14	0535-0539	+3.0	0	0	0	7.6	0	2.5	12.7
June 14	1628-1635	+0.8	0	0	0	7.9	0	2.5	12.6
June 14	1810-1817	+1.0	0	0	0	7.9	0	2.5	12.6
June 15	0357-0404	+3.4	0	0	0	7.9	0	2.5	12.7
June 15	1633-1640	+4.4	0	0	0	7.9	0	2.5	12.7
June 15	1815	+4.0	0	0	0	7.9	0	2.5	12.7
June 16	0402-0409	+3.4	0	0	0	7.9	0	2.5	12.7
June 16	0548-0551	+3.0	0	0	0	7.9	0	2.5	12.7
June 16	1637-1644	+5.4	0	0	0	7.9	0	2.5	12.7
June 16	1823	+6.3	0	0	0	7.9	0	2.5	12.7
June 17	0408-0415	+0.4	0	0	0	7.9	0	2.5	12.7
June 17	0554	-0.2	0	0	0	7.9	0	2.5	12.7
June 17	1645-1651	+7.9	0	0	0	7.9	0	2.5	12.7
June 17	1831	+7.9	0	0	0	7.9	0	2.5	12.7
June 18	1648-1658	+9.0	0	0	0	7.9	0	2.5	12.7
June 18	1833-1836	+9.2	0	0	0	7.9	0	2.5	12.7

Time is GMT. Subtract 6 hrs. for MDT.

WLFCRP Wolf Creek Pass 1973 Data

DATE	HOURS (GMT)	TEMP (°C)	TVO (bits)	TVO (bits)	TVO (bits)	PRECIP (inches)	TVO (bits)	HSV (volts)	BATT (volts)
June 19	0240	+3.7	0	0	0	7.9	0	2.5	12.7
June 19	0420-0427	+0.4	0	0	0	7.9	0	2.5	12.7
June 19	0606	-1.8	0	0	0	7.9	0	2.5	12.7
June 19	1654-1701	+5.8	0	0	0	7.9	0	2.5	12.7
June 19	1841	+7.9	0	0	0	7.9	0	2.5	12.7
June 20	0426-0433	-0.1	0	0	0	7.9	0	2.5	12.7
June 20	0612	-1.2	0	0	0	7.9	0	2.5	12.7
June 20	1522	+9.8	0	0	0	7.9	0	2.5	12.7
June 20	1700-1706	+9.8	0	0	0	7.9	0	2.5	12.7
June 20	1844	+10.2	0	0	0	7.9	0	2.5	12.7
June 21	0252	+6.9	0	0	0	7.9	0	2.5	12.7
June 22	0256-0300	+4.3	0	0	0	7.9	0	2.5	12.7
June 22	0436-0443	+2.4	0	0	0	7.9	0	2.5	12.7
June 22	1532	+13.1	0	0	0	7.9	0	2.5	12.7
June 22	1712-1719	+13.3	0	0	0	7.9	0	2.5	12.7
June 23	0303-0306	+5.6	0	0	0	7.9	0	2.5	12.7
June 23	0442-0449	+8.2	0	0	0	7.9	0	2.5	12.7
June 23	1549	+13.4	0	0	0	7.9	0	2.5	12.7
June 23	1718-1724	+14.6	0	0	0	7.9	0	2.5	12.7
June 24	0308	+5.6	0	0	0	8.0	0	2.5	12.7
June 24	0448-0455	+3.7	0	0	0	8.0	0	2.5	12.7
June 24	1544	+15.7	0	0	0	8.0	0	2.5	12.7
June 24	1722-1729	+15.7	0	0	0	8.0	0	2.5	12.7
June 25	0314-0317	+6.6	0	0	0	8.0	0	2.5	12.7
June 25	0456-0459	+8.5	0	0	0	8.0	0	2.5	12.7

Time is GMT. Subtract 6 hrs. for MDT.

WLFCRP Wolf Creek Pass 1973 Data

DATE	HOURS (GMT)	TEMP (°C)	TVO (bits)	TVO (bits)	TVO (bits)	PRECIP (inches)	TVO (bits)	HSV (volts)	BATT (volts)
June 25	1548-1551	+16.6	0	0	0	8.0	0	2.5	12.8
June 25	1729-1735	+17.2	0	0	0	8.0	0	2.5	12.7
June 26	0319-0322	+7.8	0	0	0	8.0	0	2.5	12.7
June 26	0500-0507	+7.0	0	0	0	8.0	0	2.5	12.7
June 26	1739-1742	+19.5	0	0	0	8.0	0	2.5	12.8
June 27	0325-0328	+10.6	0	0	0	8.0	0	2.5	12.7
June 27	0505-0512	+10.8	0	0	0	8.0	0	2.5	12.7
June 28	0331-0334	+9.0	0	0	0	2.0	0	2.5	12.8
June 28	0511-0518	+8.5	0	0	0	2.0	0	2.5	12.7
June 28	1604-1607	+19.2	0	0	0	1.9	0	2.5	12.8
June 28	1746-1752	+20.0	0	0	0	2.0	0	2.5	12.8
June 29	1609-1613	+18.2	0	0	0	2.0	0	2.5	12.8
June 29	1753-1759	+19.4	0	0	0	2.0	0	2.5	12.8
June 30	1616-1619	+18.6	0	0	0	2.0	0	2.5	12.8
June 30	1759-1802	+19.9	0	0	0	2.0	0	2.5	12.8
July 1	0348-0351	+8.9	0	0	0	2.0	0	2.5	12.7
July 1	0529-0532	+6.9	0	0	0	2.0	0	2.5	12.7
July 1	1620-1627	+16.4	0	0	0	2.0	0	2.5	12.8
July 1	1806-1809	+17.6	0	0	0	2.0	0	2.5	12.7
July 2	0352-0359	+8.2	0	0	0	2.0	0	2.5	12.7
July 2	0534-0537	+6.9	0	0	0	2.0	0	2.5	12.7
July 2	1625-1631	+19.8	0	0	0	2.0	0	2.5	12.8
July 2	1811-1817	+20.6	0	0	0	2.0	0	2.5	12.8
July 3	0359-0402	+9.5	0	0	0	2.0	0	2.5	12.7
July 3	0540-0543	+7.9	0	0	0	2.0	0	2.5	12.7

Time is GMT. Subtract 6 hrs. for MDT.

WLFCRP Wolf Creek Pass 1973 Data

DATE	HOURS (GMT)	TEMP (°C)	TVO (bits)	TVO (bits)	TVO (bits)	PRECIP (inches)	TVO (bits)	HSV (volts)	BATT (volts)
July 4	0405-0409	+9.2	0	0	0	2.0	0	2.5	12.7
July 4	0546-0549	+8.2	0	0	0	2.0	0	2.5	12.7
July 4	1637-1643	+18.6	0	0	0	2.0	0	2.5	12.8
July 4	1820-1824	+21.5	0	0	0	2.0	0	2.5	12.8
July 5	0410-0413	+10.2	0	0	0	2.0	0	2.5	12.7
July 5	0551-0554	+10.2	0	0	0	2.0	0	2.5	12.7
July 5	1642-1649	+20.6	0	0	0	2.0	0	2.5	12.8
July 5	1828-1831	+21.8	0	0	0	2.0	0	2.5	12.8
July 6	0236	+12.4	0	0	0	2.0	0	2.5	12.7
July 6	0415	+7.9	0	0	0	2.0	0	2.5	12.7
July 6	0557-0601	+7.6	0	0	0	2.0	0	2.5	12.7
July 6	1648-1654	+20.9	0	0	0	2.0	0	2.5	12.8
July 6	1834	+23.1	0	0	0	2.0	0	2.5	12.8
July 7	0239-0242	+14.6	0	0	0	2.0	0	2.5	12.8
July 7	0420-0424	+9.8	0	0	0	2.0	0	2.5	12.7
July 7	1654-1700	+20.7	0	0	0	2.0	0	2.5	12.8
July 7	1840-1843	+21.1	0	0	0	2.0	0	2.5	12.8
July 8	1700-1706	+16.8	0	0	0	2.0	0	2.5	12.7
July 9	0249-0252	+10.8	0	0	0	2.0	0	2.5	12.7
July 9	0432-0435	+8.2	0	0	0	2.2	0	2.5	12.7
July 9	1528	+13.7	0	0	0	2.2	0	2.5	12.7
July 10	0255-0302	+8.9	0	0	0	2.2	0	2.5	12.7
July 10	0437-0444	+7.9	0	0	0	2.2	0	2.5	12.7
July 10	1532	+13.1	0	0	0	2.2	0	2.5	12.7
July 11	0301-0307	+11.4	0	0	0	2.2	0	2.5	12.7
July 11	0444-0448	+10.2	0	0	0	2.2	0	2.5	12.7

Time is GMT. Subtract 6 hrs. for MDT.

WLFCRP Wolf Creek Pass 1973 Data

DATE	HOURS (GMT)	TEMP (°C)	TVO (bits)	TVO (bits)	TVO (bits)	PRECIP (inches)	TVO (bits)	HSV (volts)	BATT (volts)
July 11	1538	+14.7	0	0	0	2.2	0	2.5	12.7
July 11	1719-1722	+14.7	0	0	0	2.2	0	2.5	12.7
July 12	0310-0313	+9.5	0	0	0	2.2	0	2.5	12.7
July 12	0447-0453	+7.2	0	0	0	2.2	0	2.5	12.7
July 12	1542-1545	+13.8	0	0	0	2.2	0	2.5	12.7
July 12	1723-1730	+11.5	0	0	0	2.2	0	2.5	12.7
July 13	0312-0319	+ 7.2	0	0	0	2.3	0	2.5	12.7
July 13	0455-0458	+ 6.7	0	0	0	2.3	0	2.5	12.6
July 13	1549	+12.4	0	0	0	2.3	0	2.5	12.7
July 13	1731-1737	+12.3	0	0	0	2.3	0	2.5	12.7
July 14	0320	+ 8.2	0	0	0	2.4	0	2.5	12.7
July 14	0459-0506	+ 8.1	0	0	0	2.4	0	2.5	12.7
July 14	1735-1742	+14.0	0	0	0	2.5	0	2.5	12.7
July 15	0324-0330	+ 7.0	0	0	0	3.1	0	2.5	12.7
July 15	0506-0510	+ 5.9	0	0	0	3.1	0	2.5	12.6
July 17	0337-0341	+ 8.7	0	0	0	3.2	0	2.5	12.7
July 17	0515-0522	+ 7.6	0	0	0	3.2	0	2.5	12.7
July 17	1610-1613	+ 7.9	0	0	0	3.2	0	2.5	12.6
July 17	1752-1759	+10.2	0	0	0	3.2	0	2.5	12.6
July 18	0342-0346	+ 8.5	0	0	0	3.3	0	2.5	12.6
July 18	0525-0528	+ 7.9	0	0	0	3.3	0	2.5	12.6
July 18	1758-1804	+12.1	0	0	0	3.4	0	2.5	12.7
July 19	0345-0352	+ 7.6	0	0	0	3.9	0	2.5	12.6
July 19	0528-0532	+ 7.2	0	0	0	4.0	0	2.5	12.6
July 20	0533-0537	+ 4.0	0	0	0	4.1	0	2.5	12.6
July 20	1627-1634	+12.4	0	0	0	4.1	0	2.5	12.7

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July 20	1810-1817	+13.3	0	0	0	4.1	0	2.5	12.7
July 21	0358-0405	+ 6.3	0	0	0	4.1	0	2.5	12.6
July 21	0541-0544	+ 6.7	0	0	0	4.1	0	2.5	12.6
July 22	0404	+ 5.0	0	0	0	4.3	0	2.5	12.6
July 22	0548	+ 4.3	0	0	0	4.3	0	2.5	12.6
July 22	1821-1825	+13.1	0	0	0	4.3	0	2.5	12.7
July 23	0408-0415	+ 4.0	0	0	0	4.5	0	2.5	12.6
July 23	1641-1644	+13.4	0	0	0	4.5	0	2.5	12.7
July 23	1827-1830	+14.7	0	0	0	4.5	0	2.5	12.7
July 24	0236	+ 9.5	0	0	0	4.5	0	2.5	12.7
July 24	0413-0420	+ 5.3	0	0	0	4.5	0	2.5	12.6
July 24	0556-0600	+ 4.3	0	0	0	4.5	0	2.5	12.6
July 25	0240-0243	+11.2	0	0	0	4.5	0	2.5	12.7
July 25	0420-0427	+ 7.6	0	0	0	4.5	0	2.5	12.6
July 25	0606	+ 9.2	0	0	0	4.5	0	2.5	12.6
July 25	1517	+14.7	0	0	0	4.5	0	2.5	12.7
July 25	1655-1701	+15.7	0	0	0	4.5	0	2.5	12.7
July 25	1840-1843	+16.6	0	0	0	4.5	0	2.5	12.7
July 26	0243-0246	+ 9.8	0	0	0	4.5	0	2.5	12.7
July 26	0424-0431	+ 8.4	0	0	0	4.5	0	2.5	12.6
July 26	1702-1708	+12.2	0	0	0	4.5	0	2.5	12.6
July 26	1844-1847	+15.2	0	0	0	4.5	0	2.5	12.7
July 27	0251-0254	+ 5.8	0	0	0	4.7	0	2.5	12.6
July 27	0431-0438	+ 3.0	0	0	0	4.7	0	2.5	12.6
July 27	1527	+13.1	0	0	0	4.7	0	2.5	12.6
July 27	1706-1713	+12.2	0	0	0	4.7	0	2.5	12.6

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July 27	1854	16.0	0	0	0	4.7	0	2.5	12.7
July 28	0256-0259	8.7	0	0	0	4.7	0	2.5	12.6
July 28	0437-0441	6.1	0	0	0	4.7	0	2.5	12.6
July 28	1533	13.4	0	0	0	4.7	0	2.5	12.6
July 28	1710-1720	13.4	0	0	0	4.7	0	2.5	12.6
July 29	0301-0304	6.8	0	0	0	5.1	0	2.5	12.6
July 29	0443-0449	6.6	0	0	0	5.1	0	2.5	12.6
July 29	1538	13.7	0	0	0	5.1	0	2.5	12.7
July 29	1716-1725	14.8	0	0	0	5.1	0	2.5	12.7
July 30	0308-0311	6.6	0	0	0	5.3	0	2.5	12.6
July 30	0447-0454	4.7	0	0	0	5.3	0	2.5	12.6
July 30	1542-1545	14.0	0	0	0	5.3	0	2.5	12.7
July 30	1723-1729	13.8	0	0	0	5.3	0	2.5	12.7
July 31	0312-0316	5.3	0	0	0	5.4	0	2.5	12.6
July 31	0453-0500	4.7	0	0	0	5.4	0	2.5	12.6
Aug. 1	0501-0504	5.3	0	0	0	5.4	0	2.5	12.6
Aug. 1	1552-1555	13.1	0	0	0	5.4	0	2.5	12.6
Aug. 1	1734-1740	13.8	0	0	0	5.4	0	2.5	12.6
Aug. 2	0324-0327	7.0	0	0	0	5.5	0	2.5	12.6
Aug. 2	1558-1602	13.4	0	0	0	5.5	0	2.5	12.6
Aug. 2	1740-1746	14.5	0	0	0	5.5	0	2.5	12.7
Aug. 3	0328-0335	7.2	0	0	0	5.5	0	2.5	12.6
Aug. 3	0511-0518	4.6	0	0	0	5.5	0	2.5	12.6
Aug. 3	1605	14.0	0	0	0	5.5	0	2.5	12.7
Aug. 4	0334-0341	5.8	0	0	0	5.9	0	2.5	12.6
Aug. 4	0518-0521	6.8	0	0	0	5.9	0	2.5	12.6

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Aug. 4	1610	13.4	0	0	0	5.9	0	2.5	12.6
Aug. 4	1753-1759	12.5	0	0	0	5.9	0	2.5	12.6
Aug. 5	0342-0345	7.2	0	0	0	5.9	0	2.5	12.6
Aug. 5	0521-0528	7.2	0	0	0	5.9	0	2.5	12.6
Aug. 5	1614-1620	11.4	0	0	0	5.9	0	2.5	12.6
Aug. 5	1800-1803	11.4	0	0	0	5.9	0	2.5	12.6
Aug. 6	0347-0350	6.9	0	0	0	5.9	0	2.5	12.6
Aug. 6	0530-0533	6.6	0	0	0	5.9	0	2.5	12.6
Aug. 6	1619-1625	12.4	0	0	0	5.9	0	2.5	12.6
Aug. 6	1805-1808	14.7	0	0	0	5.9	0	2.5	12.6
Aug. 7	0352-0356	6.6	0	0	0	6.6	0	2.5	12.6
Aug. 7	0535-0539	5.3	0	0	0	6.6	0	2.5	12.6
Aug. 7	1809-1815	11.4	0	0	0	6.7	0	2.5	12.6
Aug. 8	0357-0404	4.4	0	0	0	7.2	0	2.5	12.6
Aug. 8	0545	5.3	0	0	0	7.2	0	2.5	12.6
Aug. 8	1817	15.7	0	0	0	7.2	0	2.5	12.6
Aug. 9	0401-0408	9.4	0	0	0	7.2	0	2.5	12.6
Aug. 9	0546-0550	7.6	0	0	0	7.2	0	2.5	12.6
Aug. 9	1636-1643	15.2	0	0	0	7.2	0	2.5	12.6
Aug. 9	1821-1824	16.9	0	0	0	7.2	0	2.5	12.6
Aug. 10	1643-1649	15.7	0	0	0	7.3	0	2.5	12.7
Aug. 10	1826-1829	17.3	0	0	0	7.3	0	2.5	12.6
Aug. 11	0236	11.4	0	0	0	7.3	0	2.5	12.6
Aug. 11	0413-0419	10.5	0	0	0	7.3	0	2.5	12.6
Aug. 11	0557	8.9	0	0	0	7.3	0	2.5	12.6
Aug. 11	1647-1657	16.4	0	0	0	7.3	0	2.5	12.6

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Aug. 14	1526	15.0	0	0	0	7.4	0	2.5	12.6
	1705-1711	15.8	0	0	0	7.4	0	2.5	12.6
Aug. 15	0255-0259	6.1	0	0	0	7.5	0	2.5	12.6
	1531	14.4	0	0	0	7.6	0	2.5	12.6
Aug. 16	0302-0305	8.7	0	0	0	7.6	0	2.5	12.6
	0444-0447	7.9	0	0	0	7.6	0	2.5	12.6
	1538	15.7	0	0	0	7.6	0	2.5	12.6
	1719-1725	17.0	0	0	0	7.6	0	2.5	12.6
Aug. 17	0305-0312	10.4	0	0	0	7.6	0	2.5	12.6
	0446-0453	8.1	0	0	0	7.6	0	2.5	12.6
	1722-1729	16.0	0	0	0	7.6	0	2.5	12.6
Aug. 18	0313-0317	8.9	0	0	0	7.6	0	2.5	12.6
Aug. 19	0319-0322	10.8	0	0	0	7.6	0	2.5	12.6
	0500-0504	8.4	0	0	0	7.6	0	2.5	12.6
Aug. 20	1559-1602	15.2	0	0	0	7.7	0	2.5	12.6
	1740-1746	15.1	0	0	0	7.7	0	2.5	12.6
Aug. 21	0328-0335	6.0	0	0	0	8.4	0	2.5	12.6
	0511-0514	5.0	0	0	0	8.4	0	2.5	12.5
	1607	7.6	0	0	0	8.4	0	2.5	12.5
	1747-1754	7.6	0	0	0	8.6	0	2.5	12.5
Aug. 22	0337-0340	7.2	0	0	0	8.7	0	2.5	12.5
	1753-1759	13.3	0	0	0	8.7	0	2.5	12.6
Aug. 23	0346	5.9	0	0	0	8.8	0	2.5	12.5
	0522-0526	5.3	0	0	0	8.8	0	2.5	12.6

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Aug. 24	0346-0349	7.6	0	0	0	8.8	0	2.5	12.6
	0528-0532	9.5	0	0	0	8.8	0	2.5	12.6
	1620-1626	12.1	0	0	0	8.8	0	2.5	12.6
	1804-1808	8.9	0	0	0	8.9	0	2.5	12.6
Aug. 25	1625-1631	12.6	0	0	0	9.0	0	2.5	12.6
	1812-1815	13.4	0	0	0	9.0	0	2.5	12.6
Aug. 26	1632-1638	13.6	0	0	0	9.3	0	2.5	12.6
	1817-1820	15.3	0	0	0	9.3	0	2.5	12.6
Aug. 27	0401-0408	6.2	0	0	0	9.3	0	2.5	12.5
	0547	5.6	0	0	0	9.3	0	2.5	12.5
	1821-1827	14.4	0	0	0	9.3	0	2.5	12.6
Aug. 28	0408-0415	9.2	0	0	0	9.4	0	2.5	12.6
	1643-1650	14.4	0	0	0	9.4	0	2.5	12.6
Aug. 29	0413-0420	5.3	0	0	0	9.5	0	2.5	12.5
	1648-1654	10.6	0	0	0	9.6	0	2.5	12.5
Aug. 30	0240	6.6	0	0	0	9.7	0	2.5	12.5
Aug. 31	1659-1706	5.6	0	0	0	10.7	0	2.5	12.4
	1845	6.6	0	0	0	10.7	0	2.5	12.4
Sept. 1	0248-0252	1.4	0	0	0	10.8	0	2.5	12.4
	1526	5.9	0	0	0	10.8	0	2.5	12.4
	1707-1713	7.9	0	0	0	10.8	0	2.5	12.5
	1850	9.2	0	0	0	10.8	0	2.5	12.5
Sept. 2	0256-0300	6.9	0	0	0	10.8	0	2.5	12.5
	1530	6.6	0	0	0	10.8	0	2.5	12.5
	1710-1719	7.3	0	0	0	10.8	0	2.5	12.5

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Sept. 3	0304	1.1	0	0	0	10.8	0	2.5	12.4
	1538	7.9	0	0	0	10.8	0	2.5	12.4
Sept. 4	0305-0312	3.3	0	0	0	10.8	0	2.5	12.4
	0447-0454	1.5	0	0	0	10.8	0	2.5	12.4
Sept. 5	0311-0318	5.3	0	0	0	10.8	0	2.5	12.5
	1548	11.8	0	0	0	10.8	0	2.5	12.5
	1730-1736	13.2	0	0	0	10.8	0	2.5	12.6
Sept. 6	0317-0324	7.1	0	0	0	10.8	0	2.5	12.5
	0500-0503	5.2	0	0	0	10.8	0	2.5	12.5
	1551-1554	12.7	0	0	0	10.8	0	2.5	12.5
Sept. 7	0325-0329	4.0	0	0	0	10.8	0	2.5	12.5
	0506-0509	3.7	0	0	0	10.8	0	2.5	12.5
	1601	13.1	0	0	0	10.8	0	2.5	12.5
	1739-1745	14.7	0	0	0	10.8	0	2.5	12.6
Sept. 8	0329-0336	7.2	0	0	0	10.8	0	2.5	12.5
	0512-0515	5.0	0	0	0	10.8	0	2.5	12.4
	1604-1607	10.2	0	0	0	10.9	0	2.5	12.5
	1747-1754	12.1	0	0	0	10.9	0	2.5	12.5
Sept. 10	0342-0345	7.9	0	0	0	10.9	0	2.5	12.4
	0521-0528	7.1	0	0	0	10.9	0	2.5	12.4
	1614-1621	4.3	0	0	0	11.2	0	2.5	12.4
	1758-1802	5.6	0	0	0	2.0	0	2.5	12.4
Sept. 11	0347-0350	3.0	0	0	0	2.5	0	2.5	12.4
	0529-0532	1.7	0	0	0	2.6	0	2.5	12.4
	1620-1626	6.6	0	0	0	2.7	0	2.5	12.4
	1803-1810	7.3	0	0	0	2.7	0	2.5	12.4

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Sept. 12	0350-0357	2.8	0	0	0	2.8	0	2.5	12.4
	0532-0539	1.7	0	0	0	2.8	0	2.5	12.4
Sept. 13	0355-0402	2.6	0	0	0	2.8	0	2.5	12.4
Sept. 14	0403-0406	4.5	0	0	0	2.8	0	2.5	12.4
	0550	2.4	0	0	0	2.8	0	2.5	12.4
	1637-1644	11.3	0	0	0	2.8	0	2.5	12.5
	1820-1826	12.0	0	0	0	2.8	0	2.5	12.5
Sept. 15	0409-0412	3.4	0	0	0	2.8	0	2.5	12.4
	1643-1646	10.8	0	0	0	2.8	0	2.5	12.5
	1826-1829	11.4	0	0	0	2.8	0	2.5	12.5
Sept. 16	0414-0417	2.7	0	0	0	2.8	0	2.5	12.4
	0555	2.4	0	0	0	2.8	0	2.5	12.4
	1646-1656	8.9	0	0	0	2.8	0	2.5	12.4
	1834	10.8	0	0	0	2.8	0	2.5	12.5
Sept. 17	0420-0423	3.2	0	0	0	2.9	0	2.5	12.4
	0602-0605	1.1	0	0	0	2.9	0	2.5	12.4
	1653-1700	11.4	0	0	0	2.9	0	2.5	12.4
Sept. 18	0243-0247	5.8	0	0	0	2.9	0	2.5	12.4
	0423-0430	5.0	0	0	0	2.9	0	2.5	12.4
	1526	11.1	0	0	0	2.9	0	2.5	12.4
	1658-1705	11.8	0	0	0	2.9	0	2.5	12.4
Sept. 19	0251-0255	5.0	0	0	0	2.9	0	2.5	12.4
	0431-0435	5.3	0	0	0	2.9	0	2.5	12.4
	1704-1710	12.8	0	0	0	2.9	0	2.5	12.5

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DATE	HOURS (GMT)	TEMP (°C)	TVO (bits)	TVO (bits)	TVO (bits)	PRECIP (inches)	TVO (bits)	HSV (volts)	BATT (volts)
Sept. 20	0255-0259	5.6	0	0	0	2.9	0	2.5	12.4
	0436-0443	3.0	0	0	0	2.9	0	2.5	12.4
	1529-1533	10.5	0	0	0	2.9	0	2.5	12.4
	1710-1717	12.1	0	0	0	2.9	0	2.5	12.4
Sept. 21	0302-0305	5.9	0	0	0	2.9	0	2.5	12.4
	1536-1539	10.5	0	0	0	2.9	0	2.5	12.4
	1716-1723	11.3	0	0	0	2.9	0	2.5	12.5
Sept. 22	0306-0310	5.0	0	0	0	2.9	0	2.5	12.4
	0447-0454	2.3	0	0	0	2.9	0	2.5	12.4
	1540-1543	11.3	0	0	0	2.9	0	2.5	12.4
	1723-1726	12.7	0	0	0	2.9	0	2.5	12.4
Sept. 23	0312-0316	5.3	0	0	0	2.9	0	2.5	12.4
	0453-0500	7.2	0	0	0	2.9	0	2.5	12.4
	1548	7.6	0	0	0	2.9	0	2.5	12.4
	1727-1734	6.9	0	0	0	2.9	0	2.5	12.4
Sept. 24	0317-0321	2.4	0	0	0	2.9	0	2.5	12.4
	0459-0503	3.0	0	0	0	2.9	0	2.5	12.4
	1551-1554	3.0	0	0	0	2.9	0	2.5	12.4
	1734-1741	4.2	0	0	0	2.9	0	2.5	12.4
Sept. 25	0322-0329	-1.5	0	0	0	2.9	0	2.5	12.4
	0506-0510	-2.8	0	0	0	2.9	0	2.5	12.3
	1557-1600	2.7	0	0	0	2.9	0	2.5	12.4
	1744	-0.5	0	0	0	2.9	0	2.5	12.3

Time is GMT. Subtract 6 hrs. for MDT.

WLFCRP Wolf Creek Pass 1973 Data

DATE	HOURS (GMT)	TEMP (°C)	TVO (bits)	TVO (bits)	TVO (bits)	PRECIP (inches)	TVO (bits)	HSV (volts)	BATT (volts)
Sept. 26	0327-0334	-3.4	0	0	0	3.1	0	2.5	12.
	0512-0515	-4.1	0	0	0	3.1	0	2.5	12.
Sept. 27	1610-1613	1.4	0	0	0	3.2	0	2.5	12.4
	1750-1757	4.4	0	0	0	3.2	0	2.5	12.4
Sept. 28	0341-0344	-2.3	0	0	0	3.3	0	2.5	12.3
	1613-1619	5.3	0	0	0	3.3	0	2.5	12.4
	1756-1802	8.2	0	0	0	3.3	0	2.5	12.4
Sept. 29	0345-0349	3.0	0	0	0	3.3	0	2.5	12.4
	0527-0530	1.7	0	0	0	3.3	0	2.5	12.4
	1620-1623	5.6	0	0	0	3.3	0	2.5	12.4
	1802-1809	5.6	0	0	0	3.3	0	2.5	12.4
Sept. 30	0350-0357	2.1	0	0	0	3.3	0	2.5	12.3
	1625-1631	9.8	0	0	0	3.3	0	2.5	12.4
	1810	12.1	0	0	0	3.3	0	2.5	12.4
Oct. 2	1635-1642	8.6	0	0	0	3.3	0	2.5	12.4
Oct. 3	0408-0411	1.7	0	0	0	3.3	0	2.5	12.4
	0550-0553	1.4	0	0	0	3.3	0	2.5	12.3
Oct. 4	1649-1655	8.0	0	0	0	3.3	0	2.5	12.4
	1832-1835	10.7	0	0	0	3.3	0	2.5	12.4
Oct. 5	0237-0241	1.1	0	0	0	3.3	0	2.5	12.4
	0419-0423	0.4	0	0	0	3.3	0	2.5	12.3
	1652-1659	2.6	0	0	0	3.3	0	2.5	12.3
Oct. 6	0244	0.8	0	0	0	3.4	0	2.5	12.3
	0423-0427	1.1	0	0	0	3.4	0	2.5	12.3
	1700-1707	6.9	0	0	0	3.4	0	2.5	12.4

Time is GMT. Subtract 6 hrs. for MDT.

WLFCRP Wolf Creek Pass 1973 Data

DATE	HOURS (GMT)	TEMP (°C)	TVO (bits)	TVO (bits)	TVO (bits)	PRECIP (inches)	TVO (bits)	HSV (volts)	BATT (volts)
Oct. 7	0251-0254	0.1	0	0	0	3.5	0	2.5	12.3
	0430-0433	1.7	0	0	0	3.5	0	2.5	12.3
	1705-1712	4.8	0	0	0	3.5	0	2.5	12.3
Oct. 8	0254	1.4	0	0	0	3.5	0	2.5	12.3
Oct. 9	0301-0305	2.7	0	0	0	3.5	0	2.5	12.3
	0440-0447	2.1	0	0	0	3.5	0	2.5	12.3
	1718-1722	-3.8	0	0	0	4.0	0	2.5	12.3
Oct. 10	0306-0310	-5.1	0	0	0	4.3	0	2.5	12.2
	1542	-5.4	0	0	0	4.3	0	2.5	12.2
	1721-1728	-3.8	0	0	0	4.3	0	2.5	12.2
Oct. 11	1548	-6.0	0	0	0	5.0	0	2.5	12.2
	1728-1735	-3.6	0	0	0	5.1	0	2.5	12.2
Oct. 12	0318-0321	-5.4	0	0	0	5.1	0	2.5	12.2
	0459-0503	-6.0	0	0	0	5.1	0	2.5	12.2
	1551-1554	-2.1	0	0	0	5.1	0	2.5	12.2
	1735-1738	1.1	0	0	0	5.1	0	2.5	12.3
Oct. 13	0322-0326	-4.4	0	0	0	5.1	0	2.5	12.3
	0504-0507	-5.8	0	0	0	5.1	0	2.5	12.3
	1557-1600	5.3	0	0	0	5.1	0	2.5	12.3
	1745	8.4	0	0	0	5.1	0	2.5	12.4
Oct. 14	0329-0333	-1.4	0	0	0	5.1	0	2.5	12.3
	1605	10.8	0	0	0	5.1	0	2.5	12.4
	1744-1750	12.7	0	0	0	5.1	0	2.5	12.4

Time is GMT. Subtract 6 hrs. for MDT.

WLFCRP Wolf Creek Pass 1973 Data

DATE	HOURS (GMT)	TEMP (°C)	TVO (bits)	TVO (bits)	TVO (bits)	PRECIP (inches)	TVO (bits)	HSV (volts)	BATT (volts)
Oct. 15	0332-0339	0.4	0	0	0	5.1	0	2.5	12.3
	0515-0519	-0.2	0	0	0	5.1	0	2.5	12.3
	1607-1613	11.5	0	0	0	5.1	0	2.5	12.4
	1756	13.4	0	0	0	5.1	0	2.5	12.4
Oct. 16	0340-0343	1.3	0	0	0	5.1	0	2.5	12.3
	0522-0526	2.3	0	0	0	5.1	0	2.5	12.3
	1614-1617	7.6	0	0	0	5.1	0	2.5	12.3
	1757-1803	9.8	0	0	0	5.1	0	2.5	12.4
Oct. 17	0527-0530	-0.5	0	0	0	5.1	0	2.5	12.3
	1618-1624	9.8	0	0	0	5.1	0	2.5	12.3
	1801-1805	10.8	0	0	0	5.1	0	2.5	12.4
Oct. 18	1625-1632	9.5	0	0	0	5.1	0	2.5	12.3
	1809	10.5	0	0	0	5.1	0	2.5	12.4
Oct. 19	0356-0400	-0.4	0	0	0	5.1	0	2.5	12.3
	0539-0543	1.7	0	0	0	5.1	0	2.5	12.3
	1631-1637	9.0	0	0	0	5.1	0	2.5	12.3
	1814	10.8	0	0	0	5.1	0	2.5	12.4
Oct. 29	0402-0405	-0.4	0	0	0	5.1	0	2.5	12.3
	1637-1644	8.7	0	0	0	5.1	0	2.5	12.3
	1819-1826	9.5	0	0	0	5.1	0	2.5	12.3
Oct. 21	0410	1.4	0	0	0	5.1	0	2.5	12.3
	0554	1.4	0	0	0	5.1	0	2.5	12.3
Oct. 22	0414-0417	-0.5	0	0	0	5.1	0	2.5	12.3
	1647-1654	9.9	0	0	0	5.1	0	2.5	12.3

Time is GMT. Subtract 6 hrs. for MDT.

WLFCRP Wolf Creek Pass 1973 Data

DATE	HOURS (GMT)	TEMP (°C)	TVO (bits)	TVO (bits)	TVO (bits)	PRECIP (inches)	TVO (bits)	HSV (volts)	BATT (volts)
Oct. 23	0240	1.7	0	0	0	5.1	0	2.5	12.3
	0418-0422	-0.2	0	0	0	5.1	0	2.5	12.3
	1515	7.9	0	0	0	5.1	0	2.5	12.3
Oct. 24	0242-0246	5.0	0	0	0	5.1	0	2.5	12.3
	0427-0430	3.7	0	0	0	5.1	0	2.5	12.3
Oct. 25	0249-0253	-1.8	0	0	0	5.1	0	2.5	12.3
Oct. 26	0436-0439	-2.1	0	0	0	5.1	0	2.5	12.2
	0255-0259	-1.3	0	0	0	5.1	0	2.5	12.2
	1531	2.1	0	0	0	5.1	0	2.5	12.2
	1709-1715	5.6	0	0	0	5.1	0	2.5	12.3
Oct. 27	1535-1538	4.5	0	0	0	5.1	0	2.5	12.2
	1716-1722	6.6	0	0	0	5.1	0	2.5	12.3
Oct. 28	0303-0310	-2.0	0	0	0	5.1	0	2.5	12.2
	0447-0451	-1.4	0	0	0	5.1	0	2.5	12.2
	1542	6.6	0	0	0	5.1	0	2.5	12.3
Oct. 29	0310-0314	0.4	0	0	0	5.1	0	2.5	12.3
	0453-0457	-1.5	0	0	0	5.1	0	2.5	12.2
Oct. 30	0315-0322	-3.8	0	0	0	5.0	0	2.5	12.2
	0457-0504	-4.0	0	0	0	5.0	0	2.5	12.2
	1552	-0.2	0	0	0	5.1	0	2.5	12.2
	1735-1738	3.0	0	0	0	5.0	0	2.5	12.3
Oct. 31	0323-0326	-1.2	0	0	0	5.0	0	2.5	12.2
	0503-0507	-2.0	0	0	0	5.0	0	2.5	12.2
	1556-1559	1.0	0	0	0	5.0	0	2.5	12.2
	1738-1742	4.0	0	0	0	5.0	0	2.5	12.3

Time is GMT. Subtract 6 hrs. for MDT.
Subtract 7 hrs. for MST.

WLFCRN Wolf Creek North 1973 Data

DATE	HOURS (GMT)	TEMP (°C)	TVO (bits)	TVO (bits)	TVO (bits)	STREAM FLOW (feet)	TVO (bits)	HSV (volts)	BATT (volts)
May 30	1644-1651	3.7	1.0	1.0	1.0	+1.3	1.0	2.5	12.7
May 30	1828-1833	5.4	1.0	1.0	1.0	+1.4	1.0	2.5	12.7
May 31	0416-0419	2.1	1.0	1.0	1.0	+1.2	1.0	2.6	12.7
May 31	0600	2.1	1.0	1.0	1.0	+1.2	1.0	2.5	12.7
May 31	1650-1657	3.7	1.0	1.0	1.0	+1.2	1.0	2.5	12.7
May 31	1833-1837	5.4	1.0	1.0	1.0	+1.2	1.0	2.5	12.7
June 1	0424-0428	2.4	1.0	1.0	1.0	+1.2	1.0	2.6	12.7
June 2	1700-1709	2.4	1.0	1.0	1.0	+1.3	1.0	2.6	12.6
June 3	1705-1714	4.2	1.0	1.0	1.0	+1.4	1.0	2.5	12.7
June 4	0437-0444	2.8	1.0	1.0	1.0	+1.4	1.0	2.6	12.6
June 4	1711-1716	3.7	1.0	1.0	1.0	+1.4	1.0	2.6	12.7
June 5	MISSING DATA - UNANNOUNCED DATA DUMP AT CSS								
June 6	0453	2.8	1.0	1.0	1.0	+1.4	1.0	2.6	12.6
June 6	1722-1730	4.7	1.0	1.0	1.0	+1.4	1.0	2.5	12.7
June 7	0454-0500	2.8	1.0	1.0	1.0	+1.3	1.0	2.6	12.7
June 7	1727-1737	5.0	1.0	1.0	1.0	+1.4	1.0	2.5	12.7
June 8	0321	2.8	1.0	1.0	1.0	+1.2	1.0	2.5	12.7
June 8	1733-1744	5.3	1.0	1.0	1.0	+1.2	1.0	2.5	12.7
June 9	0328-0330	2.8	1.0	1.0	1.0	+1.2	1.0	2.5	12.7
June 9	0504-0513	2.8	1.0	1.0	1.0	+1.4	1.0	2.5	12.7
June 9	1602	3.7	1.0	1.0	1.0	+1.2	1.0	2.5	12.7
June 9	1739-1749	5.4	1.0	1.0	1.0	+1.2	1.0	2.5	12.7
June 10	1606-1608	4.1	1.0	1.0	1.0	+1.2	1.0	2.5	12.7
June 10	1746-1751	5.6	1.0	1.0	1.0	+1.2	1.0	2.5	12.7

Time is GMT. Subtract 6 hrs. for MDT.

WLFCRN Wolf Creek North 1973 Data

DATE	HOURS (GMT)	TEMP (°C)	TVO (bits)	TVO (bits)	TVO (bits)	STREAM FLOW (feet)	TVO (bits)	HSV (volts)	BATT (volts)
June 11	0339	3.1	1.0	1.0	1.0	+1.1	1.0	2.5	12.7
June 11	0515-0523	2.8	1.0	1.0	1.0	+0.9	1.0	2.5	12.7
June 12	0341-0346	2.8	1.0	1.0	1.0	+0.8	1.0	2.5	12.7
June 12	0521-0529	2.8	1.0	1.0	1.0	+0.7	1.0	2.5	12.7
June 13	0348-0353	3.4	1.0	1.0	1.0	+0.7	1.0	2.5	12.7
June 13	0531-0535	3.4	1.0	1.0	1.0	+0.7	1.0	2.5	12.7
June 13	1623-1625	4.4	1.0	1.0	1.0	+0.7	1.0	2.5	12.7
June 13	1802-1810	5.2	1.0	1.0	1.0	+0.7	1.0	2.5	12.7
June 14	0352-0400	3.4	1.0	1.0	1.0	+0.7	1.0	2.6	12.7
June 14	0537-0539	3.4	1.0	1.0	1.0	+0.7	1.0	2.6	12.7
June 14	1628-1632	3.1	1.0	1.0	1.0	+0.6	1.0	2.6	12.6
June 14	1809-1816	3.1	1.0	1.0	1.0	+0.6	1.0	2.6	12.6
June 15	0359-0405	3.4	1.0	1.0	1.0	+0.6	1.0	2.6	12.7
June 15	0541-0545	3.4	1.0	1.0	1.0	+0.6	1.0	2.6	12.7
June 15	1632-1636	3.7	1.0	1.0	1.0	+0.7	1.0	2.5	12.7
June 15	1816-1821	4.2	1.0	1.0	1.0	+0.7	1.0	2.5	12.7
June 16	0406-0408	3.1	1.0	1.0	1.0	+0.7	1.0	2.6	12.7
June 16	0545-0550	3.1	1.0	1.0	1.0	+0.7	1.0	2.6	12.7
June 16	1638-1643	3.4	1.0	1.0	1.0	+0.8	1.0	2.5	12.7
June 16	1821-1826	4.8	1.0	1.0	1.0	+0.8	1.0	2.5	12.7
June 17	0408-0417	2.8	1.0	1.0	1.0	+0.7	1.0	2.6	12.7
June 17	0552-0556	2.4	1.0	1.0	1.0	+0.7	1.0	2.5	12.7

Time is GMT. Subtract 6 hrs. for MDT.

WLFCRN Wolf Creek North 1973 Data

DATE	HOURS (GMT)	TEMP (°C)	TVO (bits)	TVO (bits)	TVO (bits)	STREAM FLOW (feet)	TVO (bits)	HSV (volts)	BATT (volts)
June 17	1645-1650	3.7	1.0	1.0	1.0	+0.7	1.0	2.5	12.7
June 17	1828-1833	5.4	1.0	1.0	1.0	+0.8	1.0	2.5	12.7
June 18	1650-1653	4.1	1.0	1.0	1.0	+0.8	1.0	2.5	12.7
June 18	1835-1837	5.7	1.0	1.0	1.0	+0.7	1.0	2.5	12.7
June 19	0421-0428	2.4	1.0	1.0	1.0	+0.6	1.0	2.6	12.7
June 19	1655-1657	3.1	1.0	1.0	1.0	+0.9	1.0	2.5	12.6
June 19	1700-1702	3.1	1.0	1.0	1.0	+0.9	1.0	2.5	12.6
June 19	1842	4.7	1.0	1.0	1.0	+0.9	1.0	2.5	12.7
June 20	0426-0434	2.8	1.0	1.0	1.0	+0.8	1.0	2.6	12.7
June 20	1702-1709	4.0	1.0	1.0	1.0	+0.9	1.0	2.6	12.7
June 22	0438-0445	3.1	1.0	1.0	1.0	+0.7	1.0	2.5	12.7
June 22	1712-1720	4.9	1.0	1.0	1.0	+0.8	1.0	2.5	12.7
June 23	0442-0449	3.4	1.0	1.0	1.0	+0.7	1.0	2.5	12.7
June 23	1716-1724	5.4	1.0	1.0	1.0	+0.8	1.0	2.5	12.7
June 24	0449-0454	3.4	1.0	1.0	1.0	+0.6	1.0	2.6	12.7
June 24	1722-1730	5.6	1.0	1.0	1.0	+0.8	1.0	2.5	12.7
June 25	0453-0500	3.7	1.0	1.0	1.0	+0.7	1.0	2.5	12.7
June 25	1727-1737	5.7	1.0	1.0	1.0	+0.8	1.0	2.5	12.7
June 26	0323	4.4	1.0	1.0	1.0	+0.6	1.0	2.5	12.7
June 26	0500-0504	4.1	1.0	1.0	1.0	+0.7	1.0	2.5	12.7
June 26	1736-1743	6.3	1.0	1.0	1.0	+0.8	1.0	2.5	12.7
June 27	0329	4.7	1.0	1.0	1.0	+0.6	1.0	2.5	12.7
June 27	0504-0512	4.4	1.0	1.0	1.0	+0.5	1.0	2.5	12.7
June 28	0331-0334	4.7	1.0	1.0	1.0	+0.5	1.0	2.5	12.7
June 28	0509-0517	4.1	1.0	1.0	1.0	+0.5	1.0	2.5	12.7

Time is GMT. Subtract 6 hrs. for MDT.

WLFCRN Wolf Creek North 1973 Data

DATE	HOURS (GMT)	TEMP (°C)	TVO (bits)	TVO (bits)	TVO (bits)	STREAM FLOW (feet)	TVO (bits)	HSV (volts)	BATT (volts)
June 29	1614	5.0	1.0	1.0	1.0	+0.6	1.0	2.6	12.7
June 29	1751-1758	7.1	1.0	1.0	1.0	+0.7	1.0	2.5	12.7
June 30	1757-1805	7.0	1.0	1.0	1.0	+0.9	1.0	2.5	12.7
July 1	0347-0354	5.0	1.0	1.0	1.0	+0.7	1.0	2.5	12.7
July 1	0529-0534	4.4	1.0	1.0	1.0	+0.6	1.0	2.5	12.7
July 1	1622-1627	5.4	1.0	1.0	1.0	+0.5	1.0	2.5	12.7
July 1	1803-1811	7.4	1.0	1.0	1.0	+0.5	1.0	2.5	12.7
July 2	0355-0359	5.0	1.0	1.0	1.0	+0.3	1.0	2.5	12.7
July 2	0536-0537	4.7	1.0	1.0	1.0	+0.3	1.0	2.5	12.7
July 2	1627-1630	5.4	1.0	1.0	1.0	+0.7	1.0	2.5	12.7
July 2	1810-1816	7.6	1.0	1.0	1.0	+0.8	1.0	2.5	12.7
July 3	0400	5.4	1.0	1.0	1.0	+0.7	1.0	2.5	12.7
July 3	0540-0544	5.0	1.0	1.0	1.0	+0.7	1.0	2.5	12.7
July 4	0405-0410	6.0	1.0	1.0	1.0	+0.6	1.0	2.5	12.7
July 4	0545-0550	5.4	1.0	1.0	1.0	+0.7	1.0	2.5	12.7
July 4	1639-1644	6.2	1.0	1.0	1.0	+0.8	1.0	2.5	12.7
July 4	1823-1827	8.3	1.0	1.0	1.0	+0.8	1.0	2.5	12.7
July 5	0408-0416	6.3	1.0	1.0	1.0	+0.7	1.0	2.5	12.7
July 5	0552	5.4	1.0	1.0	1.0	+0.7	1.0	2.5	12.7
July 5	1644-1649	6.0	1.0	1.0	1.0	+0.6	1.0	2.5	12.7
July 5	1829-1832	8.6	1.0	1.0	1.0	+0.8	1.0	2.5	12.7
July 6	0418-0419	6.0	1.0	1.0	1.0	+0.8	1.0	2.5	12.7
July 6	0558	5.4	1.0	1.0	1.0	+0.8	1.0	2.5	12.7
July 6	1650-1653	6.1	1.0	1.0	1.0	+0.5	1.0	2.5	12.6
July 6	1837	8.6	1.0	1.0	1.0	+0.7	1.0	2.5	12.7

Time is GMT. Subtract 6 hrs. for MDT.

WLFCRN — Wolf Creek North — 1973 Data

DATE	HOURS (GMT)	TEMP (°C)	TVO (bits)	TVO (bits)	TVO (bits)	STREAM FLOW (feet)	TVO (bits)	HSV (volts)	BATT (volts)
July 7	0420-0427	6.6	1.0	1.0	1.0	0.8	1.0	2.5	12.7
	1654-1702	6.8	1.0	1.0	1.0	1.0	1.0	2.5	12.7
	1839	8.6	1.0	1.0	1.0	0.9	1.0	2.5	12.7
July 8	1702-1708	7.3	1.0	1.0	1.0	0.9	1.0	2.5	12.7
July 9	0432-0439	7.7	1.0	1.0	1.0	0.9	1.0	2.5	12.6
July 10	0440-0444	7.0	1.0	1.0	1.0	0.6	1.0	2.5	12.6
July 11	1716-1624	7.5	1.0	1.0	1.0	0.8	1.0	2.5	12.6
July 12	0450-0455	8.0	1.0	1.0	1.0	0.7	1.0	2.5	12.7
	1721-1732	7.3	1.0	1.0	1.0	0.8	1.0	2.5	12.6
July 13	0456-0501	7.3	1.0	1.0	1.0	0.7	1.0	2.5	12.6
	1727-1737	8.0	1.0	1.0	1.0	0.8	1.0	2.5	12.6
July 14	0321-0323	8.0	1.0	1.0	1.0	0.8	1.0	2.5	12.6
	0458-0506	7.6	1.0	1.0	1.0	0.8	1.0	2.5	12.6
	1735-1743	8.6	1.0	1.0	1.0	1.5	1.0	2.5	12.6
July 15	0329	8.0	1.0	1.0	1.0	1.4	1.0	2.5	12.6
	0503-0511	7.6	1.0	1.0	1.0	1.5	1.0	2.5	12.6
July 17	0339-0341	8.9	1.0	1.0	1.0	1.6	1.0	2.5	12.6
	0519-0523	8.3	1.0	1.0	1.0	1.6	1.0	2.5	12.6
	1612	7.0	1.0	1.0	1.0	1.6	1.0	2.5	12.6
	1751-1759	7.6	1.0	1.0	1.0	0.4	1.0	2.5	12.6
July 18	0340-0347	8.9	1.0	1.0	1.0	1.7	1.0	2.5	12.6
	0523-0528	8.5	1.0	1.0	1.0	1.7	1.0	2.5	12.6
	1756-1801	8.6	1.0	1.0	1.0	1.6	1.0	2.5	12.6

Time is GMT. Subtract 6 hrs. for MDT.

WLFCRN Wolf Creek North 1973 Data

DATE	HOURS (GMT)	TEMP (^{o}C)	TVO (bits)	TVO (bits)	TVO (bits)	STREAM FLOW (feet)	TVO (bits)	HSV (volts)	BATT (volts)
July 19	0349-0353	8.3	1.0	1.0	1.0	1.5	1.0	2.5	12.6
	0527-0533	8.0	1.0	1.0	1.0	1.5	1.0	2.5	12.6
July 20	0536-0537	7.4	1.0	1.0	1.0	1.6	1.0	2.5	12.6
	1629-1632	6.2	1.0	1.0	1.0	1.6	1.0	2.5	12.6
	1812-1817	8.5	1.0	1.0	1.0	1.6	1.0	2.5	12.6
July 21	0359-0405	8.0	1.0	1.0	1.0	1.6	1.0	2.5	12.6
	0544	7.3	1.0	1.0	1.0	1.6	1.0	2.5	12.6
July 22	0406-0410	7.3	1.0	1.0	1.0	1.7	1.0	2.5	12.6
	0546-0549	6.7	1.0	1.0	1.0	1.7	1.0	2.5	12.6
	1820-1827	7.9	1.0	1.0	1.0	1.7	1.0	2.5	12.6
July 23	0408-0415	7.3	1.0	1.0	1.0	1.7	1.0	2.5	12.6
	1643-1650	5.0	1.0	1.0	1.0	1.7	1.0	2.5	12.6
	1831-1833	7.6	1.0	1.0	1.0	1.8	1.0	2.5	12.6
July 24	0413-0420	8.0	1.0	1.0	1.0	1.8	1.0	2.5	12.6
July 25	0421-0427	8.6	1.0	1.0	1.0	1.8	1.0	2.5	12.6
	1655-1703	6.9	1.0	1.0	1.0	1.8	1.0	2.5	12.6
July 26	0425-0432	9.1	1.0	1.0	1.0	1.8	1.0	2.5	12.6
	1700-1705	8.6	1.0	1.0	1.0	1.8	1.0	2.5	12.6
	1847	10.6	1.0	1.0	1.0	1.8	1.0	2.5	12.6
July 27	0432-0439	8.0	1.0	1.0	1.0	1.8	1.0	2.5	12.6
	1706-1712	7.3	1.0	1.0	1.0	1.8	1.0	2.5	12.6
July 28	0439-0444	8.3	1.0	1.0	1.0	1.8	1.0	2.5	12.6
	1711-1721	7.6	1.0	1.0	1.0	1.8	1.0	2.5	12.6

Time is GMT. Subtract 6 hrs. for MDT.

WLFCRN Wolf Creek North *1973 Data*

DATE	HOURS (GMT)	TEMP (^{o}C)	TVO (bits)	TVO (bits)	TVO (bits)	STREAM FLOW (feet)	TVO (bits)	HSV (volts)	BATT (volts)
July 29	0444-0449	8.6	1.0	1.0	1.0	1.9	1.0	2.5	12.6
	1716-1725	7.6	1.0	1.0	1.0	1.9	1.0	2.5	12.6
July 30	0448-0453	8.3	1.0	1.0	1.0	1.9	1.0	2.5	12.6
	1721-1731	7.6	1.0	1.0	1.0	1.9	1.0	2.5	12.6
July 31	0454-0500	7.4	1.0	1.0	1.0	1.9	1.0	2.5	12.6
Aug. 1	0458-0506	8.3	1.0	1.0	1.0	1.9	1.0	2.5	12.6
	1732-1742	7.4	1.0	1.0	1.0	1.9	1.0	2.5	12.6
Aug. 2	1739-1749	8.0	1.0	1.0	1.0	1.9	1.0	2.5	12.6
Aug. 3	0330-0334	10.2	1.0	1.0	1.0	1.9	1.0	2.5	12.6
	0512-0517	9.3	1.0	1.0	1.0	1.9	1.0	2.5	12.6
	1607	6.7	1.0	1.0	1.0	1.9	1.0	2.5	12.5
Aug. 4	0335-0340	9.3	1.0	1.0	1.0	1.9	1.0	2.5	12.6
	0517-0522	8.6	1.0	1.0	1.0	1.9	1.0	2.5	12.6
	1750-1800	8.9	1.0	1.0	1.0	1.9	1.0	2.5	12.6
Aug. 5	0343-0344	9.9	1.0	1.0	1.0	2.0	1.0	2.5	12.6
	0523-0525	9.6	1.0	1.0	1.0	2.0	1.0	2.5	12.6
	1616-1620	8.3	1.0	1.0	1.0	2.0	1.0	2.5	12.6
	1757-1802	9.4	1.0	1.0	1.0	2.0	1.0	2.5	12.6
Aug. 6	0349-0350	9.6	1.0	1.0	1.0	2.0	1.0	2.5	12.6
	0527-0534	8.9	1.0	1.0	1.0	2.0	1.0	2.5	12.6
	1623-1627	7.3	1.0	1.0	1.0	2.0	1.0	2.5	12.6
	1801-1809	9.6	1.0	1.0	1.0	2.0	1.0	2.5	12.6
Aug. 7	0352-0359	9.6	1.0	1.0	1.0	1.9	1.0	2.5	12.6
	0534-0537	8.6	1.0	1.0	1.0	1.9	1.0	2.5	12.6
	1807-1815	9.8	1.0	1.0	1.0	1.9	1.0	2.5	12.6

Time is GMT. Subtract 6 hrs. for MDT.

WLFCRN Wolf Creek North 1973 Data

DATE	HOURS (GMT)	TEMP (°C)	TVO (bits)	TVO (bits)	TVO (bits)	STREAM FLOW (feet)	TVO (bits)	HSV (volts)	BATT (volts)
Aug. 8	0359-0404	8.6	1.0	1.0	1.0	1.9	1.0	2.5	12.6
	0538-0545	8.3	1.0	1.0	1.0	1.9	1.0	2.5	12.6
	1633-1634	7.0	1.0	1.0	1.0	1.9	1.0	2.5	12.5
	1815-1820	8.9	1.0	1.0	1.0	1.9	1.0	2.5	12.6
Aug. 9	0406-0411	10.8	1.0	1.0	1.0	1.9	1.0	2.5	12.6
	0550	9.6	1.0	1.0	1.0	1.9	1.0	2.5	12.6
	1639-1642	7.5	1.0	1.0	1.0	1.9	1.0	2.5	12.6
	1820	9.9	1.0	1.0	1.0	1.9	1.0	2.5	12.6
Aug. 10	1649	7.6	1.0	1.0	1.0	2.0	1.0	2.5	12.6
	1830-1832	9.9	1.0	1.0	1.0	2.0	1.0	2.5	12.6
Aug. 11	0415-0420	10.6	1.0	1.0	1.0	2.0	1.0	2.5	12.6
	0558	9.9	1.0	1.0	1.0	2.0	1.0	2.5	12.6
	1648-1655	8.6	1.0	1.0	1.0	2.0	1.0	2.5	12.6
	1832-1835	11.2	1.0	1.0	1.0	2.0	1.0	2.5	12.6
Aug. 12	0419-0427	10.6	1.0	1.0	1.0	2.0	1.0	2.5	12.6
	1655-1659	8.6	1.0	1.0	1.0	2.0	1.0	2.5	12.6
	1841	10.6	1.0	1.0	1.0	2.0	1.0	2.5	12.6
Aug. 13	0426-0433	10.9	1.0	1.0	1.0	2.0	1.0	2.5	12.6
	1659-1705	8.6	1.0	1.0	1.0	2.0	1.0	2.5	12.5
Aug. 14	0432-0438	10.6	1.0	1.0	1.0	2.1	1.0	2.5	12.5
	1706-1713	9.2	1.0	1.0	1.0	2.0	1.0	2.5	12.6
Aug. 16	0443-0449	10.6	1.0	1.0	1.0	2.1	1.0	2.5	12.5
	1716-1726	8.9	1.0	1.0	1.0	2.1	1.0	2.5	12.5

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WLFCRN Wolf Creek North 1973 Data

DATE	HOURS (GMT)	TEMP (°C)	TVO (bits)	TVO (bits)	TVO (bits)	STREAM FLOW (feet)	TVO (bits)	HSV (volts)	BATT (volts)
Aug. 17	0447-0452	10.9	1.0	1.0	1.0	2.1	1.0	2.5	12.6
	1724-1729	9.9	1.0	1.0	1.0	2.1	1.0	2.5	12.5
Aug. 18	0315	11.9	1.0	1.0	1.0	2.1	1.0	2.5	12.6
Aug. 19	0321	11.9	1.0	1.0	1.0	2.1	1.0	2.5	12.5
	0500-0506	11.2	1.0	1.0	1.0	2.1	1.0	2.5	12.5
Aug. 20	1738-1748	11.0	1.0	1.0	1.0	2.1	1.0	2.5	12.5
Aug. 21	0332-0334	11.2	1.0	1.0	1.0	2.0	1.0	2.5	12.5
	0509-0517	10.9	1.0	1.0	1.0	2.0	1.0	2.5	12.5
	1744-1753	9.6	1.0	1.0	1.0	2.1	1.0	2.5	12.5
Aug. 22	0335-0338	9.9	1.0	1.0	1.0	2.0	1.0	2.5	12.5
	1750-1758	10.0	1.0	1.0	1.0	2.1	1.0	2.5	12.5
Aug. 23	0340-0345	10.2	1.0	1.0	1.0	2.1	1.0	2.5	12.5
	0521-0528	9.8	1.0	1.0	1.0	2.1	1.0	2.5	12.5
Aug. 24	0347-0351	11.2	1.0	1.0	1.0	2.1	0.0	2.5	12.5
	0531	10.6	1.0	1.0	1.0	2.1	1.0	2.5	12.5
	1620-1624	10.2	1.0	1.0	1.0	2.1	0.0	2.5	12.5
	1803-1806	10.6	1.0	1.0	1.0	2.1	0.0	2.5	12.5
Aug. 25	1629-1630	8.6	1.0	1.0	1.0	2.1	1.0	2.5	12.5
	1808-1851	10.6	1.0	1.0	1.0	2.1	0.0	2.5	12.5
Aug. 26	1632-1636	8.2	1.0	1.0	1.0	2.1	1.0	2.5	12.5
	1814-1821	10.5	1.0	1.0	1.0	2.1	0.0	2.5	12.5
Aug. 27	0405-0410	10.9	1.0	1.0	1.0	2.2	1.0	2.5	12.5
	0547-0550	9.9	1.0	1.0	1.0	2.2	1.0	2.5	12.5
	1820-1827	10.4	1.0	1.0	1.0	2.1	0.0	2.5	12.5

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WLFCRN Wolf Creek North 1973 Data

DATE	HOURS (GMT)	TEMP (^{o}C)	TVO (bits)	TVO (bits)	TVO (bits)	STREAM FLOW (feet)	TVO (bits)	HSV (volts)	BATT (volts)
Aug. 28	0410-0415	10.9	1.0	1.0	1.0	2.2	1.0	2.5	12.5
	1643-1650	9.3	1.0	1.0	1.0	2.2	1.0	2.5	12.5
Aug. 29	0413-0420	11.2	1.0	1.0	1.0	2.2	1.0	2.5	12.5
	1650-1656	9.1	1.0	1.0	1.0	2.1	1.0	2.5	12.5
	1832	11.2	1.0	1.0	1.0	2.1	1.0	2.5	12.5
Aug. 31	1700-1706	7.3	1.0	1.0	1.0	1.9	1.0	2.5	12.4
	1845	8.0	1.0	1.0	1.0	2.0	1.0	2.5	12.5
Sept. 1	1706-1712	6.9	1.0	1.0	1.0	2.0	1.0	2.5	12.4
	1851	8.9	1.0	1.0	1.0	2.0	0.0	2.5	12.5
Sept. 2	1710-1720	7.2	1.0	1.0	1.0	2.0	1.0	2.5	12.5
Sept. 4	0448-0454	7.0	1.0	1.0	1.0	2.1	1.0	2.5	12.5
Sept. 5	1728-1736	7.3	1.0	1.0	1.0	2.2	1.0	2.5	12.5
Sept. 6	0501-0504	9.6	1.0	1.0	1.0	2.2	1.0	2.5	12.5
Sept. 7	0326	10.6	1.0	1.0	1.0	2.2	0.0	2.5	12.5
	0502-0510	9.6	1.0	1.0	1.0	2.2	1.0	2.5	12.5
	1739-1747	8.3	1.0	1.0	1.0	2.2	1.0	2.5	12.4
Sept. 8	0330-0335	9.9	1.0	1.0	1.0	2.2	1.0	2.5	12.5
	0510-0517	9.3	1.0	1.0	1.0	2.3	1.0	2.5	12.5
	1743-1753	8.1	1.0	1.0	1.0	2.2	1.0	2.5	12.4
Sept. 10	0342-0347	9.3	1.0	1.0	1.0	2.3	1.0	2.5	12.5
	0524	8.9	1.0	1.0	1.0	2.3	1.0	2.5	12.5
	1616-1618	8.0	1.0	1.0	1.0	2.2	1.0	2.5	12.4
	1756-1803	8.3	1.0	1.0	1.0	2.2	1.0	2.5	12.4

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WLFCRN — Wolf Creek North — 1973 Data

DATE	HOURS (GMT)	TEMP (°C)	TVO (bits)	TVO (bits)	TVO (bits)	STREAM FLOW (feet)	TVO (bits)	HSV (volts)	BATT (volts)
Sept. 11	0348-0353	8.0	1.0	1.0	1.0	2.0	1.0	2.5	12.4
	0526-0533	7.6	1.0	1.0	1.0	2.0	1.0	2.5	12.4
	1621-1624	6.0	1.0	1.0	1.0	2.1	1.0	2.6	12.3
	1803-1809	7.8	1.0	1.0	1.0	2.1	1.0	2.5	12.4
Sept. 12	0354-0355	7.0	1.0	1.0	1.0	2.1	1.0	2.5	12.4
	0534-0538	7.0	1.0	1.0	1.0	2.1	1.0	2.6	12.4
Sept. 13	0358-0403	7.8	1.0	1.0	1.0	2.2	1.0	2.5	12.4
	0541-0543	7.0	1.0	1.0	1.0	2.2	1.0	2.6	12.4
Sept. 14	0402-0405	8.9	1.0	1.0	1.0	2.2	1.0	2.5	12.5
	0545-0549	8.4	1.0	1.0	1.0	2.2	1.0	2.5	12.4
	1638-1643	6.4	1.0	1.0	1.0	2.2	1.0	2.5	12.4
	1822-1826	8.7	1.0	1.0	1.0	2.2	0.0	2.5	12.4
Sept. 15	0409-0414	8.3	1.0	1.0	1.0	2.3	1.0	2.5	12.5
	1643-1649	6.3	1.0	1.0	1.0	2.3	1.0	2.5	12.4
	1828-1832	8.6	1.0	1.0	1.0	2.3	0.0	2.5	12.4
Sept. 16	0414-0420	8.3	1.0	1.0	1.0	2.3	1.0	2.5	12.4
	0600	7.6	1.0	1.0	1.0	2.3	1.0	2.5	12.4
	1649-1654	6.7	1.0	1.0	1.0	2.3	1.0	2.5	12.4
	1832-1836	9.1	1.0	1.0	1.0	2.3	1.0	2.5	12.4
Sept. 17	0418-0425	8.0	1.0	1.0	1.0	2.3	1.0	2.5	12.4
Sept. 18	0425-0432	7.6	1.0	1.0	1.0	2.3	1.0	2.5	12.4
	1700-1706	5.7	1.0	1.0	1.0	2.3	1.0	2.5	12.3
Sept. 19	0432-0435	7.6	1.0	1.0	1.0	2.3	1.0	2.5	12.4
	1705-1711	5.7	1.0	1.0	1.0	2.3	1.0	2.5	12.3
	1850	8.3	1.0	1.0	1.0	2.4	0.0	2.5	12.4

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WLFCRN Wolf Creek North 1973 Data

DATE	HOURS (GMT)	TEMP (°C)	TVO (bits)	TVO (bits)	TVO (bits)	STREAM FLOW (feet)	TVO (bits)	HSV (volts)	BATT (volts)
Sept. 20	0435-0442	7.3	1.0	1.0	1.0	2.4	1.0	2.5	12.4
	1709-1720	5.1	1.0	1.0	1.0	2.4	1.0	2.5	12.3
	1856	8.0	0.0	1.0	0.0	2.4	0.0	2.5	12.4
Sept. 21	0443-0448	7.0	1.0	1.0	1.0	2.4	1.0	2.5	12.3
	1714-1723	5.7	1.0	1.0	1.0	2.4	1.0	2.5	12.3
Sept. 22	0448-0451	7.3	1.0	1.0	1.0	2.4	1.0	2.5	12.4
	1720-1729	5.9	1.0	1.0	1.0	2.4	1.0	2.5	12.3
Sept. 23	0454-0459	8.0	1.0	1.0	1.0	2.4	1.0	2.5	12.4
	1725-1734	6.7	1.0	1.0	1.0	2.4	1.0	2.5	12.3
Sept. 24	0320-0322	7.0	1.0	1.0	1.0	2.4	1.0	2.5	12.3
	0459-0503	6.3	1.0	1.0	1.0	2.4	1.0	2.6	12.3
	1733-1740	5.0	1.0	1.0	1.0	2.4	1.0	2.6	12.3
Sept. 25	0326	5.7	1.0	1.0	1.0	2.4	1.0	2.6	12.3
	0504-0511	5.0	1.0	1.0	1.0	2.4	1.0	2.6	12.3
	1559	3.7	1.0	1.0	1.0	2.4	1.0	2.6	12.3
	1737-1746	4.1	1.0	1.0	1.0	2.4	1.0	2.6	12.3
Sept. 26	0331-0334	3.7	1.0	1.0	1.0	2.4	1.0	2.6	12.3
	0507-0516	3.4	1.0	1.0	1.0	2.4	1.0	2.6	12.3
Sept. 27	1749-1758	3.7	1.0	1.0	1.0	2.4	1.0	2.6	12.3
Sept. 28	0341-0347	4.4	1.0	1.0	1.0	2.4	1.0	2.6	12.3
	1615-1619	2.8	1.0	1.0	1.0	2.4	1.0	2.6	12.3
	1755-1803	4.6	1.0	1.0	1.0	2.4	1.0	2.5	12.3
Sept. 29	0347-0350	5.7	1.0	1.0	1.0	2.4	1.0	2.5	12.3
	0528-0532	5.4	1.0	1.0	1.0	2.4	1.0	2.5	12.3
	1620-1624	4.1	1.0	1.0	1.0	2.4	1.0	2.6	12.3
	1800-1809	5.0	1.0	1.0	1.0	2.4	1.0	2.5	12.3

Time is GMT. Subtract 6 hrs. for MDT.

WLFCRN Wolf Creek North 1973 Data

DATE	HOURS (GMT)	TEMP (^{o}C)	TVO (bits)	TVO (bits)	TVO (bits)	STREAM FLOW (feet)	TVO (bits)	HSV (volts)	BATT (volts)
Sept. 30	0353	5.7	1.0	1.0	1.0	2.4	1.0	2.6	12.3
	1625-1631	4.1	1.0	1.0	1.0	2.4	1.0	2.6	12.3
	1806-1815	6.2	1.0	1.0	1.0	2.4	1.0	2.5	12.3
Oct. 2	1636-1642	3.5	1.0	1.0	1.0	2.4	1.0	2.6	12.3
Oct. 3	0408-0415	5.7	1.0	1.0	1.0	2.4	1.0	2.6	12.3
	0554	5.0	1.0	1.0	1.0	2.4	1.0	2.6	12.3
Oct. 4	0412-0413	5.0	1.0	1.0	1.0	2.4	1.0	2.6	12.3
	1649-1654	3.4	1.0	1.0	1.0	2.4	1.0	2.6	12.3
	1832-1835	6.0	1.0	1.0	1.0	2.4	1.0	2.5	12.3
Oct. 5	0419-9426	5.4	1.0	1.0	1.0	2.4	1.0	2.6	12.3
	1653-1700	3.7	1.0	1.0	1.0	2.4	1.0	2.6	12.3
Oct. 6	0423-0432	5.4	1.0	1.0	1.0	2.4	1.0	2.6	12.3
	1659-1706	5.0	1.0	1.0	1.0	2.4	1.0	2.6	12.3
	1844	6.0	1.0	1.0	1.0	2.4	1.0	2.5	12.3
Oct. 7	0430-0437	5.3	1.0	1.0	1.0	2.4	1.0	2.6	12.3
	1704-1711	6.0	1.0	1.0	1.0	2.4	1.0	2.5	12.3
Oct. 9	0442-0445	4.4	1.0	1.0	1.0	2.4	1.0	2.6	12.3
	1715-1720	2.7	1.0	1.0	1.0	2.5	1.0	2.6	12.2
Oct. 10	1719-1730	1.5	1.0	1.0	1.0	2.5	1.0	2.6	12.2
Oct. 11	1725-1736	0.5	1.0	1.0	1.0	2.5	1.0	2.6	12.2
Oct. 12	0459-0502	0.8	1.0	1.0	1.0	2.5	1.0	2.6	12.2
	1731-1741	2.1	1.0	1.0	1.0	2.5	1.0	2.6	12.2
Oct. 13	0506-0508	2.4	1.0	1.0	1.0	2.5	1.0	2.6	12.2
	1737-1744	2.7	1.0	1.0	1.0	2.5	1.0	2.6	12.2

Time is GMT. Subtract 6 hrs. for MDT.

WLFCRN — Wolf Creek North — 1973 Data

DATE	HOURS (GMT)	TEMP (°C)	TVO (bits)	TVO (bits)	TVO (bits)	STREAM FLOW (feet)	TVO (bits)	HSV (volts)	BATT (volts)
Oct. 14	0331	3.7	1.0	1.0	1.0	2.5	1.0	2.5	12.3
	1605	1.1	1.0	1.0	1.0	2.5	1.0	2.6	12.2
	1743-1752	3.1	1.0	1.0	1.0	2.5	1.0	2.5	12.3
Oct. 15	0335-0338	4.4	1.0	1.0	1.0	2.5	1.0	2.5	12.3
	0512-0521	3.7	1.0	1.0	1.0	2.5	1.0	2.6	12.3
	1610	1.8	1.0	1.0	1.0	2.5	1.0	2.6	12.2
	1749-1757	3.7	1.0	1.0	1.0	2.5	1.0	2.5	12.3
Oct. 16	0340-0344	5.0	1.0	1.0	1.0	2.5	1.0	2.5	12.3
	0519-0526	4.1	1.0	1.0	1.0	2.5	1.0	2.6	12.3
	1614	2.4	1.0	1.0	1.0	2.5	1.0	2.6	12.2
	1754-1803	4.1	1.0	1.0	1.0	2.5	1.0	2.5	12.3
Oct. 17	0528-0532	4.1	1.0	1.0	1.0	2.5	1.0	2.6	12.3
	1623-1624	2.1	1.0	1.0	1.0	2.5	1.0	2.6	12.2
	1801-1809	4.3	1.0	1.0	1.0	2.5	1.0	2.5	12.3
Oct. 18	1629	2.1	1.0	1.0	1.0	2.5	1.0	2.6	12.2
	1810-1812	4.4	1.0	1.0	1.0	2.5	1.0	2.5	12.3
Oct. 19	0355-0400	4.7	1.0	1.0	1.0	2.5	1.0	2.6	12.3
	0538-0542	3.9	1.0	1.0	1.0	2.5	1.0	2.6	12.2
	1631	2.1	1.0	1.0	1.0	2.5	1.0	2.6	12.2
	1814-1819	4.4	1.0	1.0	1.0	2.5	0.0	2.6	12.3
Oct. 20	0403-0407	4.4	1.0	1.0	1.0	2.5	1.0	2.6	12.3
	1637-1640	2.0	1.0	1.0	1.0	2.5	1.0	2.6	12.2
	1819-1824	4.4	1.0	1.0	1.0	2.5	1.0	2.5	12.3

Time is GMT. Subtract 6 hrs. for MDT.

WLFCRN — Wolf Creek North — 1973 Data

DATE	HOURS (GMT)	TEMP (°C)	TVO (bits)	TVO (bits)	TVO (bits)	STREAM FLOW (feet)	TVO (bits)	HSV (volts)	BATT (volts)
Oct. 21	0406-0414	4.1	1.0	1.0	1.0	2.5	1.0	2.6	12.2
	0550-0551	3.4	1.0	1.0	1.0	2.5	1.0	2.7	12.2
Oct. 22	0411-0420	3.7	1.0	1.0	1.0	2.5	1.0	2.6	12.2
	1648-1655	2.1	1.0	1.0	1.0	2.5	1.0	2.6	12.2
	1833	4.4	1.0	1.0	1.0	2.5	0.0	2.5	12.3
Oct. 23	0419-0424	3.7	1.0	1.0	1.0	2.5	1.0	2.6	12.2
Oct. 24	0427-0430	4.1	1.0	1.0	1.0	2.5	1.0	2.6	12.2
Oct. 26	0436-0443	1.2	1.0	1.0	1.0	2.5	1.0	2.6	12.2
	1708-1718	1.2	1.0	1.0	1.0	2.5	1.0	2.6	12.2
Oct. 27	1715-1722	-0.2	1.0	1.0	1.0	2.5	1.0	2.6	12.2
Oct. 28	0448-0451	0.5	1.0	1.0	1.0	2.5	1.0	2.6	12.2
Oct. 29	0450-0459	2.1	1.0	1.0	1.0	2.5	1.0	2.6	12.2
Oct. 30	0458-0503	0.5	1.0	1.0	1.0	2.5	1.0	2.6	12.2
	1730-1739	-0.2	1.0	1.0	1.0	2.5	1.0	2.6	12.1
Oct. 31	0509	0.5	1.0	1.0	1.0	2.5	1.0	2.6	12.2
	1736-1743	0.6	1.0	1.0	1.0	2.5	1.0	2.6	12.1

Time is GMT. Subtract 6 hrs. for MDT.
Subtract 7 hrs. for MST.

PALADE — Palisade Lake — 1973 Data

DATE	HOURS (GMT)	TEMP (°C)	TVO (bits)	TVO (bits)	TVO (bits)	SNOW PILLOW (inches)	TVO (bits)	HSV (volts)	BATT (volts)
Sept. 26	0330-0334	-2.1	1.0	1.0	1.0	0.3	1.0	2.5	13.0
	0508-0518	-2.1	1.0	1.0	1.0	0.3	1.0	2.5	13.0
Sept. 27	1607-1613	6.0	1.0	1.0	1.0	0.3	1.0	2.5	12.9
	1748-1756	8.3	1.0	1.0	1.0	0.3	1.0	2.5	13.0
Sept. 28	0339-0347	0.9	1.0	1.0	1.0	0.3	1.0	2.5	12.9
	0520-0528	0.7	1.0	1.0	1.0	0.3	1.0	2.5	12.9
	1614-1620	8.2	1.0	1.0	1.0	0.3	0.0	2.5	12.9
	1754-1804	11.8	1.0	1.0	1.0	0.3	1.0	2.5	13.0
Sept. 29	0344-0352	6.6	1.0	1.0	1.0	0.3	0.0	2.5	12.9
	0526-0534	4.3	1.0	1.0	1.0	0.3	1.0	2.5	12.9
	1618-1626	8.4	0.0	1.0	1.0	0.3	1.0	2.5	12.9
	1800-1809	10.8	1.0	0.0	1.0	0.0	1.0	2.5	13.0
Sept. 30	0351-0357	4.3	1.0	1.0	1.0	0.3	1.0	2.5	12.9
	1624-1632	11.7	1.0	1.0	1.0	0.3	1.0	2.5	12.9
Oct. 2	1634-1644	11.2	1.0	1.0	1.0	0.3	1.0	2.5	12.9
Oct. 3	0409-0415	5.9	1.0	1.0	1.0	0.3	0.0	2.5	12.9
Oct. 4	0236	4.0	1.0	1.0	1.0	0.3	1.0	2.5	12.8
	0412-0422	2.5	0.0	1.0	1.0	0.3	1.0	2.5	12.8
	1646-1654	11.1	1.0	1.0	1.0	0.3	1.0	2.5	12.8
	1828-1837	13.3	0.0	0.0	0.0	0.0	0.0	2.5	12.9
Oct. 5	0242	4.6	1.0	1.0	1.0	0.3	1.0	2.5	12.8
	0416-0426	4.0	1.0	1.0	1.0	0.3	1.0	2.5	12.8
	1651-1701	5.2	1.0	1.0	1.0	0.3	1.0	2.5	12.8

Time is GMT. Subtract 6 hrs. for MDT.

PALADE Palisade Lake 1973 Data

DATE	HOURS (GMT)	TEMP (°C)	TVO (bits)	TVO (bits)	TVO (bits)	SNOW PILLOW (feet)	TVO (bits)	HSV (volts)	BATT (volts)
Oct. 6	0424-0431	1.4	1.0	1.0	1.0	0.3	1.0	2.5	12.7
	1657-1705	10.2	1.0	1.0	1.0	0.3	1.0	2.5	12.7
Oct. 7	0250-0252	3.0	1.0	1.0	1.0	0.3	1.0	2.5	12.7
	0429-0437	2.9	1.0	1.0	1.0	0.3	1.0	2.5	12.7
	1703-1710	10.4	1.0	1.0	1.0	0.3	1.0	2.5	12.7
	1847-1849	12.6	0.0	0.0	0.0	0.0	0.0	2.5	12.9
Oct. 8	0256-0304	5.1	1.0	1.0	1.0	0.3	1.0	2.5	12.7
Oct. 9	0304	4.6	1.0	1.0	1.0	0.3	1.0	2.5	12.7
	0440-0446	4.3	0.0	1.0	1.0	0.3	1.0	2.5	12.7
	1714-1723	-1.8	1.0	1.0	1.0	0.3	1.0	2.5	12.6
	1901	0.1	1.0	1.0	1.0	0.3	1.0	2.5	12.6
Oct. 10	0308-0311	-3.1	1.0	1.0	1.0	0.3	1.0	2.5	12.6
	1540-1545	-2.8	1.0	1.0	1.0	0.3	1.0	2.5	12.6
	1720-1728	-1.5	1.0	1.0	1.0	0.3	1.0	2.5	12.6
Oct. 11	1545-1550	-4.2	1.0	1.0	1.0	0.3	1.0	2.5	12.6
	1726-1733	-1.1	1.0	1.0	1.0	0.3	1.0	2.5	12.6
Oct. 12	0316-0324	-3.3	1.0	1.0	1.0	0.3	1.0	2.5	12.6
	0457-0505	-4.0	1.0	1.0	1.0	0.3	1.0	2.5	12.6
	1550-1554	-0.5	1.0	1.0	1.0	0.3	1.0	2.5	12.6
	1732-1740	2.2	1.0	1.0	1.0	0.3	1.0	2.5	12.6
Oct. 13	0325-0329	-1.2	1.0	1.0	1.0	0.3	1.0	2.5	12.6
	0503-0510	-1.2	1.0	1.0	1.0	0.3	1.0	2.5	12.6
	1556-1558	7.0	1.0	1.0	1.0	0.3	1.0	2.5	12.6
	1736-1644	11.2	1.0	1.0	1.0	0.0	1.0	2.5	12.7

Time is GMT. Subtract 6 hrs. for MDT.

PALADE Palisade Lake 1973 Data

DATE	HOURS (GMT)	TEMP (°C)	TVO (bits)	TVO (bits)	TVO (bits)	SNOW PILLOW (inches)	TVO (bits)	HSV (volts)	BATT (volts)
Oct. 14	0327-0334	5.8	1.0	1.0	1.0	0.0	1.0	2.5	12.7
	1605-1606	11.4	1.0	1.0	1.0	0.3	1.0	2.5	12.7
	1743-1752	14.2	1.0	1.0	1.0	0.0	1.0	2.5	12.7
Oct. 15	0334-0340	6.3	1.0	1.0	1.0	0.3	1.0	2.5	12.7
	0514-0524	5.3	1.0	1.0	1.0	0.3	1.0	2.5	12.7
	1606-1614	13.0	1.0	1.0	1.0	0.3	1.0	2.5	12.7
	1748-1758	16.9	1.0	1.0	1.0	0.0	1.0	2.5	12.8
Oct. 16	0341-0345	7.2	1.0	1.0	1.0	0.3	1.0	2.5	12.7
	0521-0529	6.6	1.0	1.0	1.0	0.3	1.0	2.5	12.7
	1614-1620	9.8	1.0	1.0	1.0	0.3	1.0	2.5	12.7
	1754-1802	13.9	1.0	1.0	1.0	0.0	1.0	2.5	12.7
Oct. 17	0527-0533	5.0	1.0	1.0	1.0	0.3	1.0	2.5	12.6
	1618-1624	11.1	1.0	1.0	1.0	0.3	1.0	2.5	12.6
	1800-1807	15.2	1.0	1.0	1.0	0.0	1.0	2.5	12.7
Oct. 18	1624-1630	10.4	1.0	1.0	1.0	0.3	1.0	2.5	12.6
	1806-1815	15.0	1.0	1.0	1.0	0.0	1.0	2.5	12.7
Oct. 19	0355-0403	4.6	1.0	1.0	1.0	0.3	1.0	2.5	12.6
	1630-1637	11.4	1.0	1.0	1.0	0.3	1.0	2.5	12.6
	1811-1817	14.6	0.0	0.0	0.0	0.0	0.0	2.5	12.7
Oct. 20	0400-0408	5.0	1.0	1.0	1.0	0.3	1.0	2.5	12.6
	1635-1643	11.6	1.0	1.0	1.0	0.3	1.0	2.5	12.6
	1818-1824	14.3	0.0	0.0	0.0	0.0	0.0	2.5	12.7
Oct. 21	0406-0414	4.3	0.0	1.0	1.0	0.3	0.0	2.5	12.6
	0550-0553	4.0	1.0	1.0	1.0	0.3	1.0	2.5	12.6

Time is GMT. Subtract 6 hrs. for MDT.

	PALADE		Palisade Lake						
DATE	HOURS (GMT)	TEMP (°C)	TVO (bits)	TVO (bits)	TVO (bits)	SNOW PILLOW (feet)	TVO (bits)	HSV (volts)	BATT (volts)
Oct. 22	0235	4.3	1.0	1.0	1.0	0.3	1.0	2.5	12.6
	0411-0420	3.7	1.0	1.0	1.0	0.3	1.0	2.5	12.6
	1645-1653	13.0	1.0	1.0	1.0	0.3	1.0	2.5	12.6
	1829-1835	14.9	0.0	0.0	0.0	0.0	0.0	2.5	12.7
Oct. 23	0418-0426	5.3	1.0	1.0	1.0	0.3	1.0	2.5	12.6
Oct. 24	0247	7.5	1.0	1.0	1.0	0.3	1.0	2.5	12.6
	0425-0430	6.9	1.0	1.0	1.0	0.3	1.0	2.5	12.6
Oct. 25	0249-0253	0.5	0.0	1.0	1.0	0.3	1.0	2.5	12.6
Oct. 26	0256-0259	0.8	0.0	1.0	1.0	0.3	1.0	2.5	12.5
	0434-0443	0.5	1.0	1.0	1.0	0.3	1.0	2.5	12.5
	1529	3.0	1.0	1.0	1.0	0.3	1.0	2.5	12.5
	1708-1716	6.5	1.0	1.0	1.0	0.3	1.0	2.5	12.5
	1851-1854	9.5	0.0	0.0	0.0	0.0	0.0	2.5	12.6
Oct. 27	1533	3.0	1.0	1.0	1.0	0.3	1.0	2.5	12.4
	1715-1724	10.7	1.0	1.0	1.0	0.3	1.0	2.5	12.5
	1859	11.4	0.0	0.0	0.0	0.0	0.0	2.5	12.6
Oct. 28	0305-0311	1.4	0.0	1.0	1.0	0.3	1.0	2.5	12.5
	0445-0454	2.4	1.0	1.0	1.0	0.3	1.0	2.5	12.5
	1541-1543	6.1	1.0	1.0	1.0	0.3	1.0	2.5	12.5
Oct. 29	0310-0317	2.6	1.0	1.0	1.0	0.3	1.0	2.5	12.5
	0451-0500	1.7	1.0	1.0	1.0	0.3	1.0	2.5	12.5
Oct. 30	0316-0322	-1.5	1.0	1.0	1.0	0.3	1.0	2.5	12.5
	0456-0506	-0.9	1.0	1.0	1.0	0.3	1.0	2.5	12.5
	1552	2.1	1.0	1.0	1.0	0.3	1.0	2.5	12.5
	1732-1737	7.2	1.0	1.0	1.0	0.3	1.0	2.5	12.5

Time is GMT. Subtract 6 hrs. for MDT.
Subtract 7 hrs. for MST.

PALADE Palisade Lake 1973 Data

DATE	HOURS (GMT)	TEMP (°C)	TVO (bits)	TVO (bits)	TVO (bits)	SNOW PILLOW (feet)	TVO (bits)	HSV (volts)	BATT (volts)
Oct. 31	0504-0512	-2.8	1.0	1.0	1.0	0.3	1.0	2.5	12.4
	1556-1558	0.1	1.0	1.0	1.0	0.3	1.0	2.5	12.4
	1736-1744	6.3	1.0	1.0	1.0	0.3	1.0	2.5	12.5

Time is GMT. Subtract 6 hrs. for MDT.
Subtract 7 hrs. for MST.

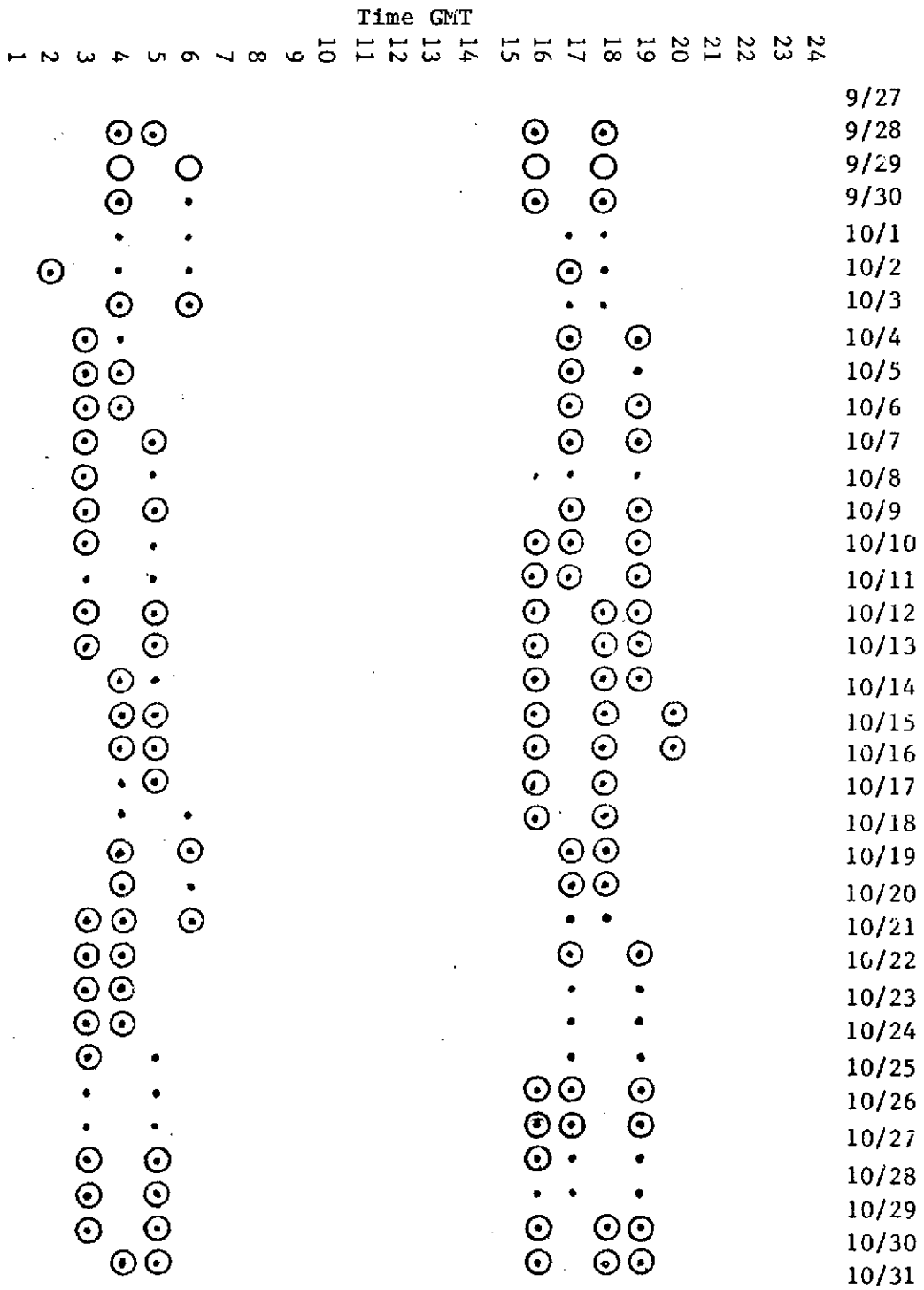
Table 3

NASA/WSSI Throughput Data

June 1, 1973 - October 31, 1973

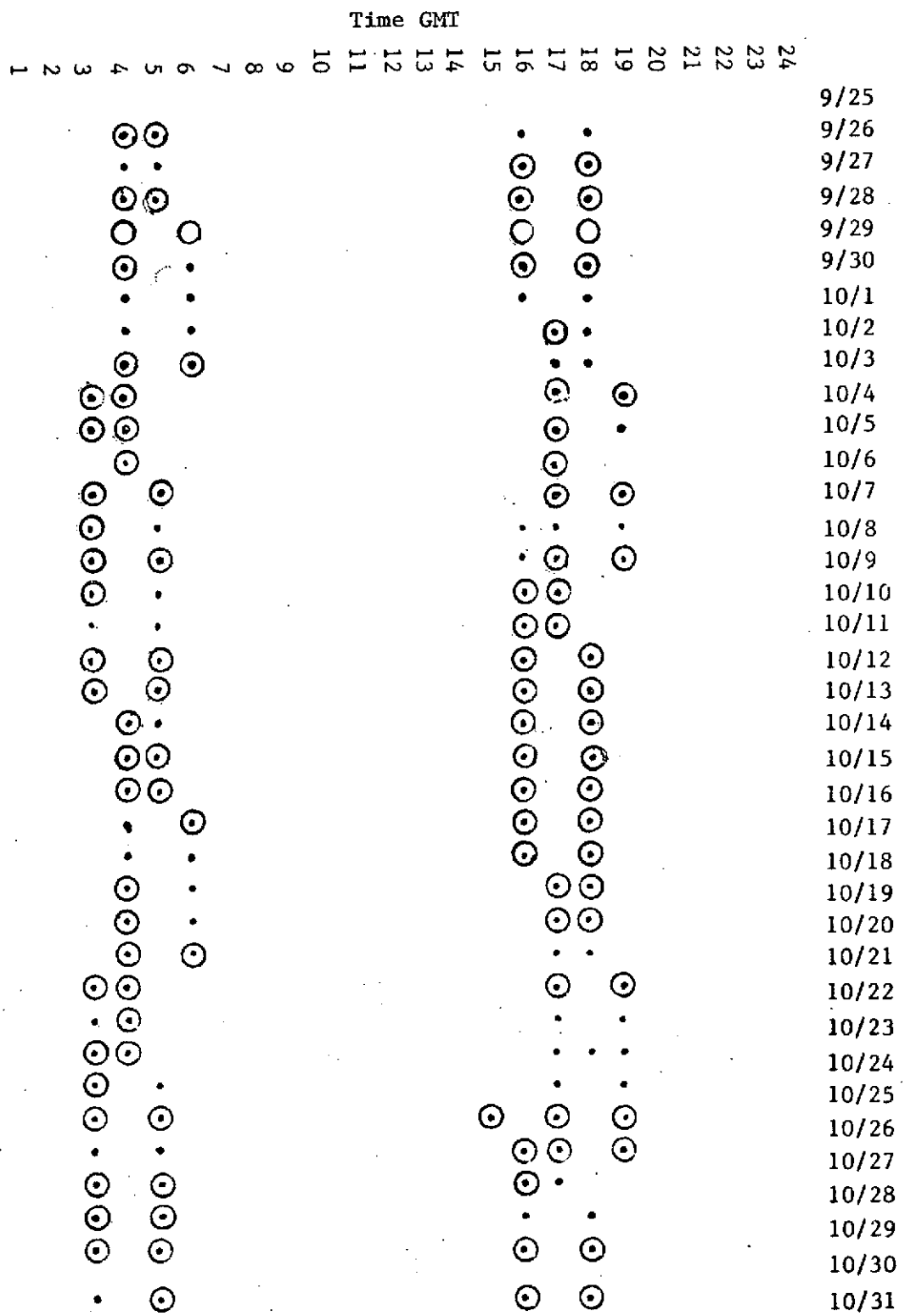
LIMESA Lime Mesa

• data from NASA
○ data received at WSSI



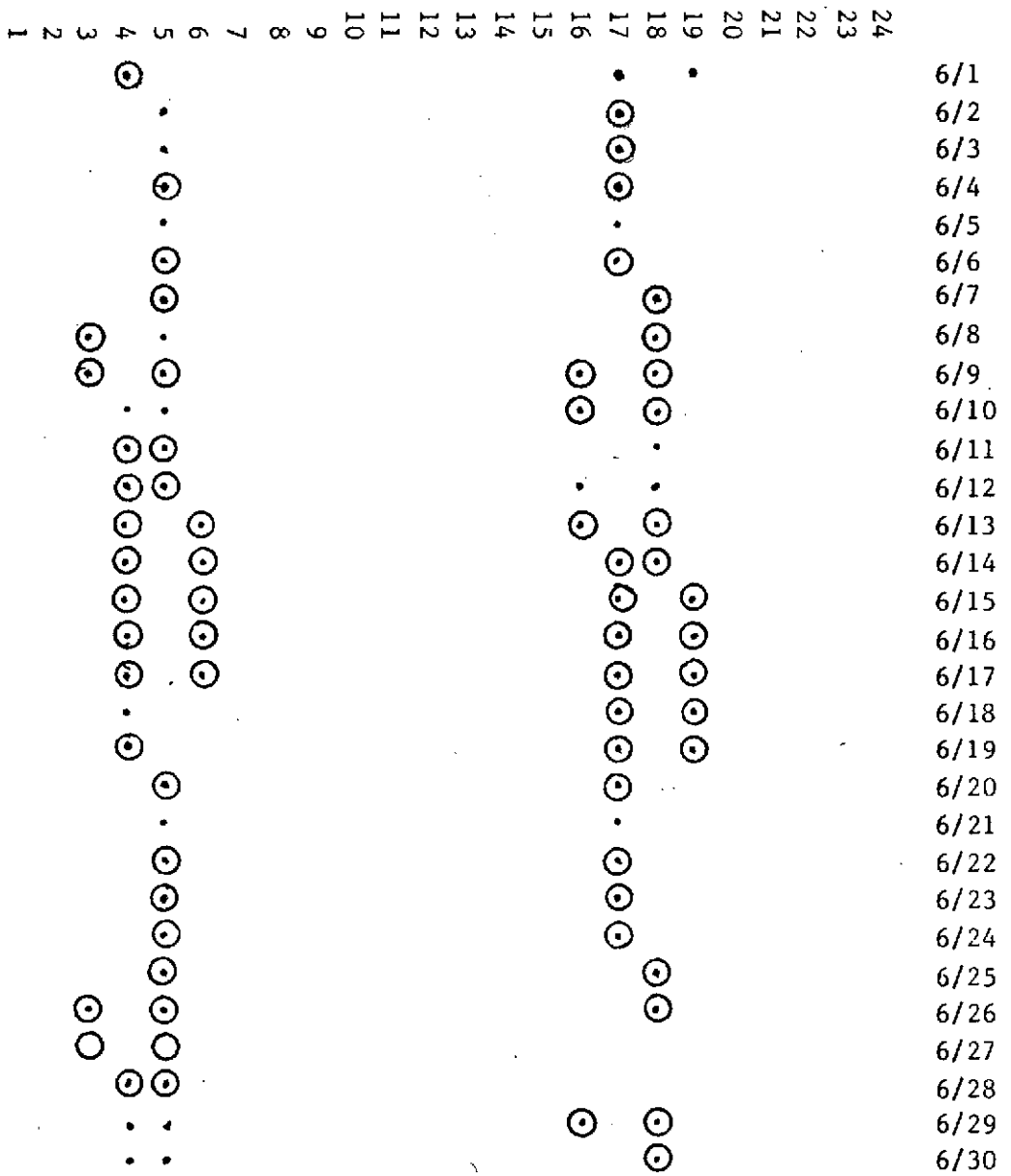
PALADE Palisade Lake

• data from NASA
○ data received at WSSI



WLFCRN Wolf Creek North

• data from NASA
○ data rcvd at WSSI



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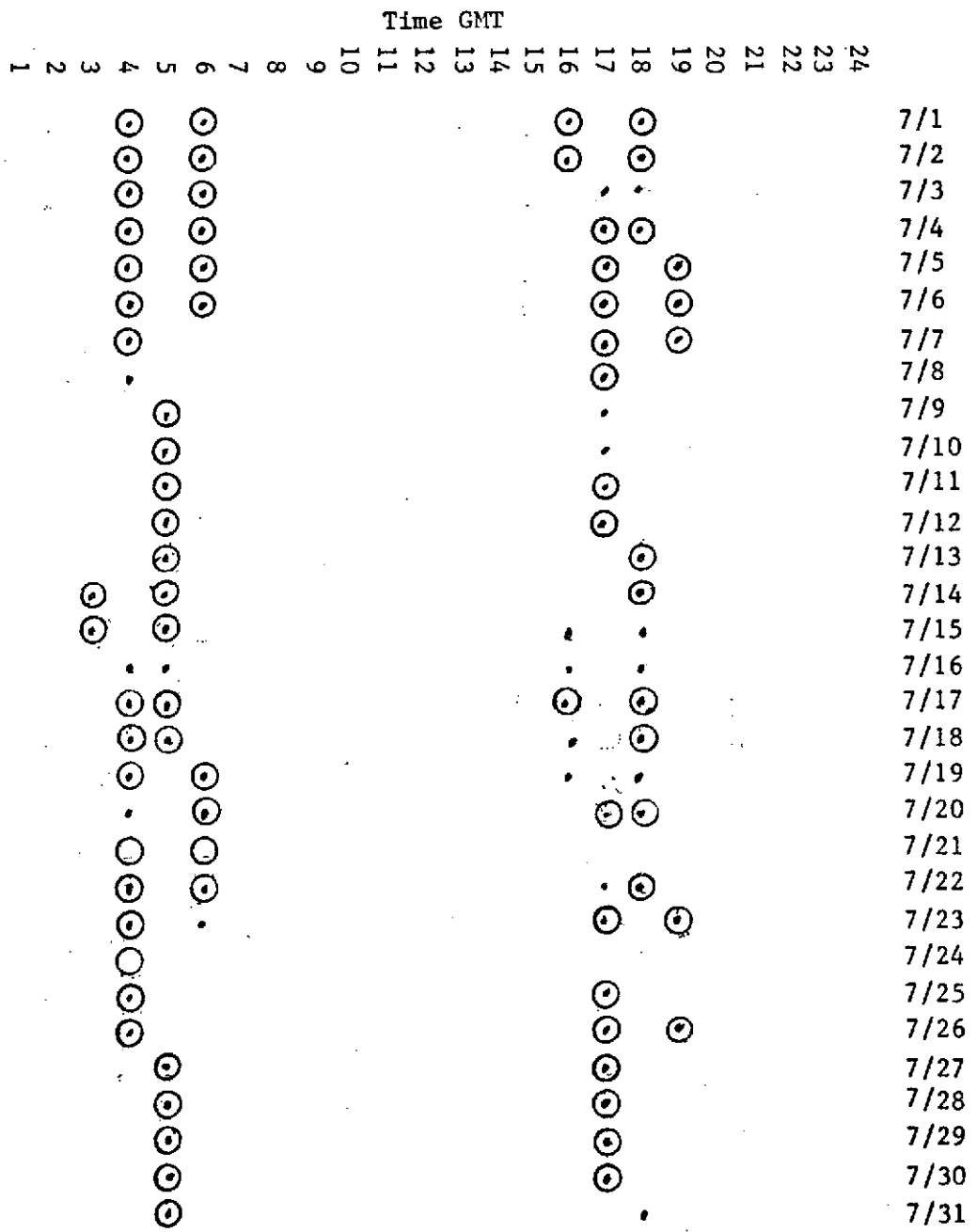

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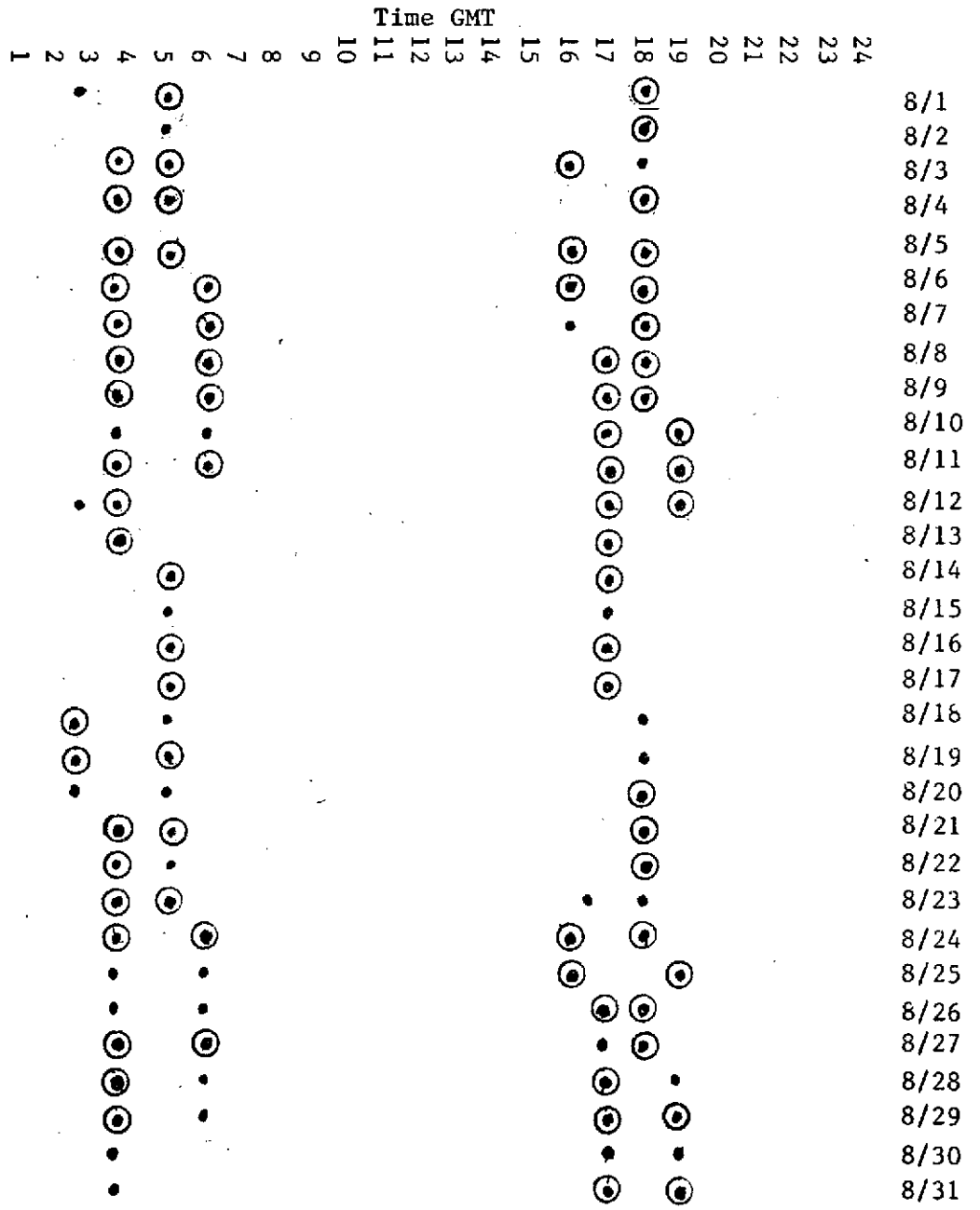

WLFCRN Wolf Creek North

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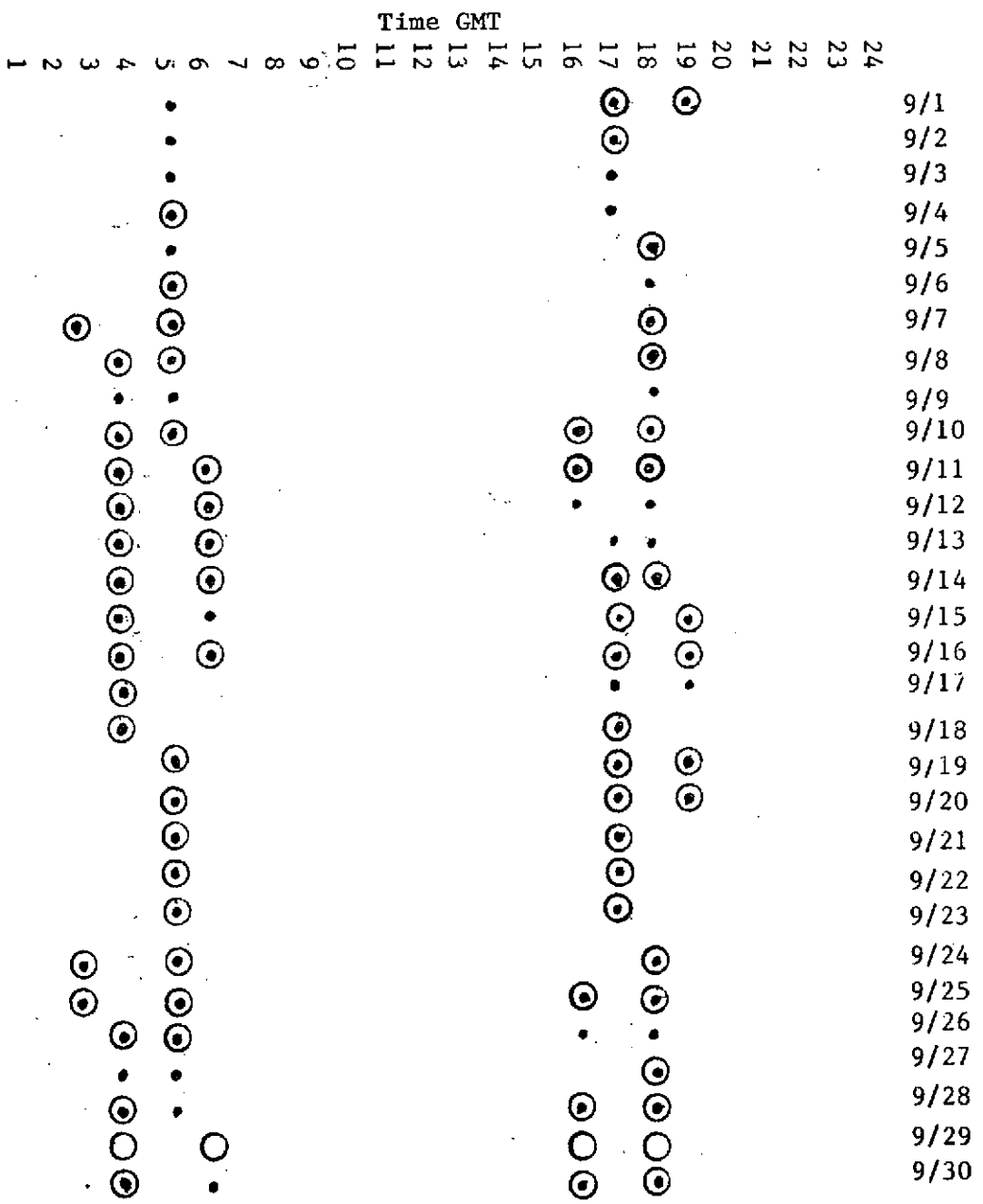
○ data received at WSSI



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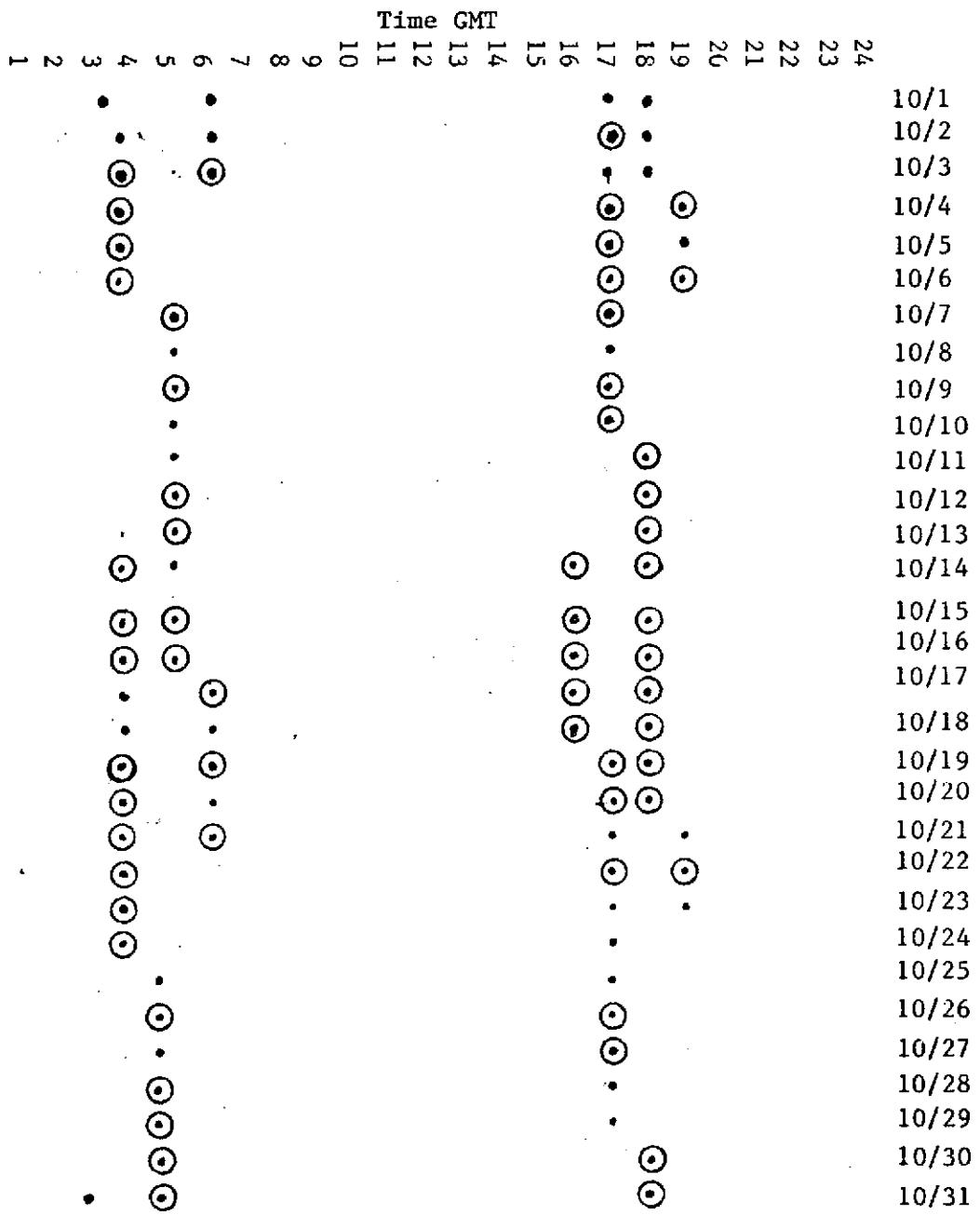

WLFCRP Wolf Creek Pass

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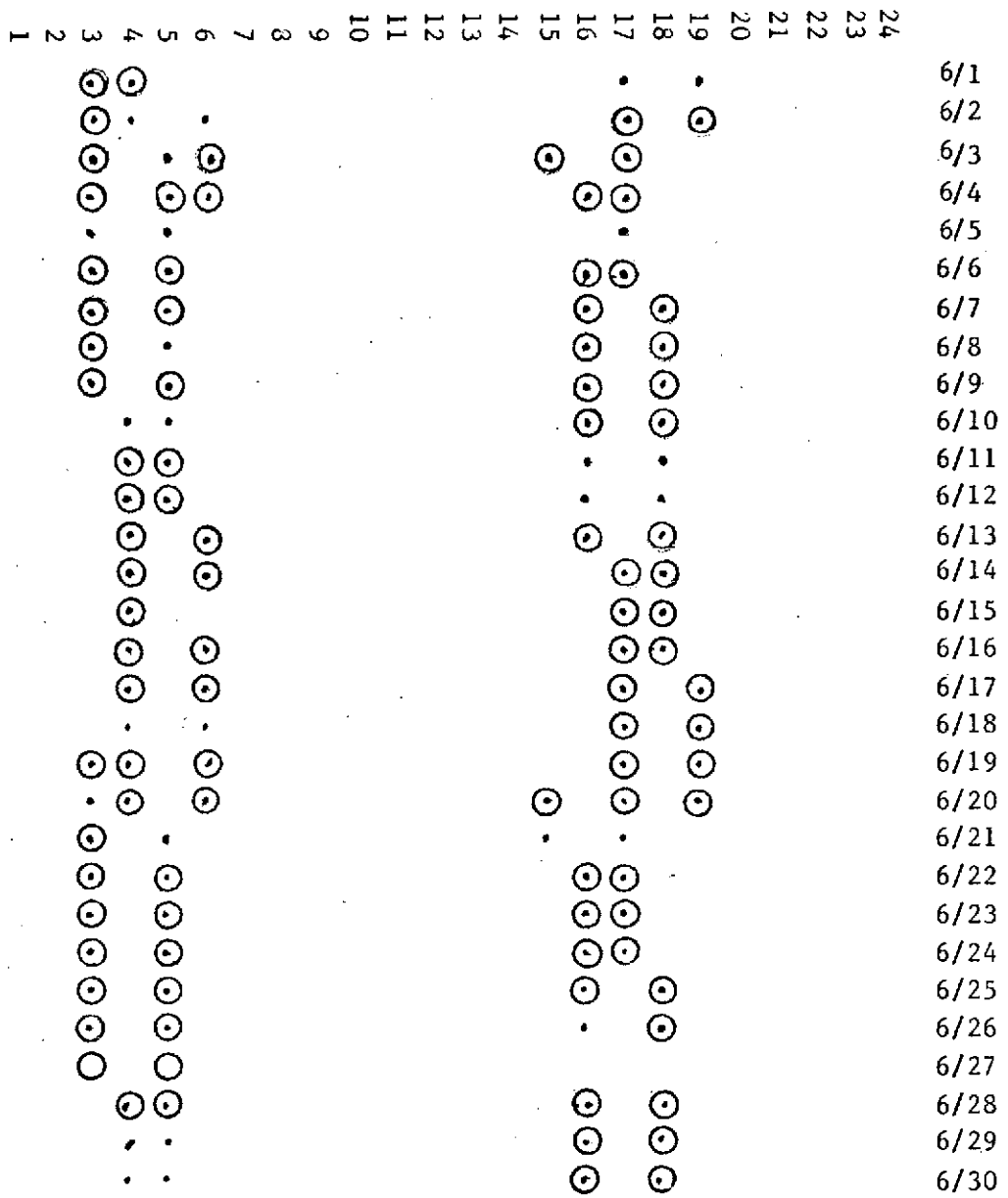
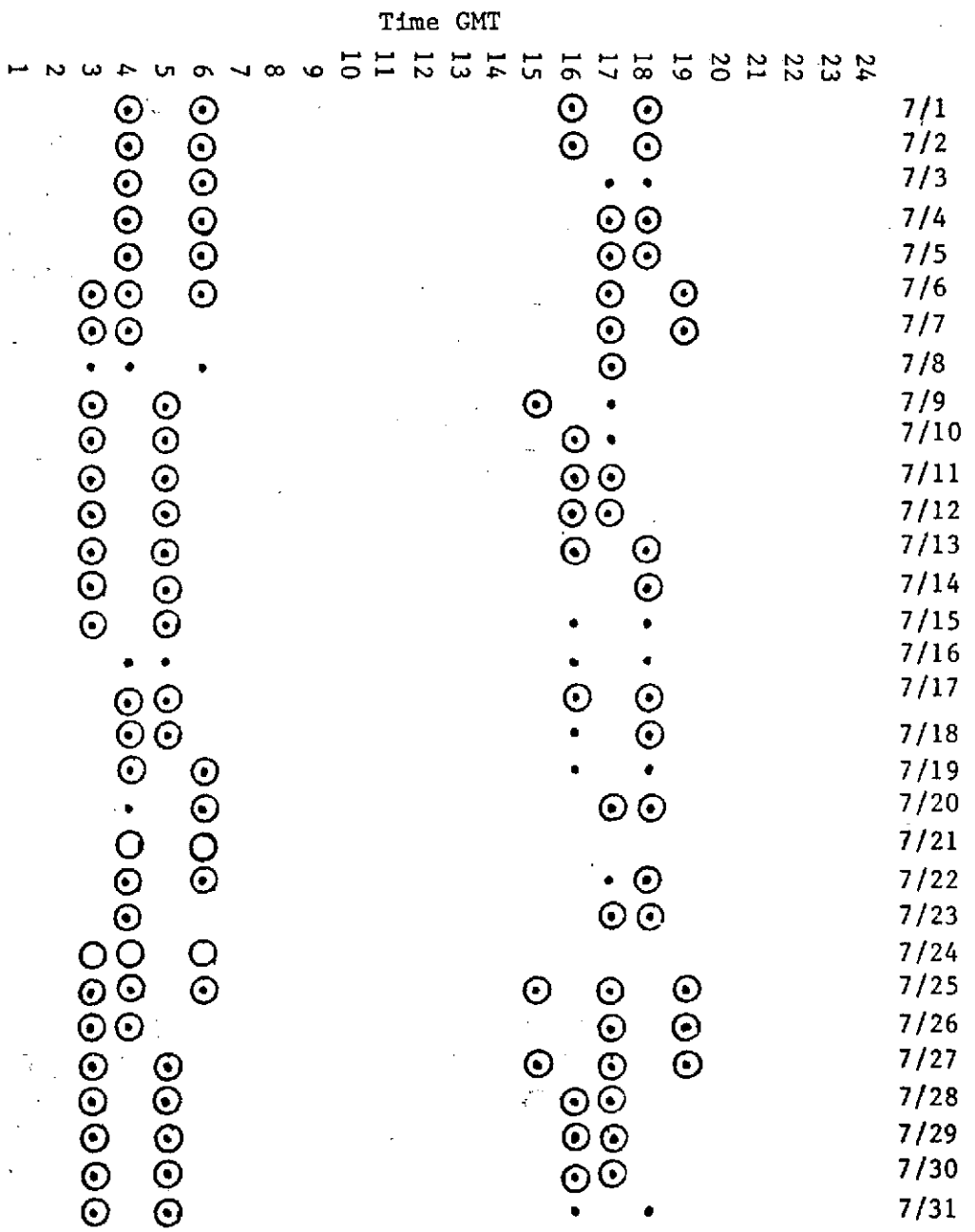
○ data rcvd at WSSI



WLFCRP Wolf Creek Pass

• data from NASA
○ data received at WSSI



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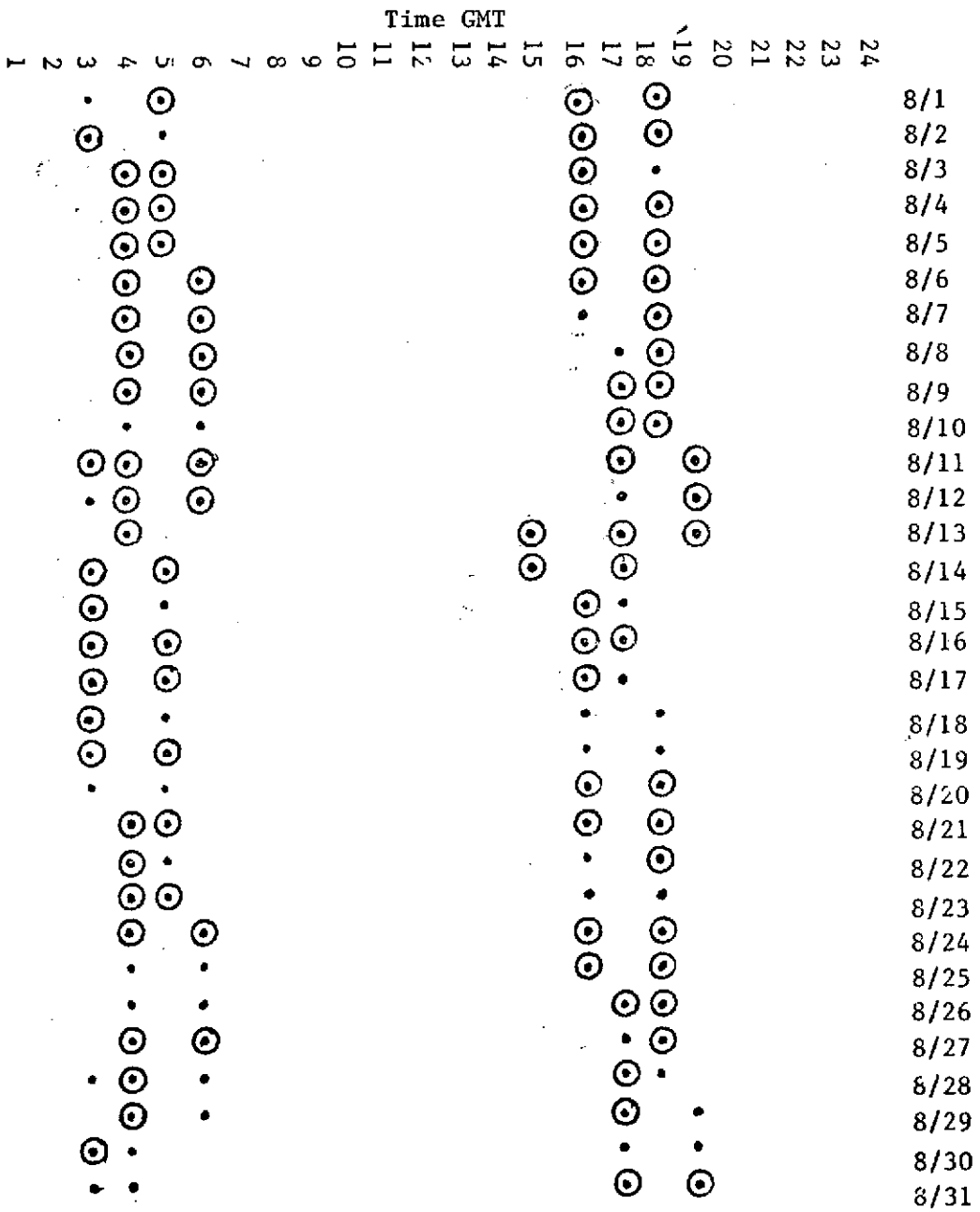
○ data received at WSSI



WLFCRP Wolf Creek Pass

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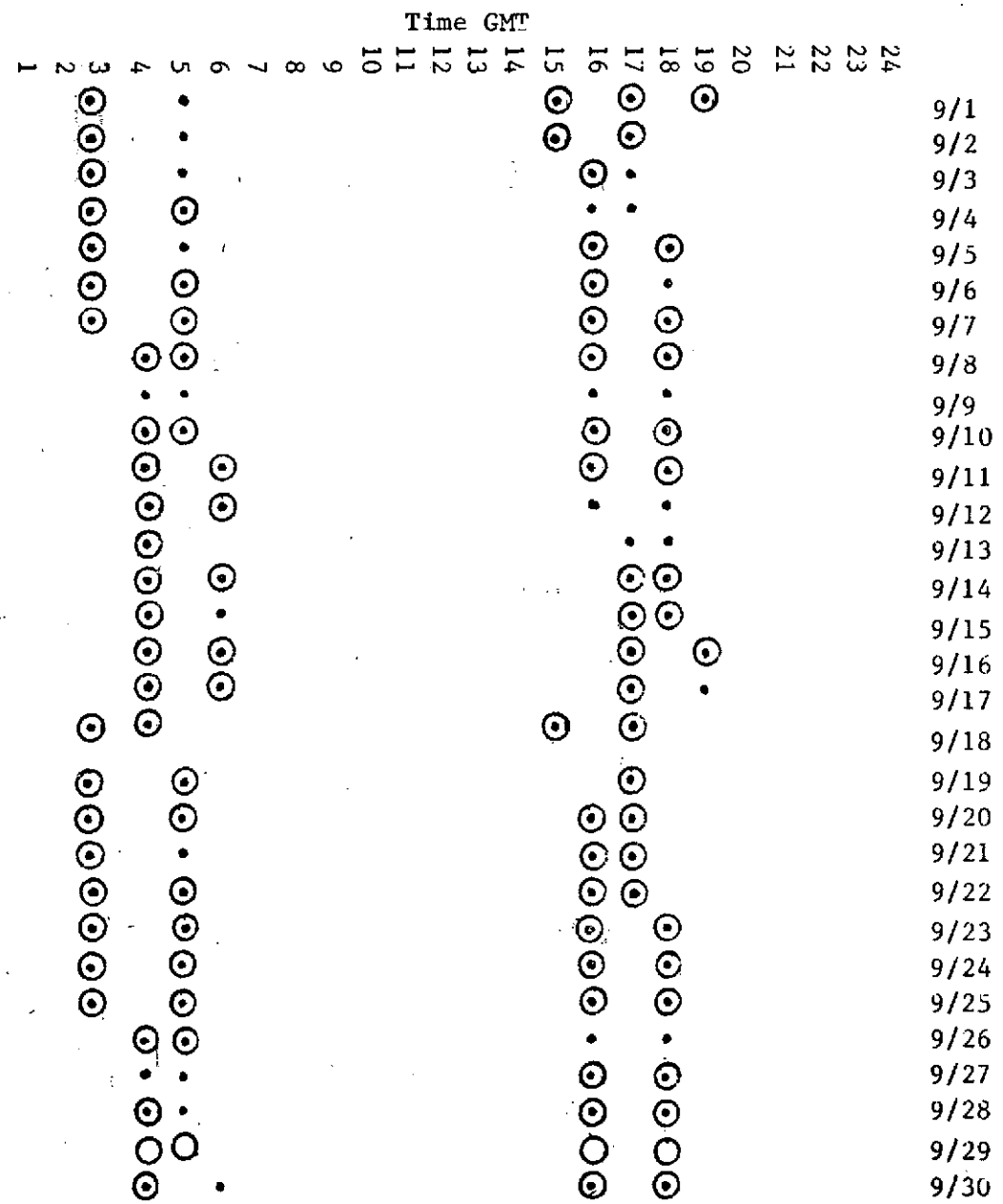
○ data received at WSSI



WLFCRP Wolf Creek Pass

• data from NASA
○ data received at WSSI

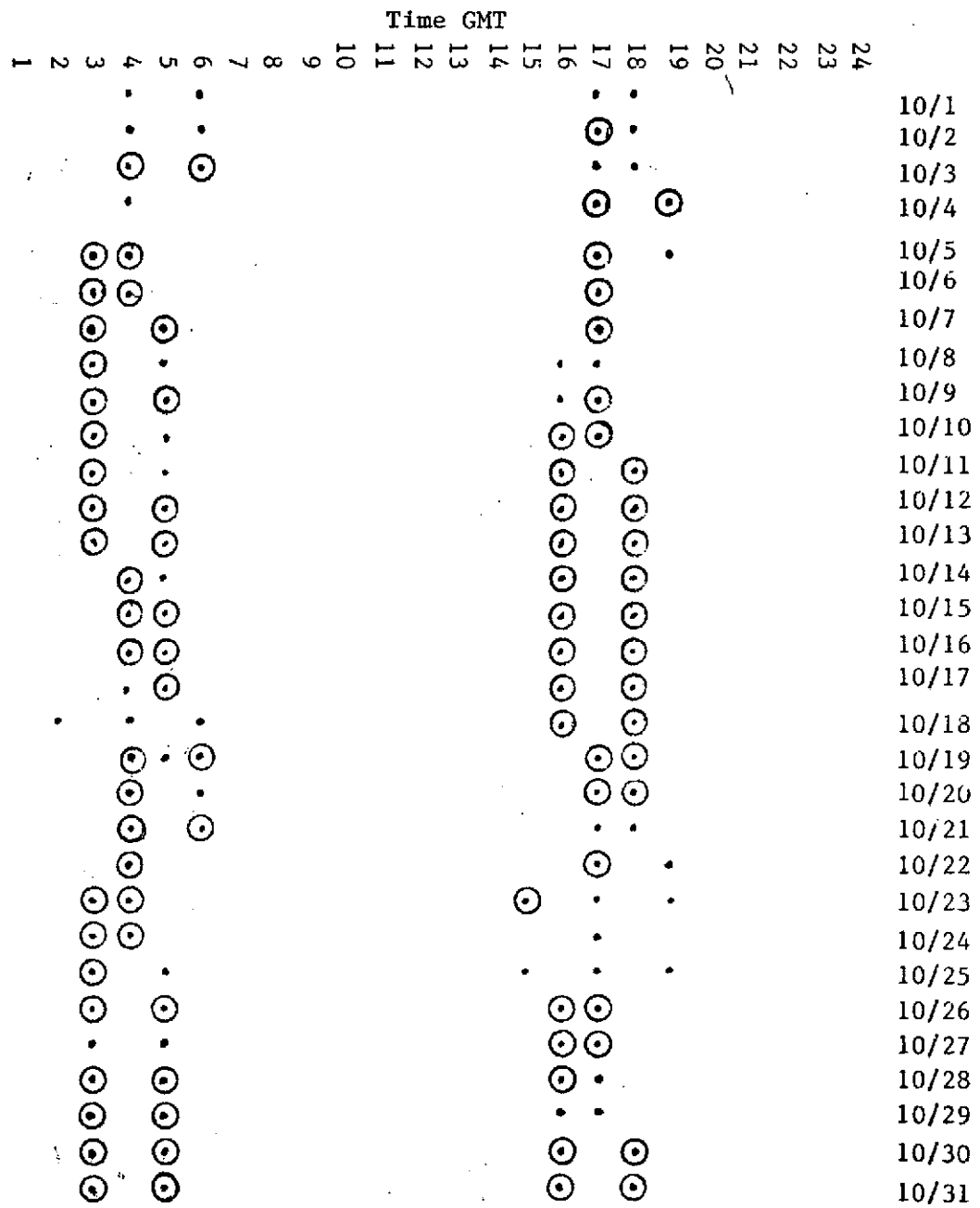


Figure 11

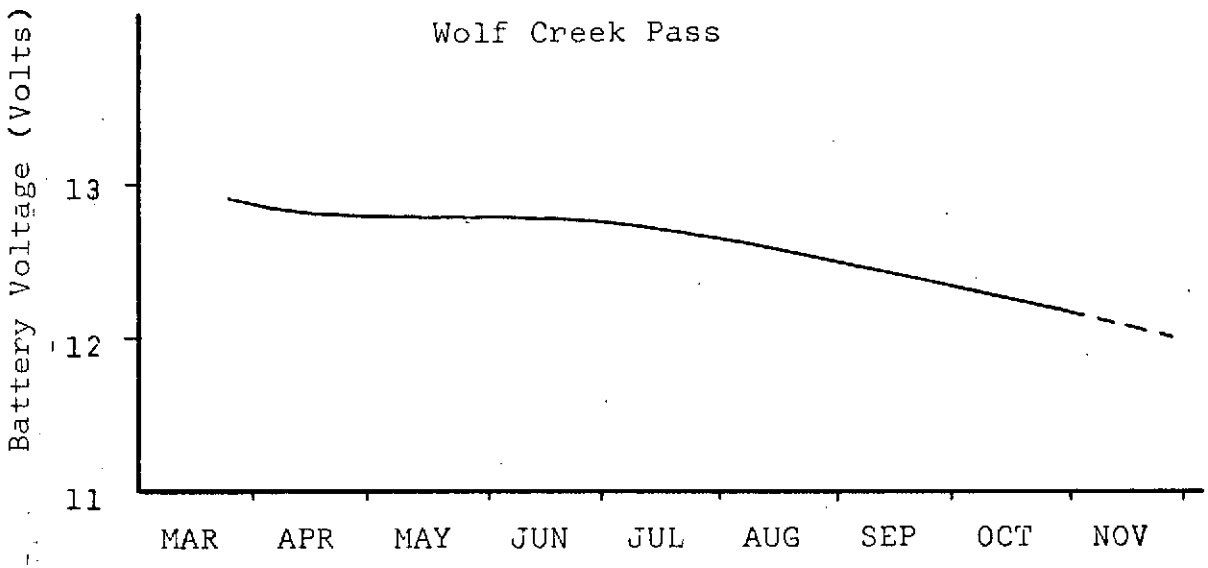

Wolf Creek Pass
Battery Voltage (Volts)
13
12
11
MAR
APR
MAY
JUN
JUL
AUG
SEP
OCT
NOV

Table 4 - Data Throughput Efficiency, Wolf Creek Pass

Data Orbits at Fort Collins/Data Orbits at Goddard

Day of Month	June	July	August	Sept.	Oct.	Total
1	2/4	4/4	3/4	4/5	0/4	
2	3/5	4/4	3/4	3/4	1/4	
3	4/5	2/4	3/4	2/4	2/4	
4	5/5	4/4	4/4	2/4	2/3	
5	0/3	4/4	4/4	3/4	3/4	
6	4/4	5/5	4/4	3/4	3/3	
7	4/4	4/4	3/4	4/4	3/3	
8	3/4	1/4	3/4	4/4	1/4	
9	4/4	3/4	4/4	0/4	3/4	
10	2/4	3/4	2/4	4/4	3/4	
11	2/4	4/4	5/5	4/4	3/4	
12	2/4	4/4	3/5	2/4	4/4	
13	4/4	4/4	4/4	1/3	4/4	
14	4/4	3/3	4/4	4/4	3/4	
15	3/3	2/4	2/4	3/4	4/4	
16	4/4	0/4	4/4	4/4	4/4	
17	4/4	4/4	3/4	3/4	3/4	
18	2/4	3/4	1/4	4/4	2/5	
19	5/5	2/4	2/4	3/4	4/5	
20	5/6	3/4	2/4	4/4	3/4	
21	1/4	*2/0	4/4	3/4	2/4	
22	4/4	3/4	2/4	4/4	2/3	
23	4/4	3/3	2/4	4/4	3/5	
24	4/4	*3/0	4/4	4/4	2/3	
25	4/4	6/6	2/4	4/4	1/5	
26	3/4	4/4	2/4	2/4	4/4	
27	*2/0	5/5	3/4	2/4	2/4	
28	4/4	4/4	2/5	3/4	3/4	
29	2/4	4/4	2/4	*4/0	2/4	
30	2/4	4/4	1/4	3/4	4/4	
31		2/4	2/4		4/4	
Totals	94/120	98/118	89/127	90/116	84/123	455/604
Throughput Efficiency	78%	83%	70%	78%	68%	75%

* NASA data not available.
Figures not included in totals.

Table 5 - Data Throughput Efficiency, Wolf Creek North

Data Orbits at Fort Collins/Data Orbits at Goddard

Day of Month	June	July	August	Sept.	Oct.	Total
1	1/3	4/4	2/3	2/3	0/4	
2	1/2	4/4	1/2	1/2	1/4	
3	1/2	2/4	3/4	0/2	2/4	
4	2/2	4/4	3/3	1/2	3/3	
5	0/2	4/4	4/4	1/2	2/3	
6	2/2	4/4	4/4	1/2	3/3	
7	2/2	3/3	3/4	3/3	2/2	
8	2/3	1/2	4/4	3/3	0/2	
9	4/4	1/2	4/4	0/3	2/2	
10	2/4	1/2	2/4	4/4	1/2	
11	2/3	2/2	4/4	4/4	1/2	
12	2/4	2/2	3/4	2/4	2/2	
13	4/4	2/2	2/2	2/4	2/2	
14	4/4	3/3	2/2	4/4	3/4	
15	4/4	2/4	0/2	3/4	4/4	
16	4/4	0/4	2/2	4/4	4/4	
17	4/5	4/4	2/2	1/3	3/4	
18	2/3	3/4	1/3	2/2	2/4	
19	3/3	2/4	2/3	3/3	4/4	
20	2/2	3/4	1/3	3/3	3/4	
21	0/2	*2/0	3/3	2/2	2/4	
22	2/2	3/4	2/3	2/2	3/3	
23	2/2	3/4	2/4	2/2	1/3	
24	2/2	*1/0	4/4	3/3	1/2	
25	2/2	2/2	2/4	4/4	0/2	
26	3/3	3/3	2/4	2/4	2/2	
27	*2/0	2/2	3/4	1/3	1/2	
28	2/2	2/2	2/4	3/4	1/2	
29	2/4	2/2	3/4	*4/0	1/2	
30	1/3	2/2	0/3	3/4	2/2	
31		1/2	2/3		2/3	
Totals	64/84	71/89	74/103	66/89	60/90	335/455
Throughput Efficiency	76%	80%	72%	74%	67%	74%

* NASA data not available.
Figures not included in totals.

During the same 153 day period, 604 satellite orbits relayed data from the Wolf Creek Pass site to Goddard. Four hundred and fifty-five of the data orbits were received at Fort Collins at the remote computer terminal. The data dropout rate, 25%, was similar to that experienced at Wolf Creek North. Goddard received an average of 3.95 data orbits/day while Fort Collins received 2.97 data orbits/day.

The total number of messages received at Goddard from each of the two stations has been relatively invariant from month to month (coefficient of correlation, .03 - .07) indicating that the number of fruitful satellite passes per month is nearly constant and that the two stations are not experiencing transmitter problems. The data dropout rate also appears to be varying little from month to month (coefficient of variation, .07 - .08).

C. Public Reaction to ERTS Sites

The summer ERTS sites were chosen partly on the basis of visibility from high tourist use areas, so that public response to the installations could be measured. The Wolf Creek Pass site is visible from U.S. Highway 160 at a point where summer tourists pull over into a parking area at the top of the pass. The Wolf Creek North site is not visible from a main highway, but is located only ½ mile upstream from a popular campground 6 miles southwest of Wolf Creek Pass. See Figures 5, 6, and 7 for the locations of the two sites. Highway Department figures indicate that vehicle use of U.S. Highway 160 is substantial, especially during the summer months. A traffic count of vehicles traveling in both directions on Highway 160 at Bayfield, Colorado (approximately 20 miles East of Durango) was completed during 1972 and is shown in Table 6.

Table 6

Vehicle Traffic Count
Hwy. 160 at Bayfield, Colorado

Month	Average Daily Count	Month	Average Daily Count
January	1492	July	4387
February	1654	August	4152
March	2015	September	3120
April	2179	October	2482
May	2674	November	1897
June	3716	December	1664

Average day of average month: 2619 vehicles

Figures shown in Table 6 would be fairly representative of the number of vehicles traveling over Wolf Creek Pass in 1973 although they would probably tend to overestimate traffic on the pass somewhat since local traffic between Durango and Pagosa Springs would be included in the Bayfield count. The Bayfield count indicates that 546,732 vehicles passed the counting point during the months June through October, 1972. If the occupants of only one in ten vehicles noticed the Wolf Creek Pass installation in 1973, and if the occupants of only one in ten thousand vehicles walked over to the site, the site would still have received considerable public exposure.

No vandalism or tampering with the instruments has been noted at either site since installation.

The ERTS sites also received no damage during the deer and elk hunting seasons in September and October.

No strong negative public reactions were noted. It appears that most of the people who notice the ERTS installations are merely curious about the purpose and function of the units.

D. Data Comparisons

Comparisons of on-site data with ERTS transmitted data were completed for the Wolf Creek Pass site. A recording raingage was installed at this site on June 27, 1973 and charts are available from this gage to compare with the recording raingage that is connected to the ERTS package. The ERTS data has a resolution of .10 inch while the adjacent gage has a resolution of .01 inch. A precipitation data comparison for the period July 29 through August 14 is shown in Figure 12. The comparison in quite good but points out that further resolution is desirable in the ERTS data. Plans have been made, as discussed further in following sections of this report, to increase the resolution of this data.

Temperature data comparisons are shown in Figure 13 for Wolf Creek Pass. The comparison is between a thermograph located at the Wolf Creek Pass site in a thermoscreen about 65 feet west of the ERTS installation and the self-aspirated temperature shield that was in place at the ERTS site. The temperature data from the two sources has good agreement. Agreement between temperatures as measured by the two sensors was not as good during the summer months and plans were made to install a new temperature sensor with radiation shield on the ERTS package in the fall. The new temperature sensor configuration is discussed further in following sections.

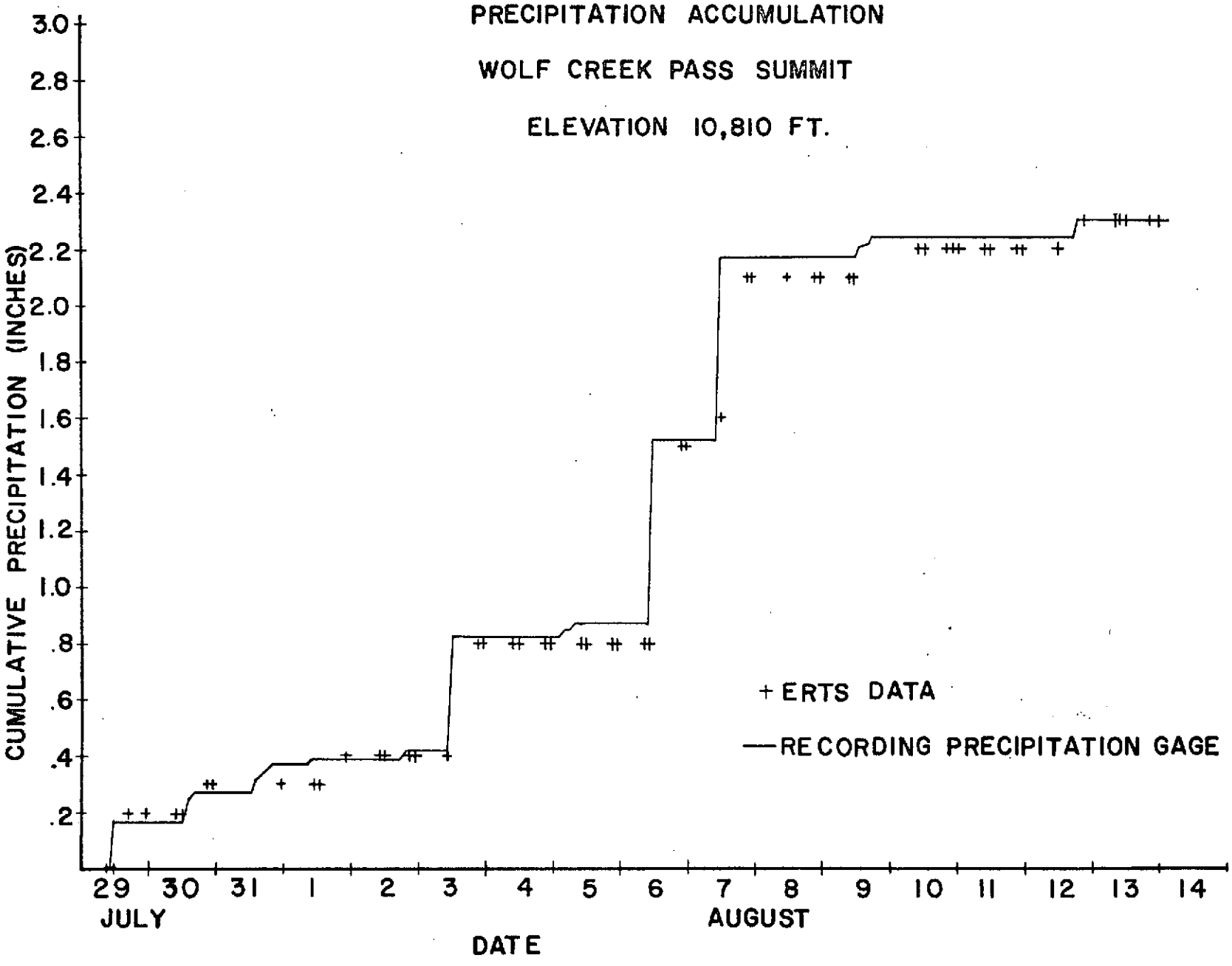
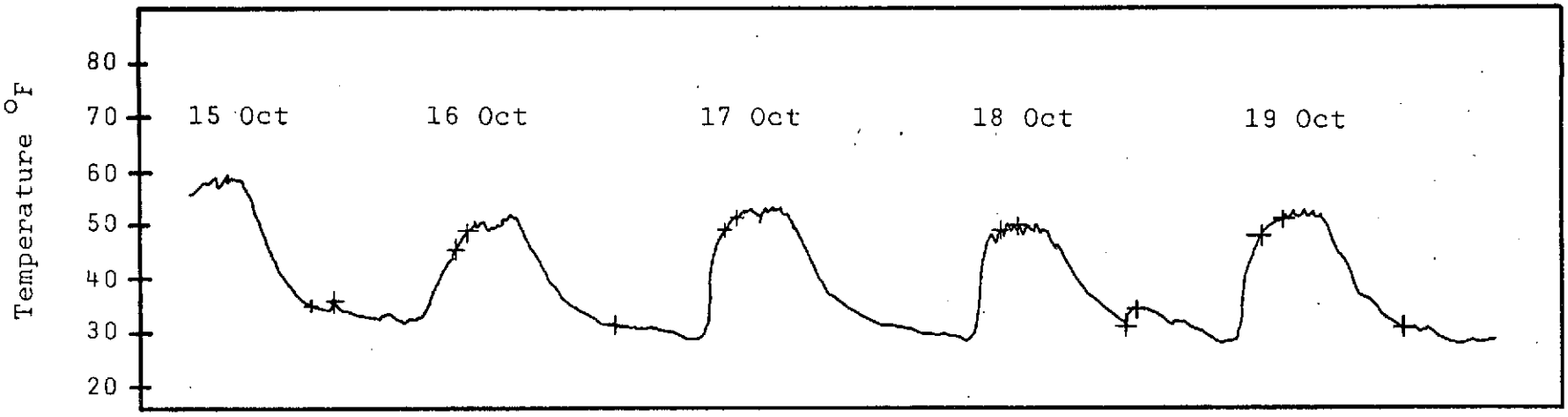

PRECIPITATION ACCUMULATION
WOLF CREEK PASS SUMMIT
ELEVATION 10,810 FT.
CUMULATIVE PRECIPITATION (INCHES)
3.0
2.8
2.6
2.4
2.2
2.0
1.8
1.6
1.4
1.2
1.0
.8
.6
.4
.2
+ ERTS DATA
— RECORDING PRECIPITATION GAGE
29 30 31 1 2 3 4 5 6 7 8 9 10 11 12 13 14
JULY
AUGUST
DATE

Figure 12



Thermograph Trace
Wolf Creek Pass (J01)
Oct 15 - Oct 19, 1973

+ ERTS data

Figure 13

E. Summer Maintenance Experience

No maintenance problems were encountered at either of the summer sites and no special maintenance trips were scheduled. A routine servicing trip was scheduled on September 10th to the Wolf Creek Pass site to empty the accumulation bucket in the ERTS recording raingage and to recharge the gage with an evaporation retardant and antifreeze solution. The trip was scheduled from Fort Collins on the basis of ERTS-received data.

II. Planning and Operation of the 1973-74 Winter Network

A. Analysis of the ERTS Program

An analysis of the ERTS program was completed by the Bureau of Reclamation and its contractors in August and September. See, for example, Appendix A. The strengths and weaknesses of the data collection system were discussed and decisions were made on the future disposition of the network. The initial successes of the operational testing phase of the program suggested a step forward into a semi-operational mode.

B. Suggestions for Disposition of Stations

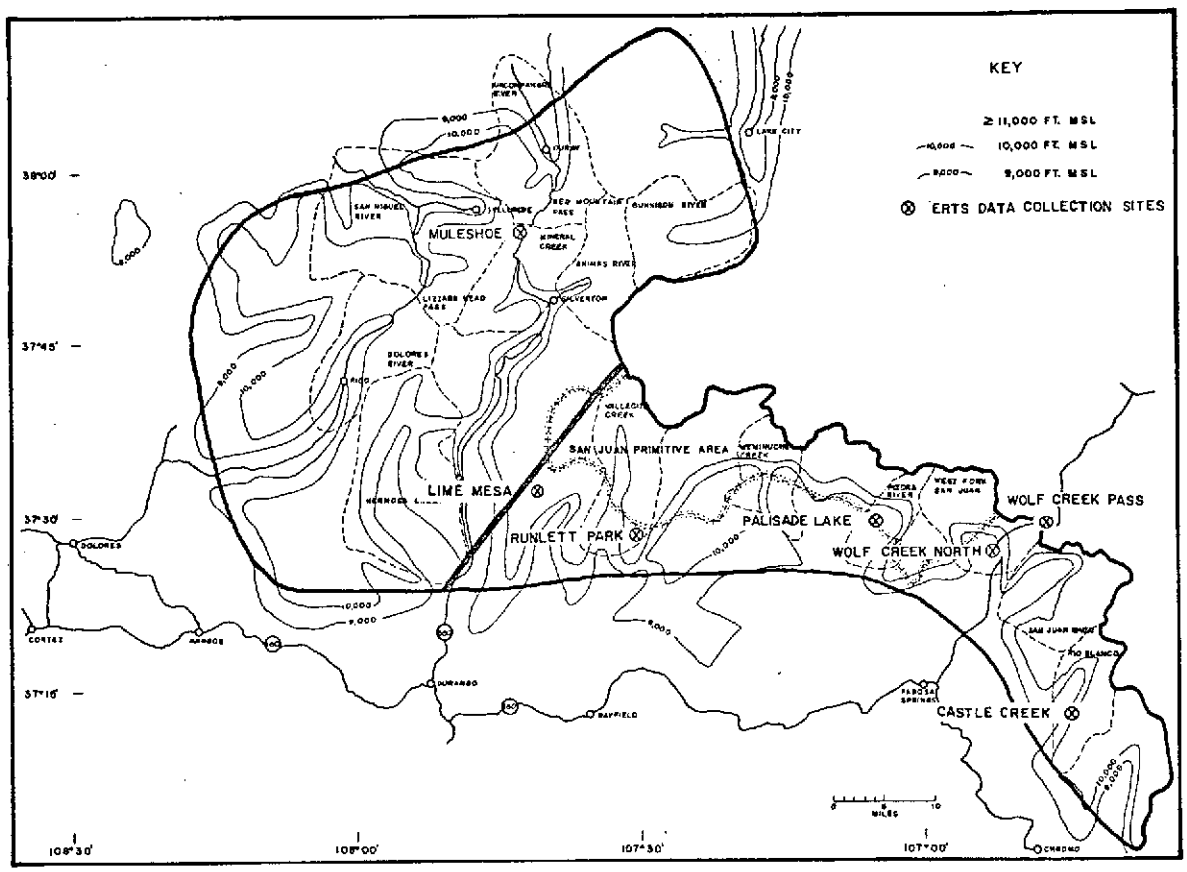
Discussions were held with Bureau contractors and other water users to determine the best uses and locations for the limited number of ERTS installations. Decisions on measurements and locations were based mainly on need for near-real time operational measurements. A significant number of installations were committed to the Bureau's seeding contractor for use in monitoring weather conditions for cloud seeding control. A decision was made to instrument these sites with recording precipitation gages and to increase the resolution of the ERTS precipitation measurements. New sites were chosen so that good coverage of the cloud seeding target area would result. Table 7 lists the spring sites and the changes in locations and instrumentation that will result in the new winter network. Figure 14 shows the new site locations in relation to the target area of the Colorado River Basin Pilot Project. The 1973-74 target area is the southeastern half of the outlined area. New sites are Lime Mesa, Palisade Lake, and Castle Creek. All of the new sites will be instrumented with precipitation gages. The Lime Mesa site is a high elevation site on the mountain barrier and is an important indicator of precipitation at the highest elevations in the San Juan Mountains. The Castle Creek gage provides better telemetry coverage of the extreme southeast part of the target area. The Palisade Lake gage is installed at the same location as a Soil Conservation Service snow pillow and provides coverage for the mountainous area between Wolf Creek Pass and the West Needle Mountains, north of Lime Mesa. The Lime Mesa

Table 7

ERTS Program
Changes in Station Configuration

Spring 1973		Winter 1973-74	
Site	Parameters	Site	Parameters
Muleshoe	Temperature	Muleshoe	No Change
	Wind Speed		No Change
	Wind Direction		No Change
	Radiation		No Change
	Battery Voltage		No Change
			Add Humidity
			Add Rime Ice Detector
			Add Muleshoe Battery
Wolf Creek North	Streamflow	Wolf Creek North	No Change
	Water Temperature		No Change
	Battery Voltage		No Change
Wolf Creek Pass	Temperature	Wolf Creek Pass	Radiation Shield
	Precipitation		No Change
	Battery Voltage		No Change
Molas Divide	Temperature	Lime Mesa	Radiation Shield
	Precipitation		No Change
	Battery Voltage		No Change
Runlett Park	Temperature	Runlett Park	No Change
	Wind Speed		No Change
	Wind Direction		No Change
	Relative Humidity		No Change
	Battery Voltage		No Change
Devil Mountain	Temperature	Castle Creek	Radiation Shield
	Wind Speed		Omit
	Wind Direction		Omit
	Battery Voltage		No Change
			Add Precipitation
Pagosa Peak	Temperature	Palisade Lake	Radiation Shield
	Snow Pillow		No Change
	Battery Voltage		No Change
			Add Precipitation

Half-scale voltage is monitored at all sites except Muleshoe.



Winter 1973-74 ERTS Site Locations

Figure 14

site is a remote site that will be serviced by helicopter. The Muleshoe station is the site of a ground telemetry installation that was designed for collection of meteorological data for use in snow avalanche hazard forecasting. The site is located near the starting zone of several avalanche paths and is safely accessible only by helicopter during the winter months. Further details of the locations of the seven sites are given in Table 8. A list of USGS maps and USFS aerial photos covering the winter sites is given in Tables 9 and 10. The locations of each of the new 1973-74 winter sites are shown on topographic maps in Figures 15 through 19. ERTS-1 satellite imagery of the Pilot Project is also available and several prints of the project area have been ordered.

C. Field Installation of Winter Sites

WSSI technicians have made two fall field trips to install and service the winter network. One trip was conducted in late September and resulted in the installation of the Lime Mesa and Palisade Lake sites. Another trip was conducted in late October and early November and resulted in the installation of the Runlett Park and Muleshoe sites and maintenance and calibration of other sites. All seven ERTS sites were surveyed during this field trip as a first step towards completion of a satellite visibility study. Drafted site survey figures are given in Figures 20 through 26. The dark lines on each of the figures outline the position of the solid horizon. The thin lines delineate the outlines of trees and other "soft" objects. Dashed lines are used for estimates of the horizon when it is not clearly visible from the ERTS site due to intervening trees, etc. Visibility is seriously restricted at two of the seven sites, Palisade Lakes and Wolf Creek North.

Following is a site-by-site description of installation, calibration, and maintenance activities for the winter network. First, two general comments are in order concerning the field work: (1) New radiation shields and sensors (see Figures 27 and 28) were installed (or will be installed) at Muleshoe, Lime Mesa, Palisade Lake, Castle Creek, and Wolf Creek Pass in an attempt to decrease some minor radiation errors that have been experienced at some of these sites in the past, and (2) The resolution of all ERTS raingage data has been increased by decreasing the range of measurement from 0"-12" to 0"-10" water equivalent. This was accomplished by offsetting the zero point of the ERTS measurement to correspond to two inches of water in the gage. The gage normally receives a two inch charge of antifreeze and evaporation retardant when the gage is serviced, so that no effective decrease in the range of measurement results.

Table 8

Fall 1973 ERTS Station Data

Station	Computer ID	Platform ID	WSSI ID	Date of Installation	Latitude	Longitude	Elevation	County
Palisade Lake	PALADE	6025	JL4	9/25/73	37°30'N	107°09'W	9,500'	Hinsdale
Wolf Creek North	WLFCRN	6040	KN1	4/27/73	37°27'N	106°53'W	7,800'	Mineral
Castle Creek	CASTLE	6143	NP3	N/A	37°12'N	106°45'W	9,100'	Archuleta
Runlett Park	RUNPRK	6202	KI1	11/7/73	37°29'N	107°30'W	10,760'	La Plata
Muleshoe	MULSUE	6212	FG6	11/6/73	37°52'N	107°45'W	12,800'	San Juan
Wolf Creek Pass	WLFCRP	6241	JO1	3/23/73	37°29'N	106°48'W	10,810'	Mineral
Lime Mesa	LIMESA	6347	JH1	9/27/73	37°34'N	107°41'W	11,700'	La Plata
Spare	XXXXXX	6062						

Table 9

ERTS Sites
Forest Service Aerial Photographs

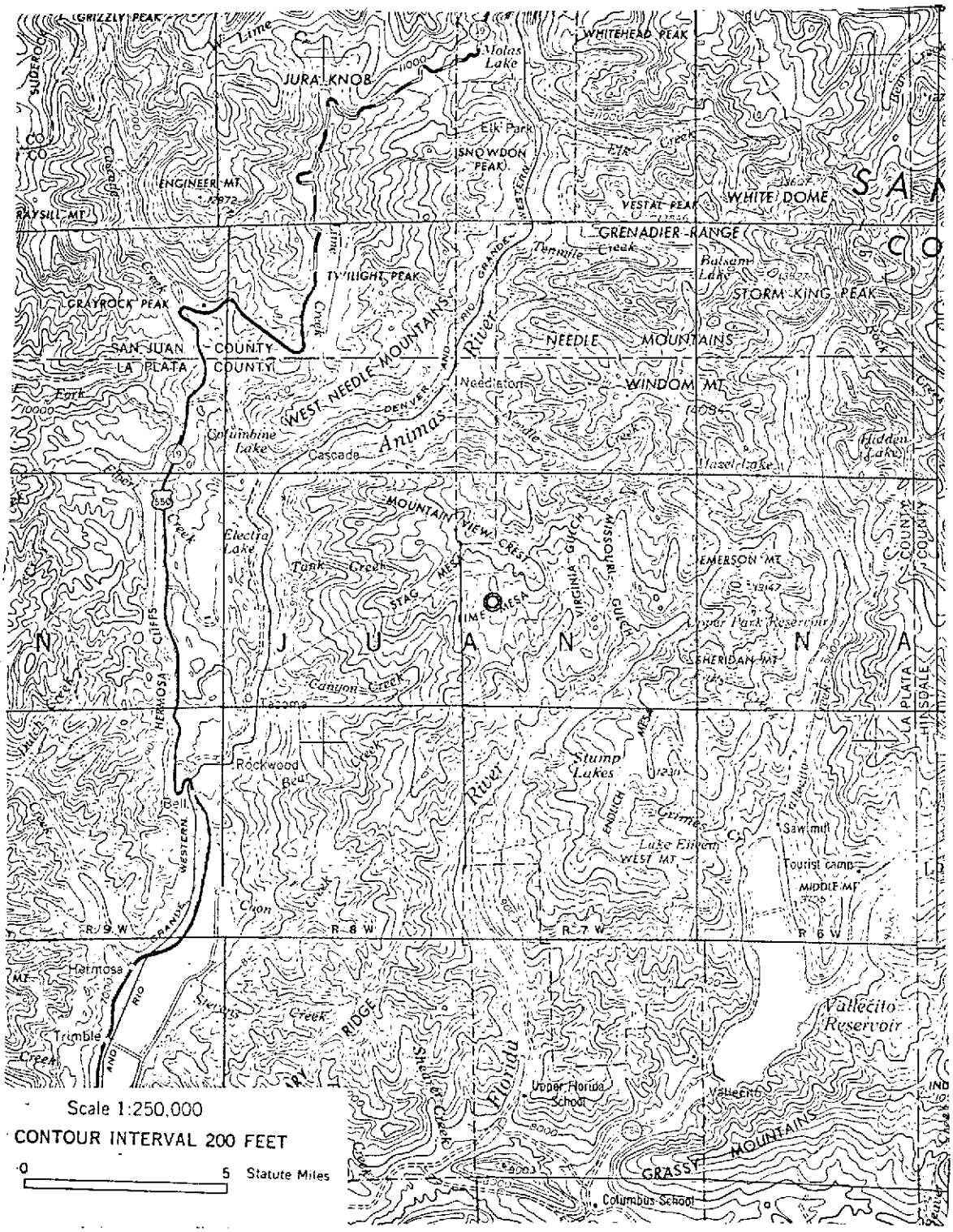
Site	Photo Number
Wolf Creek Pass	ENP 3 139
Wolf Creek North	ENP 5 91
Palisade Lake	EOU 25 245
Castle Creek	ENP 3 46
Muleshoe	ENP 11 44
Runlett Park	ENP 8 170
Lime Mesa	Unknown

Table 10

USGS Maps

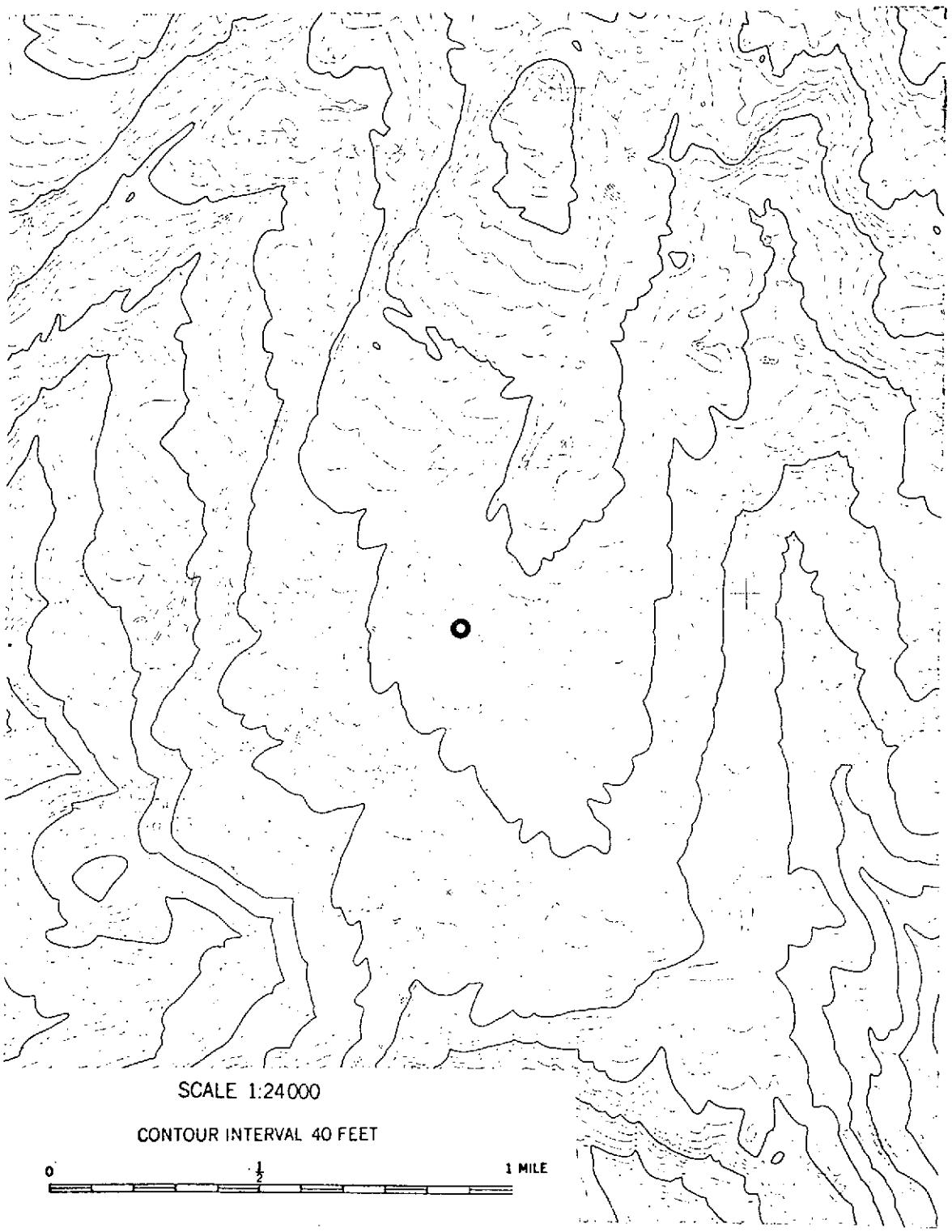
Site	Quadrangle
Wolf Creek Pass	15' Wolf Creek Pass 1957
Wolf Creek North	15' Wolf Creek Pass 1957
Palisade Lake	7½' San Cristobal 4SW 1973*, Oakbrush Ridge 1964
Castle Creek	15' Wolf Creek Pass 1957
Muleshoe	7½' Ironton, Telluride, Ophir, Silverton 1955
Runlett Park	7½' Vallecito Reservoir, Granite Peak 1964
Lime Mesa	7½' Needle Mountains SW 1973*

*advance proofs



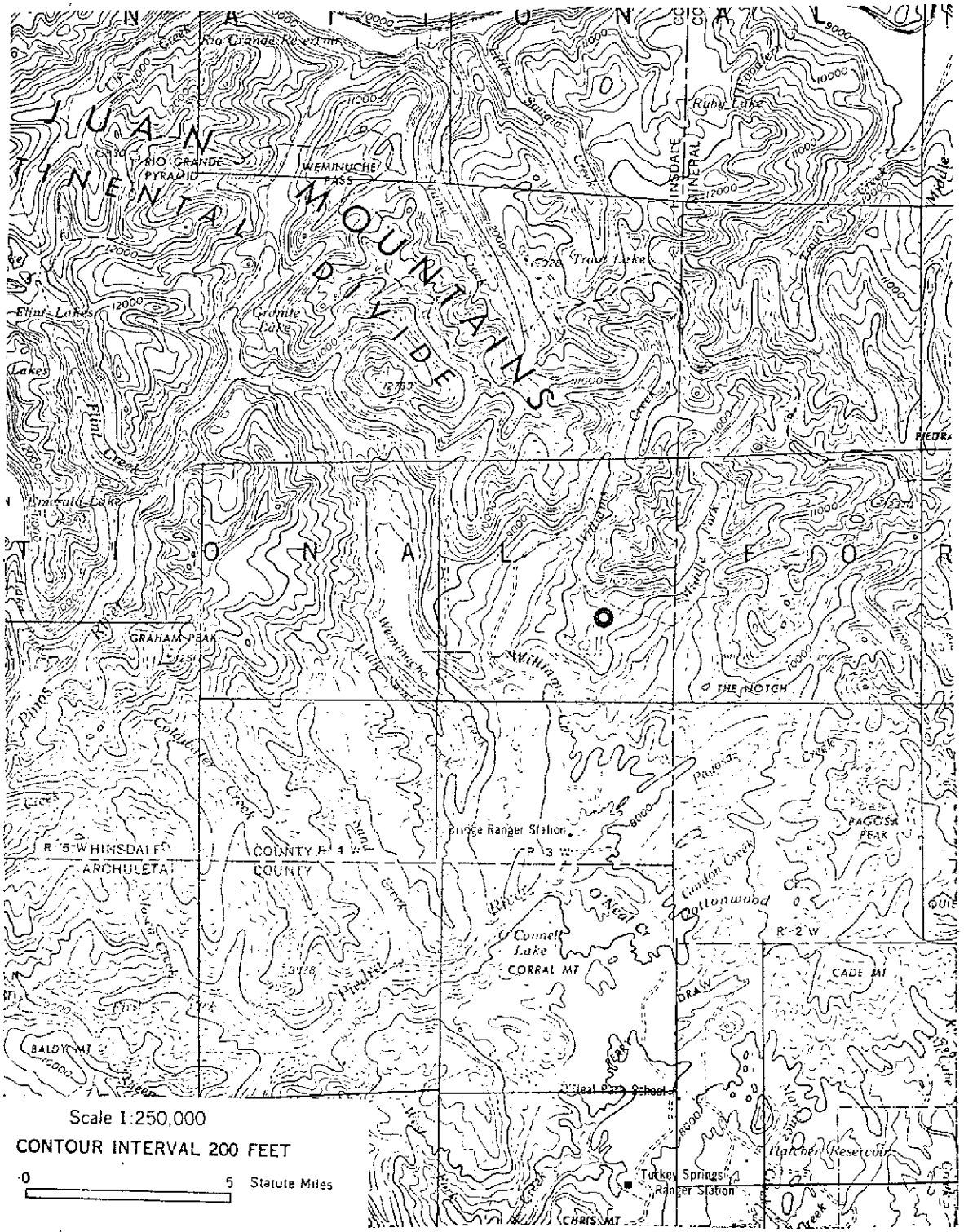
Lime Mesa

Figure 15



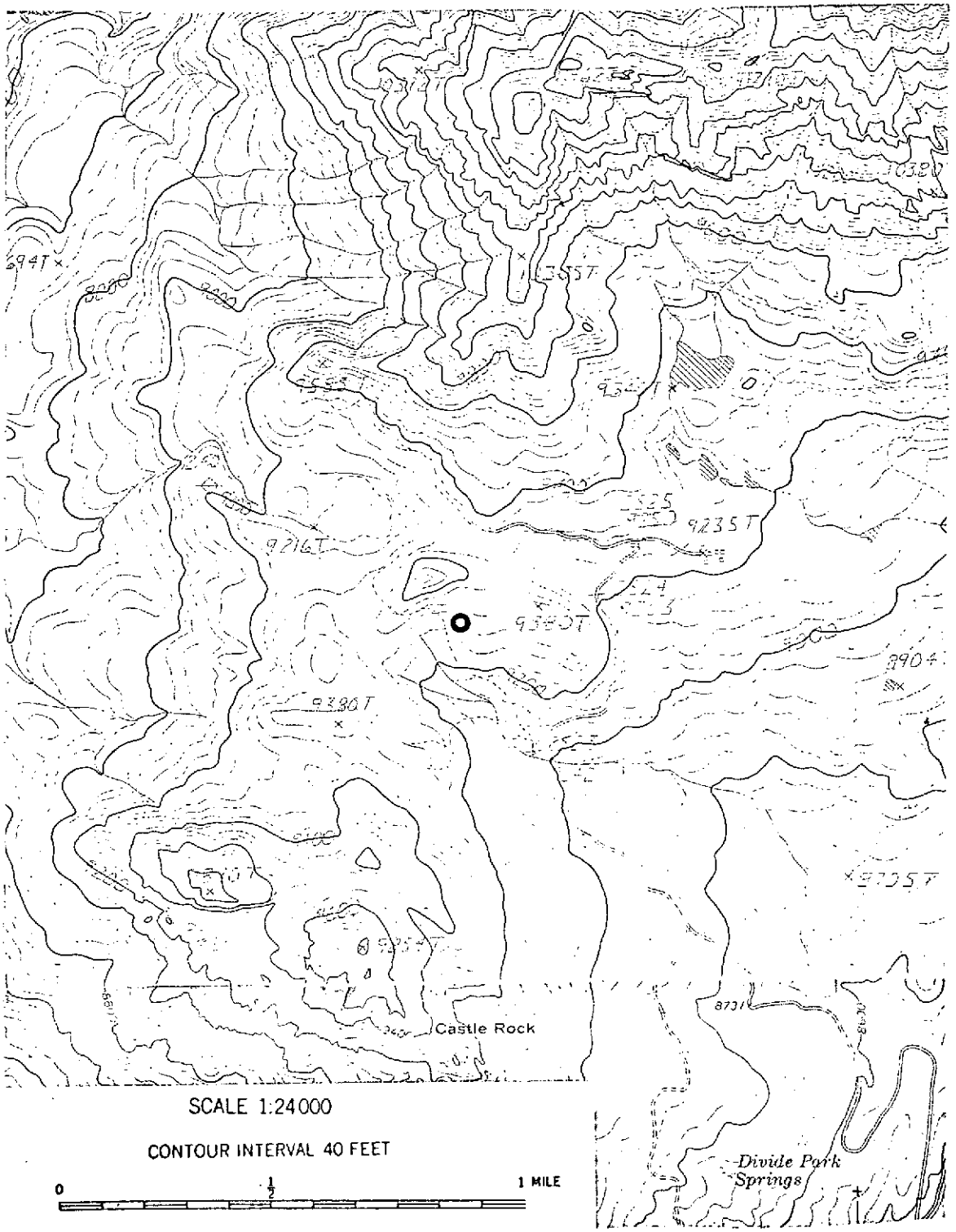
Lime Mesa

Figure 16



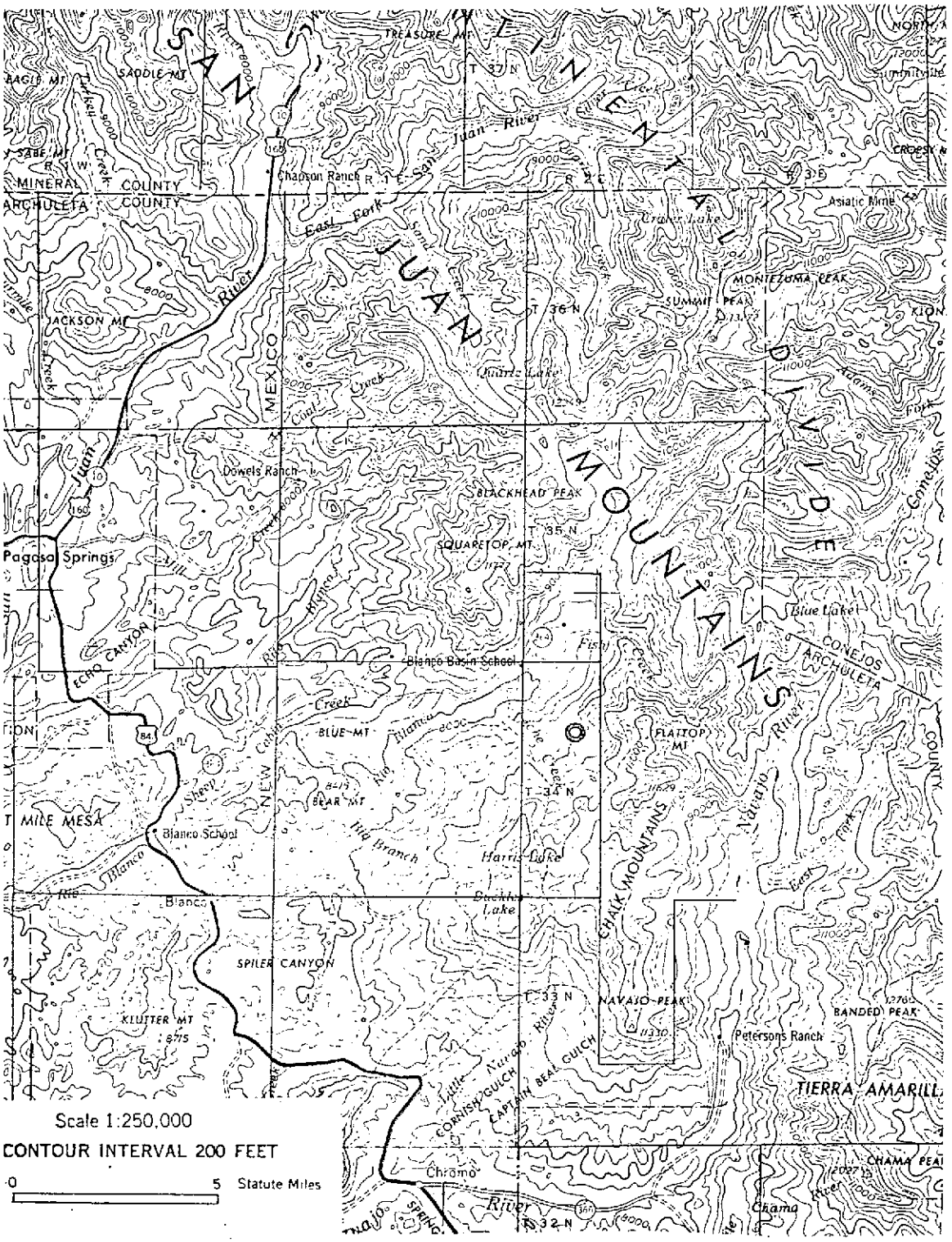
Palisade Lakes

Figure 17



Palisade Lakes

Figure 18



Castle Creek

Figure 19

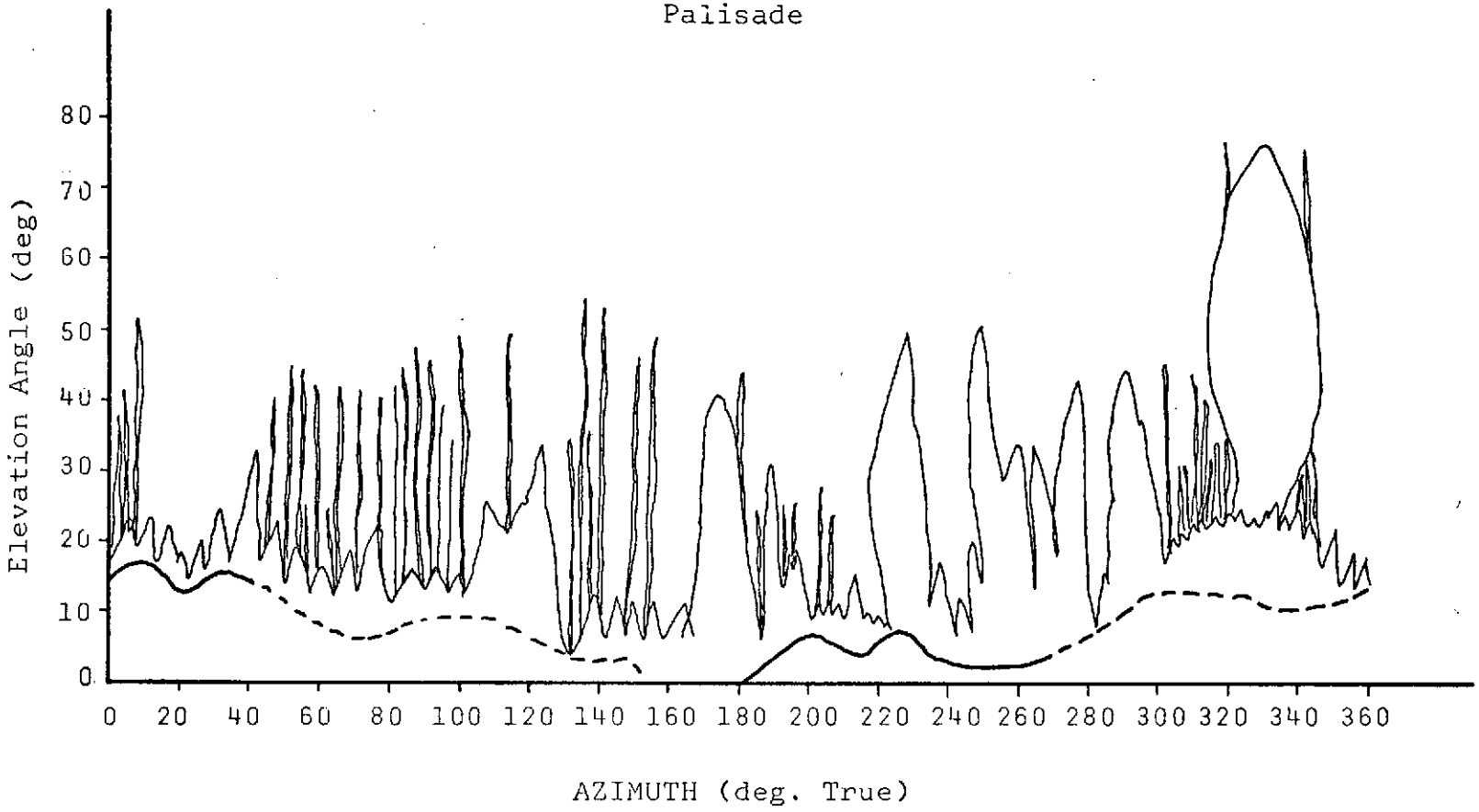

Palisade
Elevation Angle (deg)
0
10
20
30
40
50
60
70
80
0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300 320 340 360
AZIMUTH (deg. True)

Figure 20

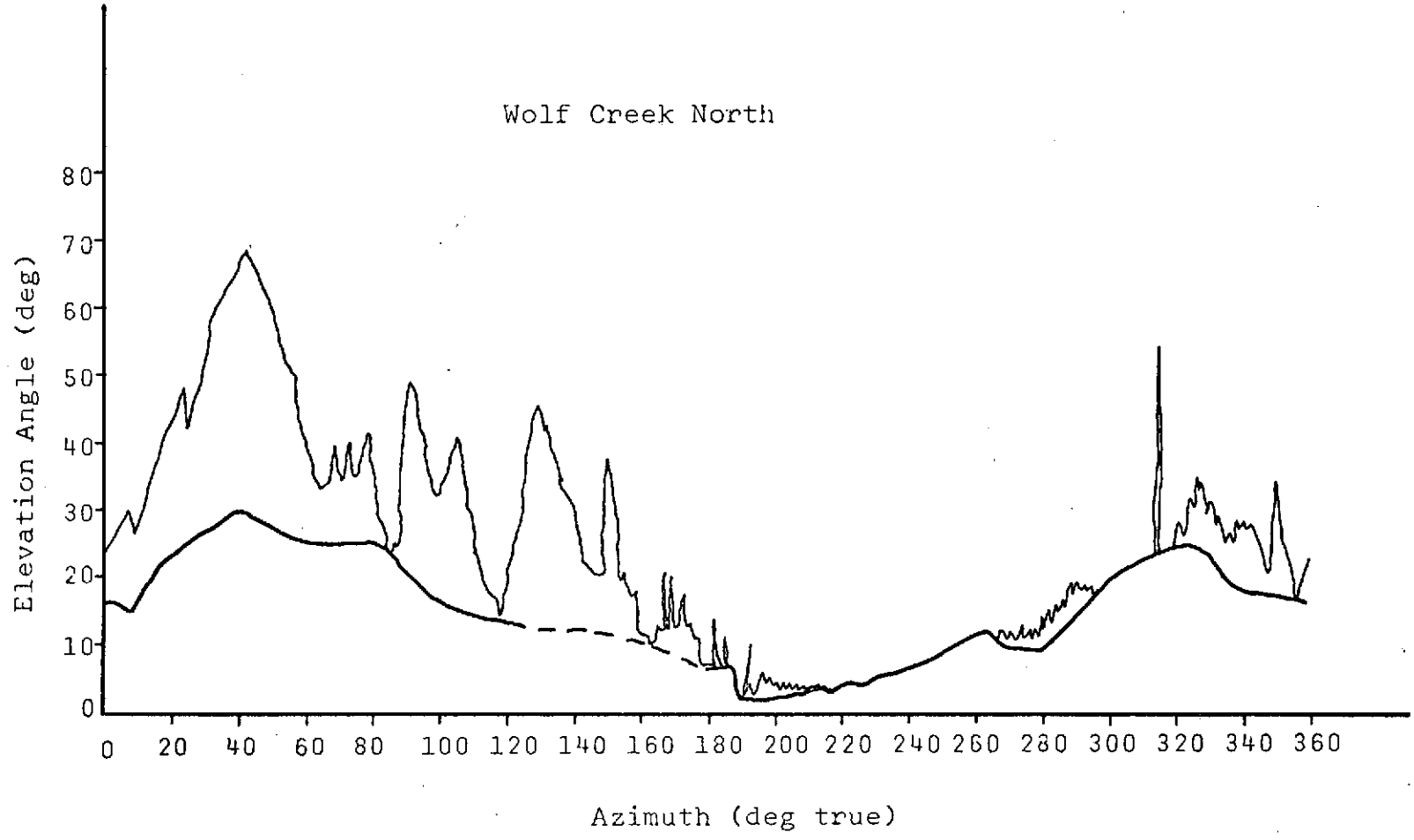

Wolf Creek North
Elevation Angle (deg)
0
10
20
30
40
50
60
70
80
0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300 320 340 360
Azimuth (deg true)

Figure 21

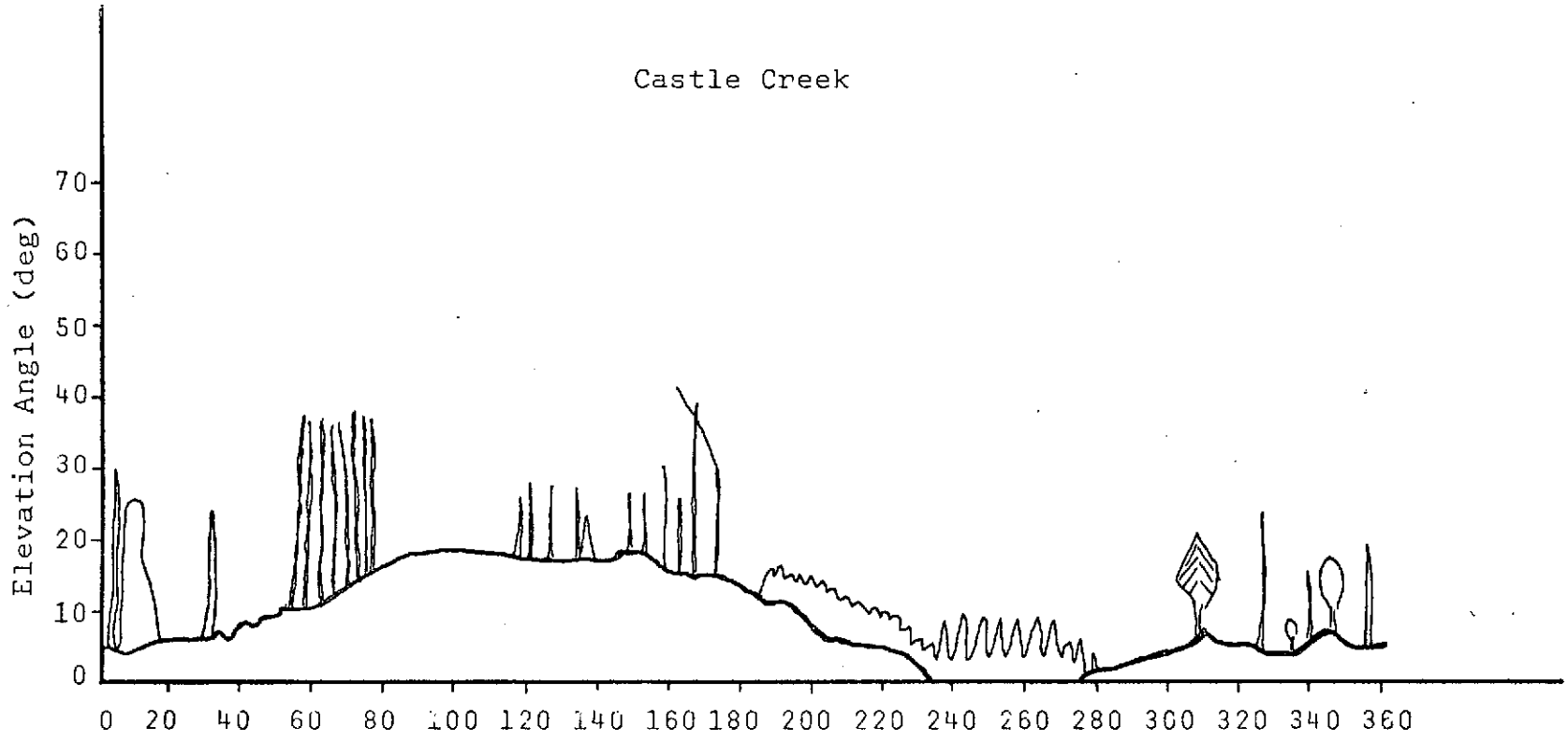

Castle Creek
Elevation Angle (deg)
70
60
50
40
30
20
10
0
0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300 320 340 360
AZIMUTH (deg. True)

Figure 22

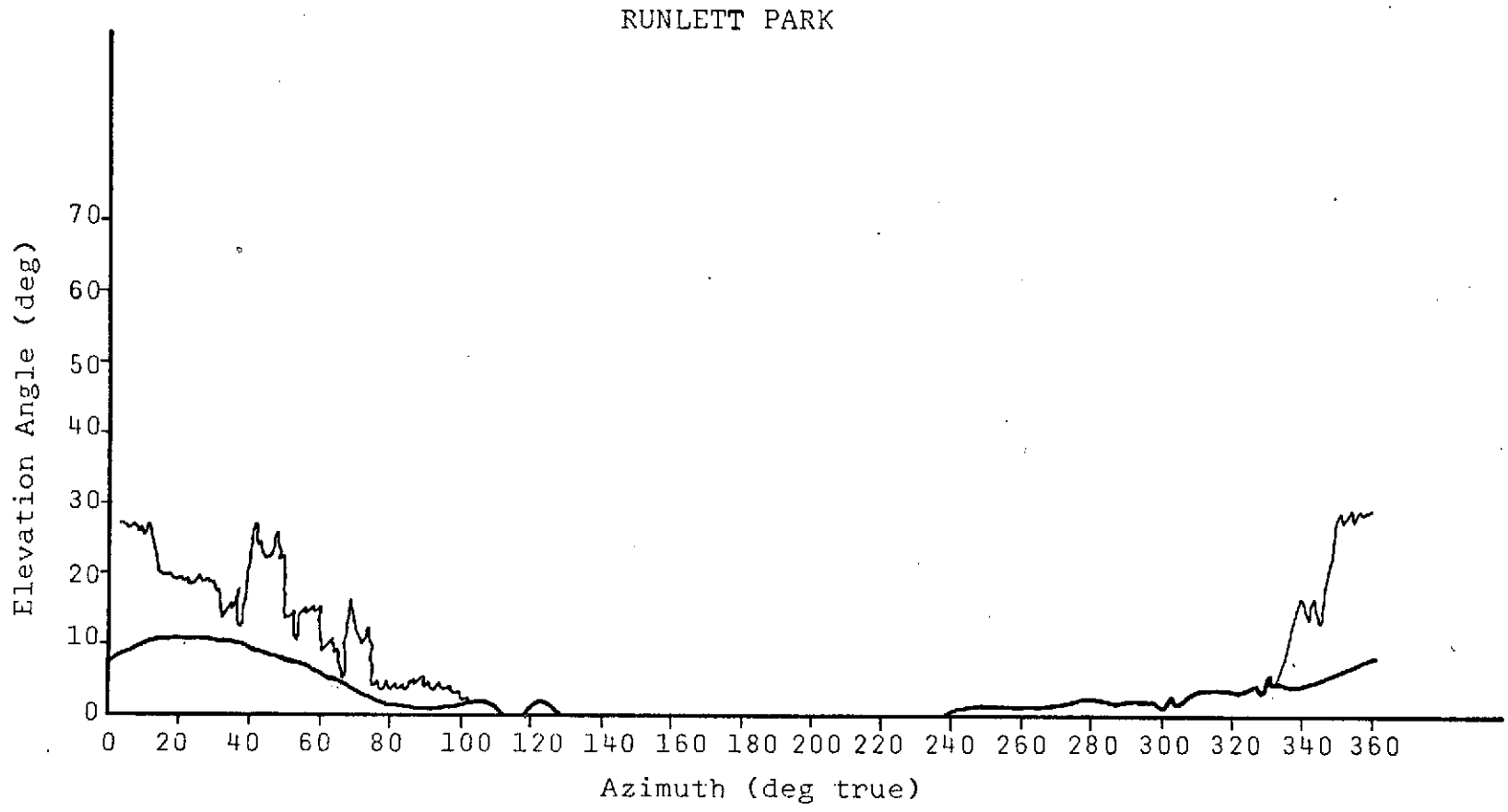

RUNLETT PARK
Elevation Angle (deg)
0
10
20
30
40
50
60
70
0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300 320 340 360
Azimuth (deg true)

Figure 23

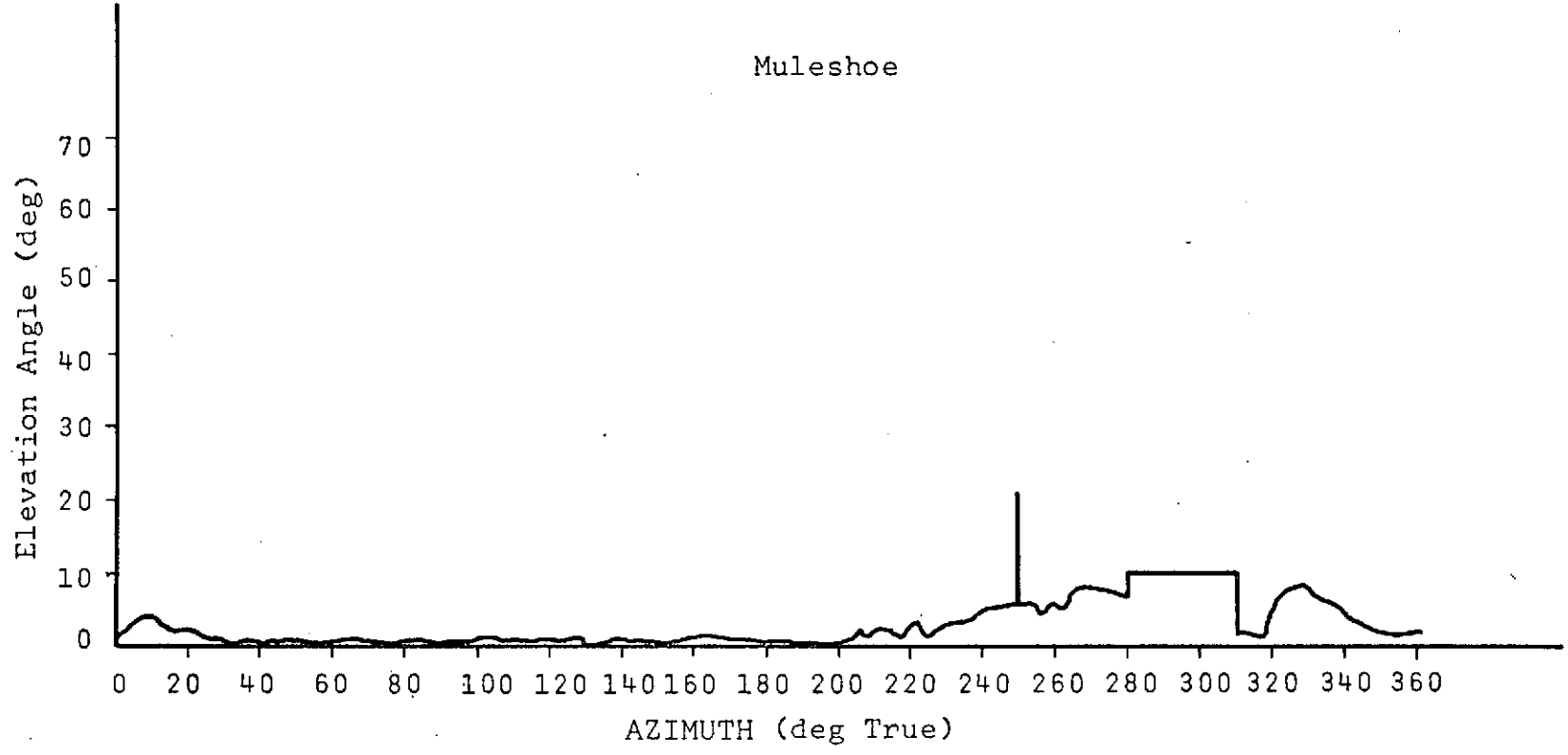

Muleshoe
Elevation Angle (deg)
70
60
50
40
30
20
10
0
0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300 320 340 360
AZIMUTH (deg True)

Figure 24

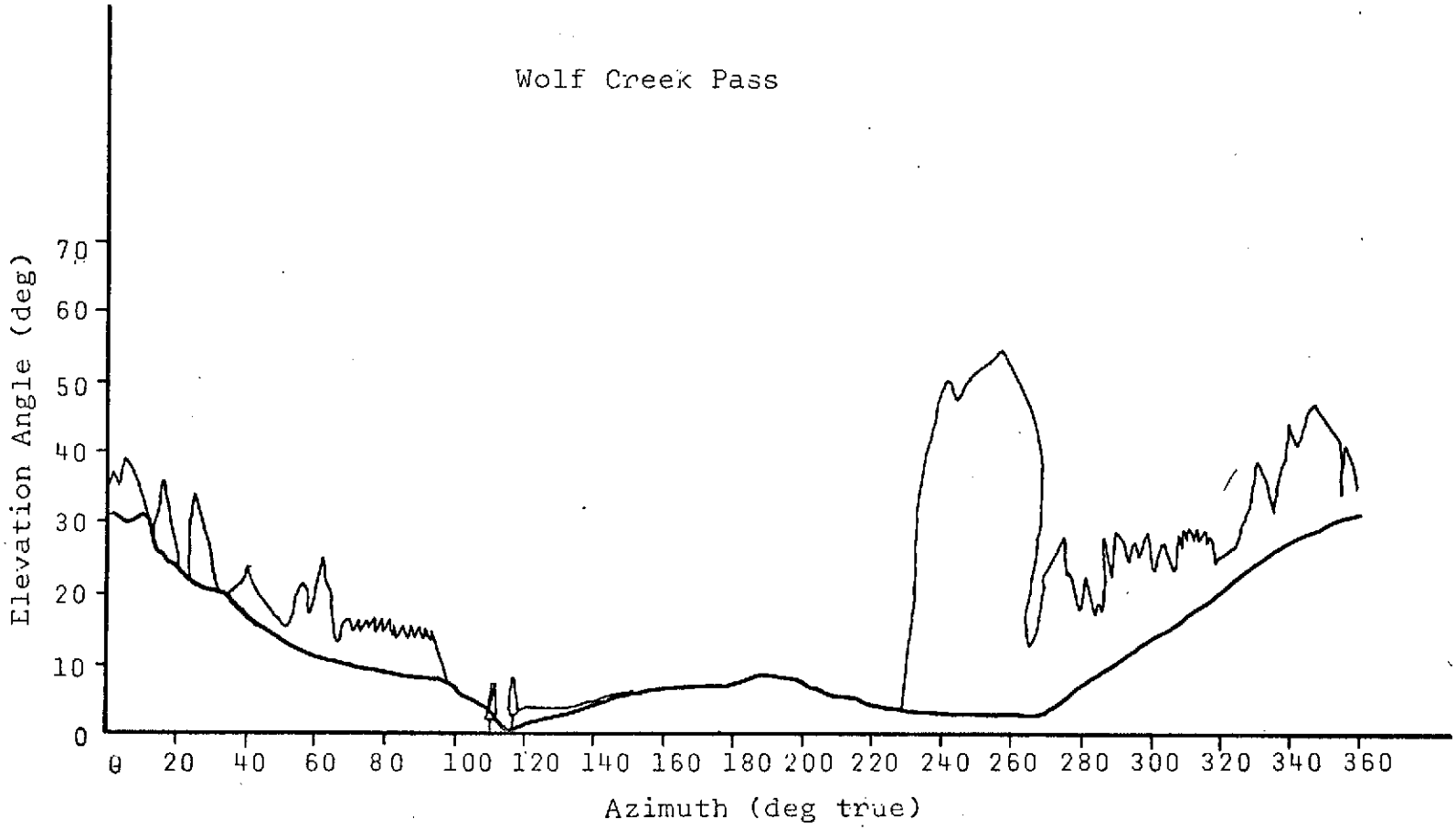

Wolf Creek Pass
Elevation Angle (deg)
0
10
20
30
40
50
60
70
0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300 320 340 360
Azimuth (deg true)

Figure 25

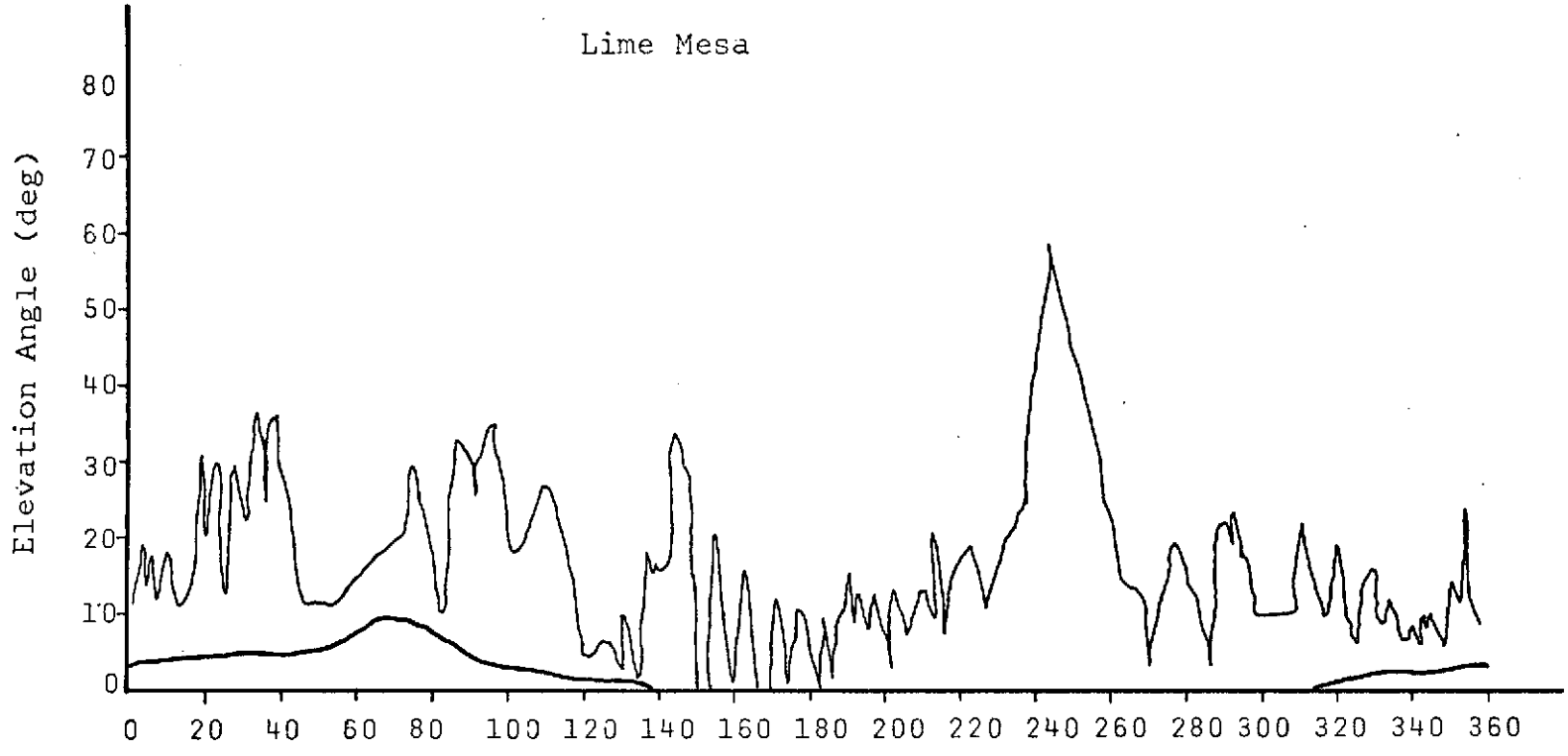
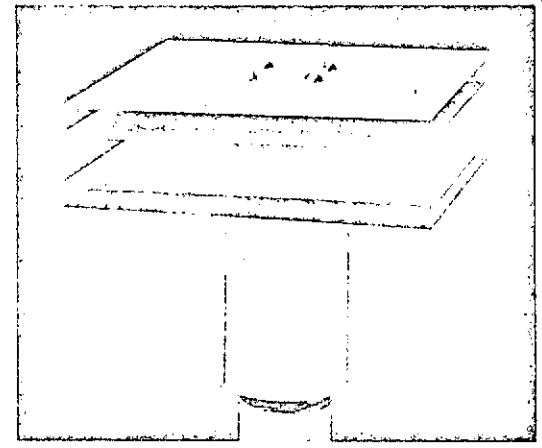

Lime Mesa
Elevation Angle (deg)
0
10
20
30
40
50
60
70
80
0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300 320 340 360
AZIMUTH (deg. True)

Figure 26



IS4 RADIATION SHIELD

Four metal plates protect temperature sensors from solar radiation. Surfaces receiving direct radiation are painted white to reflect the energy. Other surfaces are painted black to radiate heat that accumulates. Shield will house thermocouples, platinum resistance bulbs, and thermisters. Plates are 4″ x 4″ square. Threaded base has 1″ ID. Overall height 3½″. Weight ¾ lb/shipping 1½ lbs.

Figure 27

YSI Thermilinear® Component

YSI Part #44203

Range −30° to +50°C

This Thermilinear Thermistor Network is a composite device consisting of resistors and precise thermistors which produce an output voltage linear with temperature, see Fig. 1, or a linear resistance with temperature, see Fig. 2. The precise thermistors can either be the YSI # 44018 (as included in the #44203) or they can be a YSI 700 Series Probe since they are electrically identical.

Equations which describe the behavior of the device are:
(Refer to Fig. 7)

$Eout_1 = (-0.0067966\ Ein)\ T + 0.65107\ Ein$

$Eout_2 = (+0.0067966\ Ein)\ T + 0.34893\ Ein$

(Refer to Fig. 2)

$R_T = (-127.096)\ T + 12175$

$T = °C$

SPECIFICATIONS

	Voltage Mode	Resistance Mode
Thermistor Absolute Accuracy and Interchangeability:	±0.15°C	±0.15°C
Linearity Deviation:	±0.16°C	±20.3 ohms
***Ein Max**	3 Volts	
***I_T Max**		475 ua
Sensitivity:	0.0067966 Ein/°C	127.096 ohms/°C
Load Resistance:	1 Megohm or more	
Time Constant:	The time required for the thermistor to indicate 63% of a new impressed temperature, in 'well stirred' oil, 1 sec; in free still air, 10 sec.	

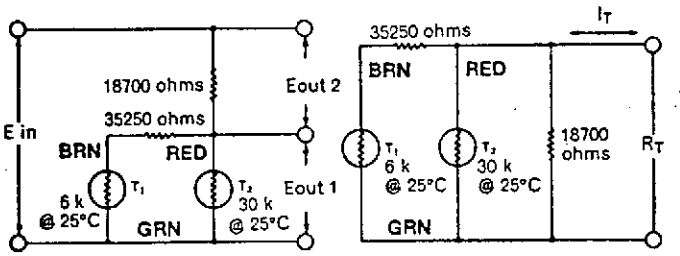


Fig. 1 Fig. 2

Figure 28

1. Wolf Creek Pass - Temperature sensor and radiation shield replaced on November 9, 1973. Temperature calibration performed at the site. Some difficulty was encountered in performing the calibration and a decision was made to replace the batteries at the earliest opportunity and reaccomplish the calibration.

2. Wolf Creek North - Batteries replaced on November 9, 1973. No calibration performed. The ERTS hookup to the stream flow sensor was disconnected by USGS personnel in mid-October due to the possibility of burning out the bubble gage motor in the event of a partial blockage of the inlet to the float well. A satisfactory solution to this problem was found and the ERTS package was reconnected on November 10th.

3. Palisade Lake - Installed on September 25, 1973. An in-shop temperature calibration was performed on September 24, 1973. A new temperature sensor, radiation shield, and recording raingage was installed on September 25, 1973. The Soil Conservation Service's snow pillow was not connected to the ERTS package on this date since the fluid in the snow pillow was too warm for an accurate calibration.

4. Lime Mesa - Installed on September 27, 1973 with a temperature sensor and raingage. On November 1 a new temperature sensor and shield were installed and the raingage was recalibrated to provide better resolution. An initial shop calibration was completed before the original installation.

5. Muleshoe - Installed on November 6 after a wait of several days for the proper weather conditions and receipt of needed parts. The ERTS site was flown in by helicopter. Calibrations were performed before the site was transported and again after the site was installed. Calibrations were coordinated with the seeding contractor and were also accomplished using the ground telemetry link.

6. Runlett Park - Installed and calibrated in the field on November 7, 1973. A pre-calibration was also performed in the shop. Seeding contractor personnel aided in calibration of the sensors.

7. Castle Creek - The Castle Creek gage has not yet been installed due to late receipt of a raingage. The site will be installed in late November or early December.

D. Computer Program Development

New or modified programs are now being completed to convert engineering data from all platforms into scientific data units.

The programming is being handled at the Computer Sharing Service Computer at the Bureau of Reclamation in Denver. Calibration curves and other inputs have been provided by the primary contractor.

II. Progress Planned for Next Reporting Period

A. Computer programming work will be completed.

B. An analysis of satellite visibility statistics will be completed for each of the winter sites. Preliminary conclusions will be drawn on the applicability of using simple surveying measurements at proposed sites to forecast the frequency of data relay to ground receiving sites via ERTS satellite.

C. Additional efforts will be made to give maximum exposure of the ERTS data relay concepts to potential users.

D. Installation and calibration of all sites will be completed. This work includes replacement of batteries at Wolf Creek Pass and recalibration of the temperature sensor, the calibration and connection of the Palisade Lake snow pillow, the installation and calibration of the Castle Creek site, and calibration of the Wolf Creek North stream flow sensor. An additional maintenance trip will be scheduled by WSSI technicians if required.

e. Results to date are:

1. The near real-time DCS platform data transfer to time-share computer is a working reality. Six stations are now being automatically monitored and displayed with a system delay of 3 to 8 hours from time of data transmission to time of data accessibility on the computer.

2. The DCS platform system has proven itself a valuable tool for near real-time monitoring of mountain precipitation. Data from Wolf Creek Pass were an important input in making the decision when to suspend seeding operations to avoid exceeding our suspension criteria in that area.

3. The DCS platforms, as deployed in this investigation, have proven themselves to be reliable weather resistant systems for winter mountain environments in the southern Colorado mountains.

f. Publications:

C.D. Whiteman, Satellite Data Collection Systems. Report to Bureau of Reclamation by Western Scientific Services, Inc. October 10, 1973.

Olin Foehner, Monitor Weather Conditions for Cloud Seeding Control, ERTS Investigation Number 642. Presentation of paper to Discipline Panel Review, ERTS Investigations, Goddard Space Flight Center, Greenbelt, Maryland. October 24, 1973.

g. Recommendations: None

h. Changes in standing order forms: None

i. ERTS image descriptor forms: N/A

j. No changes were made in data request forms during the reporting period.

k. Six DCS platforms are in place and operational. The remaining platform is in summer storage but will be installed in early December.