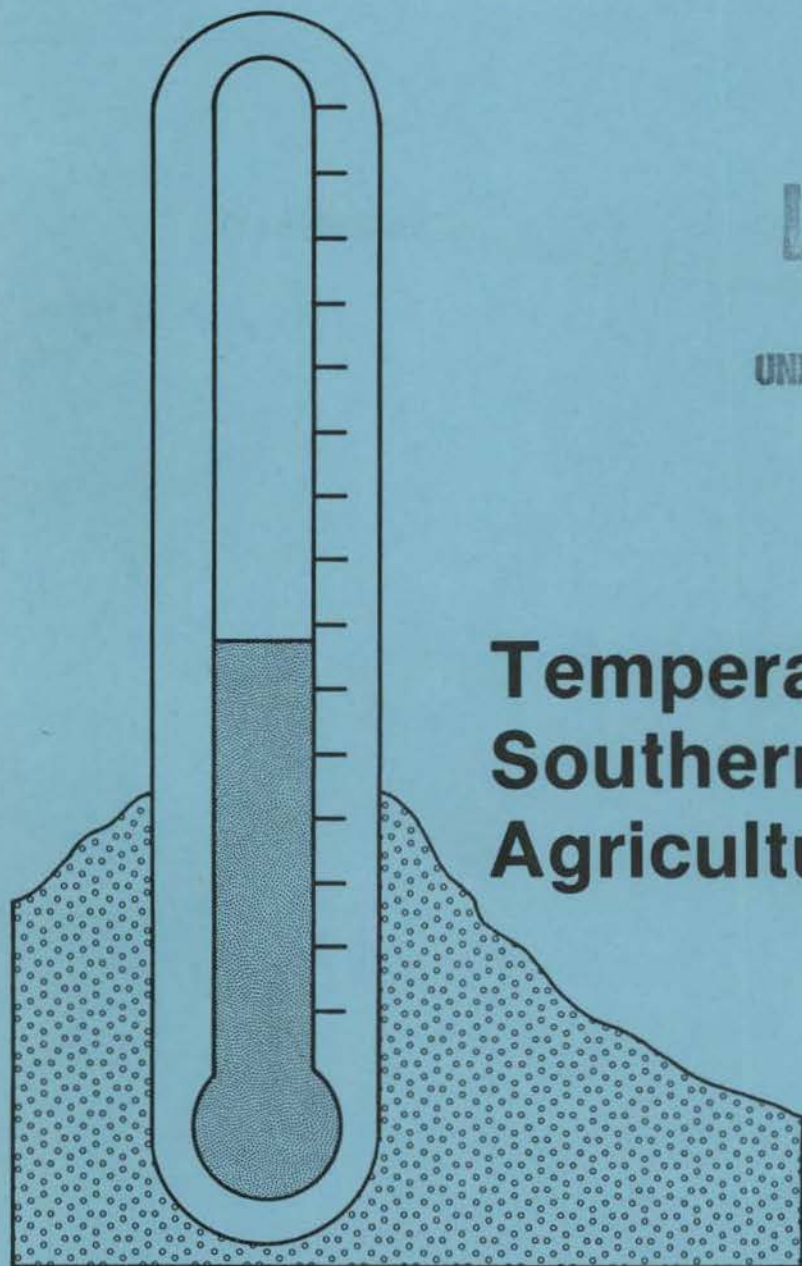


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Temperatures of Southern Idaho Agricultural Soils

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R. E. McDole, Maurice Faubion, D. O. Everson, Deborah Amos

Interpretive information on Idaho's atmospheric climate has been published by the National Weather Service (Rice 1971) and the University of Idaho (Everson et al. 1978). However, information on temperatures of Idaho soils has been published only for a small area in southeastern Idaho (McDole and Fosberg 1974b).

Many people can make use of soil temperatures. Farmers and others in agriculture are particularly interested in soil temperatures which play a major role in seed germination, plant growth, crop harvest, chemical soil reaction and other biological activities. Contractors use knowledge of soil temperatures in certain phases of their construction operations to prevent damage from soil freezing.

During the past decade the Soil Conservation Service, USDA, has developed an interest in soil temperature data for use as a basis for soil classification and mapping (U.S. Department of Agriculture 1975). Use of soil temperature data makes it possible to classify and group soils having similar management requirements. Considerable soil temperature data have been collected but unfortunately little has been summarized and published. Summaries of climatological data, which include minimum and maximum soil temperatures for several stations in Idaho, are published monthly (U.S. Department of Commerce 1978).

The National Weather Service uses radio, TV and other media to report and forecast soil temperatures at critical periods during the growing season. These critical periods are at planting time and at harvest time. These reports or forecasts can be useful for short-term or day-to-day planning of planting and harvest. However, for long-range planning, interpretive analyses of long-term records of soil temperatures are essential. This is the primary purpose of this publication.

Factors Influencing Soil Temperature

Contrary to appearances, soils are dynamic or ever-changing. Soil temperature changes with the seasons and with the time of day. The magnitude of these changes is influenced by the physical properties of the soil. Since soils are heterogeneous in composition, a change in location can result in a change in soil characteristics which may directly or indirectly affect its temperature.

The climate at the soil surface and the amount of solar radiation absorbed by soil greatly influence the soil temperature.

Soil particles are good conductors of heat, much better than water. Water is more than twice as effective as air in conducting heat. Under natural conditions, soil is comprised of about equal parts solid particles and voids or pore spaces. When these pores are filled with air, soil is an excellent insulating material. As the amount of water in the pore spaces increases, heat conductance increases. Irrigation or heavy rains may cause large temperature changes to depths of 20 inches or more. Compaction of soils results in fewer pore spaces and more rapid changes in temperature.

Seasonal soil temperature variations are obvious. During winter months, the frozen portion of the soil will be 32°F (0°C) or colder, depending on air temperature. At the other extreme, summer temperatures of the surface soil can reach 130° to 150°F (55° to 66°C) where the sun directly strikes the soil surface.

The diurnal or daily temperature fluctuations in the soil vary with time of day as the air temperature varies. Both the amount and magnitude of daily change and the daily maximum and minimum temperatures depend not only on depth within the soil

profile but also on other soil characteristics. Soil temperatures change more slowly than air temperatures because the heat capacity of soil is greater than that of air. Factors which affect change in soil temperatures are cloud cover, vegetative cover, soil color, temperature at lower depths in the soil profile, the angle at which the sun's rays strike the ground surface, soil moisture content (or soil air content) and the temperature of the air above the soil. At a depth of 4 inches (10 cm) in the soil profile, maximum and minimum soil temperatures lag 2 to 3 hours behind maximum and minimum air temperatures. The magnitude of this lag will vary with soil texture, soil moisture, soil color and vegetative cover.

Importance of Soil Temperature

The importance of atmospheric climate is readily recognized since it dictates the clothes we wear, our outside activities, plant growth and other factors that influence our lives. "Soil climate" is not as noticeable as atmospheric climate but nevertheless is important because of its effect on plant growth. Soil temperature is one of the important factors comprising soil climate. According to Smith et al. (1964), the soil does not really come to life until its temperature exceeds 42°F (5°C). The life or activity in the soil increases rapidly as the temperature rises above 46°F (7°C) and decreases after it reaches temperatures above 95°F (35°C). This activity includes biological, chemical and physical processes.

Soil temperatures influence many biological processes of economic importance to agriculture.

Table 1. Minimum or threshold temperatures for seed germination for commonly grown crops in southern Idaho.

Crop	Threshold temperature for seed germination	
	°F	°C
Clover, alfalfa	34-38	1-3
Small grains, onions	34-36	1-2
Peas, sugarbeets, carrots	38-41	3-5
Potatoes	45-48	7-9
Corn, tomatoes	48-50	9-10
Beans	50-55	10-13
Melons	55-60	13-16

Unpublished data from C. B. Nelson, former Advisory Agricultural Meteorologist, U.S. Weather Bureau, Kimberly, Idaho.

Crop performance is affected both directly and indirectly. Seed germination and plant growth are directly affected since they take place only after the soil reaches a certain "threshold" temperature level. Below this threshold, seeds and plants remain dormant. Even when the soil exceeds the threshold temperature for seed germination (Table 1), plant growth continues to be influenced by soil temperature (Table 2).

A plant's physiology is influenced by both soil and atmospheric factors. For example, tillering and length of internodes in grain and bruise damage in potato tubers are affected by soil and air temperature. Potato tubers are less susceptible to bruise injury when they are maintained at temperatures above 44°F (7°C). Thus in potato harvesting operations, knowing the temperature of the soil is critical.

Soil temperature indirectly affects crop performance since it has a definite regulatory effect on root growth and on the availability of nutrients by controlling biological and chemical processes in the soil. For example, conversion of ammonium fertilizer to the more available nitrate form depends on microbial activity. Microbes are ineffective below soil temperatures of approximately 50°F (10°C). Since we also know the ammonium form of nitrogen is less subject to leaching than the nitrate form of nitrogen, we should apply ammonium fertilizer when the soil temperature is below 50°F (10°C) to minimize leaching problems. Effectiveness of herbicides, fungicides and other pesticides also is related to temperature. Before these materials can function properly, a specific range in soil temperature is necessary for chemical reactions to take place or for crop plants and pests to be in the proper stage of growth. These are a few examples of the importance of soil temperatures.

Table 2. Soil temperature ranges for optimum growth and maximum yield of various crops.*

Low temperature	Medium temperature	High temperature
Barley	Oats	Brome grass
Ryegrass	Sugarbeets	Alfalfa
Peas	Wheat	Beans
Potatoes	Tomatoes	Corn

*Within each category, crops are arranged from top to bottom in approximate order of increasing temperature requirement (from Baker and Swan, 1966).

Methods and Procedures

Daily soil temperatures* have been collected from 12 sites across southern Idaho and Malheur County in eastern Oregon (Fig. 1). The length of record for most of these sites ranges from 8 to 13 years. The world standard for soil temperature measurement is 4-inch (10 cm) depth, but this report includes data on both shallower and deeper depths. At 6 of the 12 sites, soil temperatures were measured only at 4-inch (10 cm) depth. At 3 sites, soil temperatures were measured only at 3-inch (7.5 cm) depth and 3 others (Kuna, Twin Falls and Idaho Falls) had thermometer probes at more than one depth (Table 3). The King Hill site was a seasonal site, with soil temperatures recorded only during the growing season. The Hagerman and Rigby sites were limited in years of record, and primarily used as seasonal stations. For this reason King Hill, Hagerman and Rigby have not been included in the graphical presentation of data in this report (see appendix).

Soil temperatures were collected at each of the sites with the aid of thermometers which recorded maximum and minimum temperatures. These ther-

*Soil temperature data were made possible through the cooperation of the National Weather Service, U.S. Department of Commerce, the University of Idaho and several cooperators who assisted in establishing and maintaining soil temperature stations. These cooperators included University of Idaho Research and Extension Centers, federal agencies, agricultural commodity companies, radio and television stations and private individuals.

момeters consist of a metal probe approximately 14 inches (35 cm) in length and ½ inch (1 cm) in diameter, buried horizontally in the soil at the depth from which the temperature was to be obtained. This probe is connected by a flexible cable to the dial portion of the thermometer. The thermometers were read daily and were found to have an accuracy of $\pm 1^\circ\text{F}$ (0.5°C). Most observation sites were checked yearly for accuracy of thermometer readings and depth of placement.

Soil temperature information given in this publication can only be used as a general guide for broad areas of southern Idaho's agricultural land. If soil temperatures are needed for a specific area, on-site measurements are necessary. For example, in monitoring soil temperatures for potato harvest, soil temperatures must be taken in the field to be harvested. Several readings throughout the field should be taken and averaged. Soil thermometers are available at farm supply stores at a reasonable cost.

Soil temperature data reported here were generally taken under a bare soil surface. Shading of the soil surface by vegetation will influence soil temperatures. Thus, these soil temperatures may be different from soil temperatures under a crop. They will, however, approximate spring temperatures where plant cover has not developed or fall temperatures where vegetative cover has died or been removed in preparation for harvest.

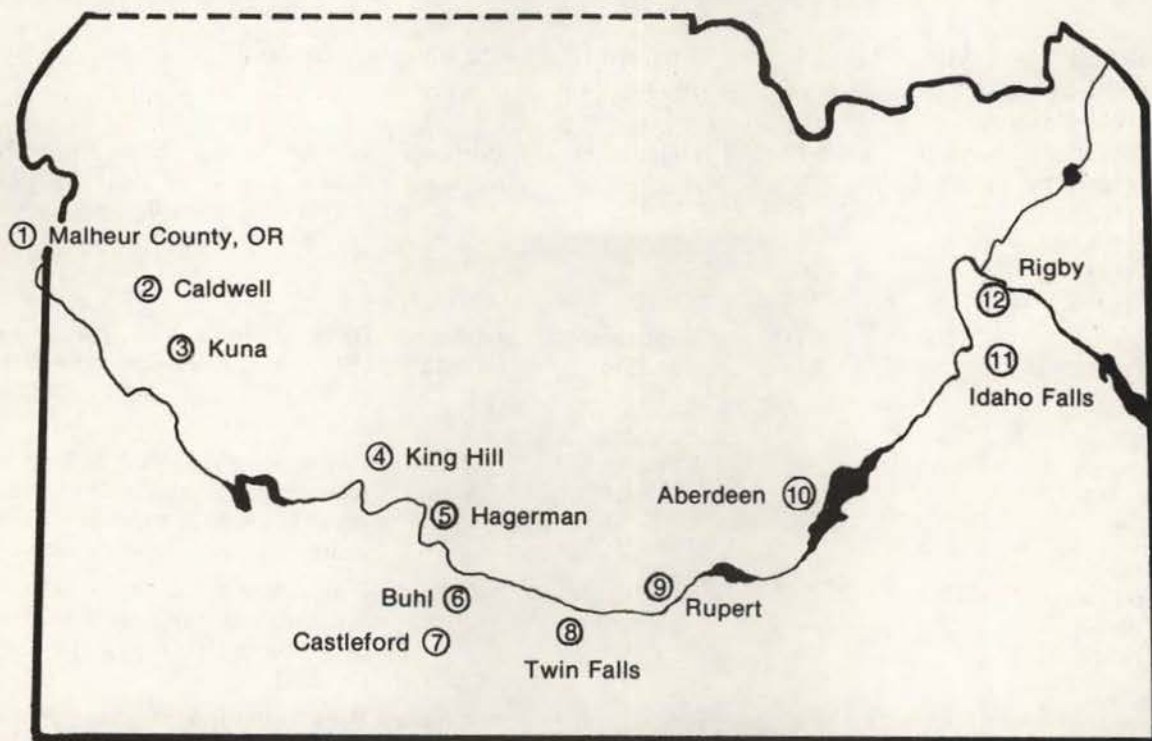


Fig. 1. Location of soil temperature sites in southern Idaho.

Results

Mean Annual Soil Temperature

The mean annual soil temperature (MAST) obtained for each year for each site is given in Table 4. In general, for nearly level sites with medium-textured soils, the MAST decreases as the elevation

increases (Fig. 2). MAST values for some of the sites appear to deviate from a straight line curve. Some of these deviations can be explained by characteristics of the temperature sites. For example, the Kuna site is probably cooler than expected because it has an irrigated, clipped grass cover. The Rupert site is

Table 3. Characteristics and location of temperature sites.

Site, years of data	Elevation (ft.)	Temperature depth (inches)	Site description	Soil	Location, site characteristics
1. Malheur, OR 9 (1967-75)	2230	4	Nonirrigated, bare	Malheur silt loam	Oregon State University Experiment Station, 7 miles southwest of Ontario; light brownish gray (10YR 6/2) when dry; dark grayish brown (10YR 4/2) when moist.
2. Caldwell 12 (1964-75)	2505	4	Nonirrigated, usually bare, some light vegetation	Purdam silt loam	University of Idaho R & E Center; north-facing slope; light brownish gray (10YR 6/2) when dry; dark grayish brown (10YR 4/2) when moist.
3. Kuna (1967-75)	2774	4 and 8	Irrigated, clipped grass	Elijah silt loam	Excellent data, representative of irrigated pasture.
4. King Hill 11 (1964-75)	2700	3	Irrigated, usually bare	Sandy	Summer season only; Green Giant Co. station; moved from year to year.
5. Hagerman 2 (1973-74)	3095	4	Nonirrigated, bare to weedy	Sandy loam	Light gray (10YR 6/1) when dry; dark gray (10YR 4/1) when moist.
6. Buhl 13 (1963-75)	3800	3	Irrigated, bare	Sandy	Green Giant Co.; nearly level; 24-inch square in grass; medium brown (10YR 5/3) when dry; dark brown (10YR 3/3) when moist.
7. Castleford 6 (1963-64 and 1966-69)	3825	3	Irrigated, usually bare	Sandy	Green Giant Co.; moved from year to year.
8. Twin Falls 3 (1970, 73, 74) 13 (1963-75) 11 (1963-73) 13 (1963-75) 11 (1964, 66-75)	3960	2 4 8 20 36	Irrigated, bare	Portneuf silt loam	Weather Service Office, Kimberly; 24-inch square in irrigated grass; light brown (10YR 6/3) when dry; medium brown (10YR 4/3) when moist.
9. Rupert 8 (1968-75)	4200	4	Nonirrigated, bare	Loamy sand	Radio station KAYT; grayish brown (10YR 5/2) when dry; very dark grayish brown (10YR 3/2) when moist; shaded by pole at times
10. Aberdeen 11 (1965-75)	4405	4	Nonirrigated, bare	Declo loam	University of Idaho R & E Center; 30 ft. from irrigated cropland; light brownish gray (10YR 6/2) when dry; dark grayish brown (10YR 4/2) when moist.
11. Idaho Falls 4 (1964-72) 2 (1964-66)	4788	4 20	Nonirrigated, weedy	Silt loam	6 miles northwest Idaho Falls (Osgood area), pale brown (10YR 6/3) when dry; dark brown (10YR 3/3) moist; question on reliability.
12. Rigby 2 (1967-68)	4835	4	Irrigated, bare	Silt loam	Brown (10YR 5/3) when dry; dark brown (10YR 3/3) when moist; bare area in garden; mostly seasonal data.

Table 4. Mean annual soil temperature for each year for each site.

Year	Malheur	Caldwell	Kuna*	Hagerman	Buhl	Castleford	Twin Falls*	Rupert	Aberdeen	Idaho Falls*	Rigby
1963	—	—	—	—	53.3	49.8	50.3	—	—	—	—
1964	—	52.4	—	—	51.0	47.5	48.2	—	—	—	—
1965	—	54.1	—	—	51.5	—	50.5	—	48.3	—	—
1966	—	54.6	—	—	50.8	51.2	50.6	—	50.4	—	—
1967	58.4	53.1	51.2	—	52.3	52.2	51.6	—	50.2	—	48.4
1968	56.9	50.5	51.9	—	49.8	49.9	50.5	54.3	49.3	—	49.4
1969	56.8	50.9	51.0	—	51.1	50.1	51.5	54.4	50.9	47.0	—
1970	56.0	51.4	51.8	—	51.4	—	50.9	52.0	49.1	46.9	—
1971	55.9	50.6	51.5	—	53.3	—	49.7	52.1	48.9	47.5	—
1972	56.9	51.0	51.2	—	51.7	—	50.5	55.4	50.3	48.6	—
1973	57.9	51.5	50.2	54.6	51.1	—	50.8	55.9	50.3	—	—
1974	58.0	52.2	51.0	54.4	52.1	—	51.8	56.5	51.1	—	—
1975	55.4	53.0	49.6	—	50.6	—	49.2	53.7	49.5	—	—
Average	56.9	52.1	51.0	54.5	51.5	50.1	50.5	54.3	49.8	47.5	48.9

*Data from 4 inch depth only.

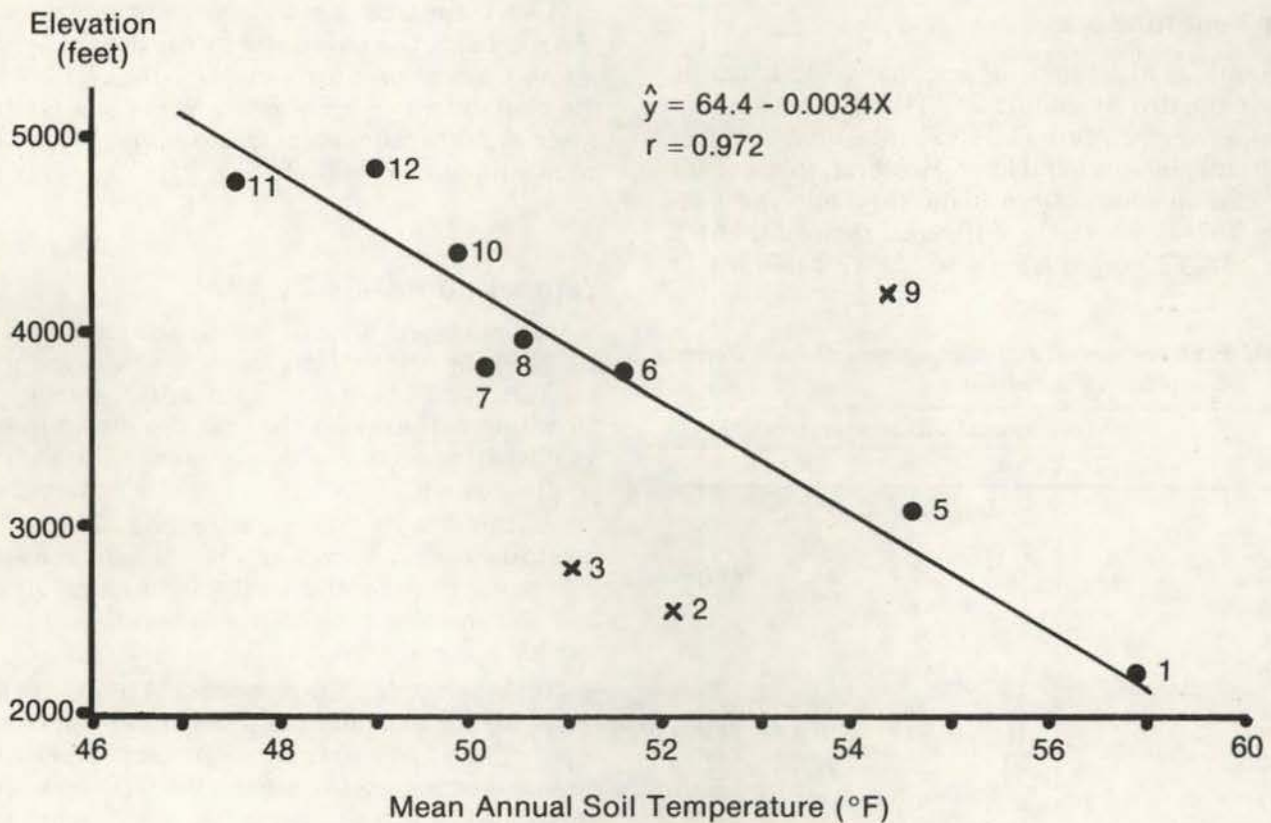


Fig. 2 Change in mean annual soil temperature (MAST) with change in elevation for nearly level sites having medium textured soils. Calculations do not include Caldwell (2), Kuna (3) and Rupert sites due to atypical site and soil characteristics (see narrative on site characteristics).

warmer than expected due to a loamy sand soil texture (McDole and Fosberg 1974b). The cooler than expected temperature at the Caldwell site has no apparent explanation.

MAST and Soil Profile Depth

According to Smith et al. (1964) and McDole and Fosberg (1974a), MAST is the same for all depths within the soil profile. The validity of this assumption could be checked by data from the Twin Falls site since temperatures were collected from several depths. MAST calculations for depths of 4, 8 and 20 inches (10, 20 and 50 cm) were nearly identical (Table 5), but at the 36-inch (90 cm) depth MAST was approximately 3°F (1.7°C) warmer than the shallower depths. Comparison of data for individual years showed MAST at 36 inches (90 cm) was 3 to 4°F (1.7 to 2.2°C) warmer than at 4, 8 and 20 inches (10, 20 and 50 cm) every year except 1964. These results question either the validity of assuming a constant MAST throughout the profile or the validity of the 36-inch (90 cm) temperature data from the Twin Falls site.

MAST vs. Mean Annual Air Temperature

Smith et al. (1964) suggest that MAST can be approximated by adding 2°F (1.1°C) to mean annual air temperature (MAAT) measured at 5 feet (150 cm) above ground level. However, this was not the case in southeastern Idaho (McDole and Fosberg 1974a) where the difference between MAST and MAAT ranged from 4 to 5°F (2.2 to 2.8°C).

Table 5. Mean annual soil temperature from different depths, Twin Falls site.

Year	Mean annual soil temperature (°F)				
	2	4	8	20	36
	Depth (inches)				
1963	—	50.3	49.2	50.0	—
1964	—	48.2	47.7	48.0	47.0
1965	—	50.5	49.7	50.1	—
1966	—	50.6	50.1	50.8	54.3
1967	—	51.6	51.2	51.9	55.5
1968	—	50.5	50.1	50.3	53.7
1969	—	51.5	50.9	50.8	53.9
1970	51.3	50.9	51.0	50.9	54.0
1971	—	49.7	50.2	49.7	52.6
1972	—	50.5	51.2	51.0	54.2
1973	51.4	50.8	51.3	50.9	54.4
1974	52.8	51.8	—	51.9	55.6
1975	—	49.2	—	50.6	54.3
Average	51.8	50.5	50.2	50.5	53.5

Toy et al. (1978) compared MAAT with MAST at 8 different locations across the United States. They derived the equation

$$Y = 4.646 + 0.986X$$

for predicting MAST (Y) for a given MAAT (X). They showed a standard error of the estimate for this equation as 5.15°F. Use of this equation for the Idaho sites gave estimated MAST surprisingly close — within 2°F (1.1°C) — to the measured MAST except for the Caldwell site. The predicted value for the Caldwell site was 4.4°F (2.3°C) warmer than the measured value.

Data from this study show that, except for the Caldwell site, MAST is warmer than MAAT (Table 6). The Rupert site has the greatest difference between MAST and MAAT, an average of 6.7°F (3.7°C) which again reflects the effects of the loamy sand soil texture. The Kuna site has a relatively small difference — 1.2°F (0.7°C) — which reflects the irrigated, clipped grass cover. Again the Caldwell site appears to be an anomaly, since MAST is cooler than MAAT. The difference between MAST and MAAT for sites having similar soil texture and vegetative cover range from 2.4°F (1.3°C) at the Buhl site to 5.6°F (3.1°C) at Aberdeen.

MAAT apparently is only a rough estimator of MAST. Using this parameter we can predict MAST within a range of ±3 to 4°F (1.7 to 2.2°C) when site characteristics are similar. When soil texture, cover and other site characteristics vary, MAAT is a poor estimator of MAST.

Temperature Data By Sites

Maximum and minimum daily soil temperatures are given in Appendix A for each of the soil temperature sites. Mean maximum daily soil temperatures for each week of the year are shown in odd numbered appendix tables 1 through 29 and are graphically represented in odd numbered appendix figs. 1 through 29. Mean minimum daily soil temperatures for each week of the year are shown in even numbered appendix tables 2 through 30 and are graphically represented in even numbered appendix figs. 2 through 30.

The graphic data in Appendix A show the extreme high maximum and minimum temperatures (upper lines) and extreme low maximum and minimum temperatures (lower lines) for each week of the year. The line in the center of the crosshatched area represents either the average maximum soil temperature or average minimum soil temperature obtained during the period of record. The crosshatched area represents the range of soil temperatures which occurred 50% of the time.

Table 6. Mean annual soil temperature (MAST) and mean annual air temperature (MAAT) for soil sites.

Year	Malheur		Caldwell		Kuna		Buhl		Twin Falls		Rupert		Aberdeen	
	MAST	MAAT	MAST	MAAT	MAST	MAAT	MAST	MAAT	MAST	MAAT	MAST	MAAT	MAST	MAAT
1963	—	—	—	—	—	—	53.3	49.4	—	—	—	—	—	—
1964	—	—	52.4	50.3	—	—	51.0	46.9	48.2	46.2	—	—	—	—
1965	—	—	54.1	51.7	—	—	51.5	49.2	50.5	47.8	—	—	48.3	44.3
1966	—	—	54.6	53.0	—	—	50.8	49.5	50.6	48.7	—	—	50.4	44.9
1967	58.4	52.5	53.1	53.8	51.2	50.8	52.3	50.4	51.6	48.8	—	—	50.2	45.3
1968	56.9	51.6	50.5	52.5	51.9	49.7	49.8	48.5	50.5	47.5	54.3	47.5	49.3	43.9
1969	56.8	51.5	50.9	52.2	51.0	49.5	51.1	49.8	51.5	48.5	54.4	47.8	50.9	44.4
1970	56.0	51.4	51.4	53.4	51.8	49.9	51.4	50.1	50.9	47.7	52.0	48.3	49.1	44.2
1971	55.9	51.2	50.6	52.6	51.5	49.4	53.3	49.1	49.7	47.2	52.1	47.2	48.9	43.9
1972	56.9	50.3	51.0	51.6	51.2	49.1	51.7	48.5	50.5	46.8	55.4	47.1	50.3	44.1
1973	57.9	52.5	51.5	54.1	50.2	50.8	51.1	49.9	50.8	47.8	55.9	48.2	50.3	43.4
1974	58.0	51.9	52.2	53.3	51.0	50.0	52.1	49.4	51.8	47.8	56.5	48.5	51.1	44.5
1975	55.4	49.8	53.0	52.1	49.6	48.7	50.6	47.6	49.2	46.4	53.7	46.3	49.5	43.4
Average	56.9	51.4	52.1	52.6	51.0	49.8	51.5	49.1	50.5	47.8	54.3	47.6	49.8	44.2

MAAT taken at 5 feet above ground level.

The average daily soil temperatures for each of the sites are also presented graphically for each week in Appendix B figs. 31 through 44. This average daily temperature is derived from the maximum and minimum daily temperatures (maximum plus minimum divided by 2). The upper and lower lines

represent the extreme high and extreme low average daily temperatures respectively. The line through the center of the crosshatched area represents the average daily soil temperature. The crosshatched area represents the range in mean soil temperatures which has occurred 50% of the time.

Conclusions

Average daily soil temperatures, average annual soil temperatures and minimum and maximum soil temperatures may be of value to many people for long range planning of activities and for predicting the feasibility of cropping and cultural practices. This information can readily be obtained from data included in this publication.

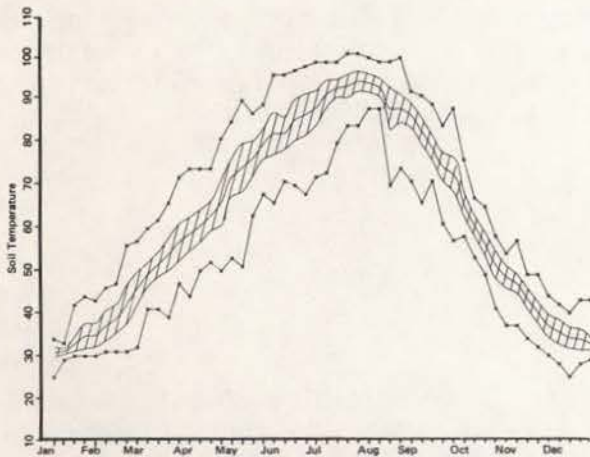
However, average temperatures or minimum and maximum temperatures will not replace on-site temperature measurements where an exact knowl-

edge of soil temperatures is needed at any specific time. For example, at a potato harvest specific field temperatures are needed and they cannot be replaced by the long-term averages shown here. Neither can an average value for a reporting station be used for all areas adjacent to the station, since differences in the soil, exposure, cover, moisture and other factors can result in different temperatures. For this reason when exact measurement of soil temperature is needed, on-site data must be obtained.

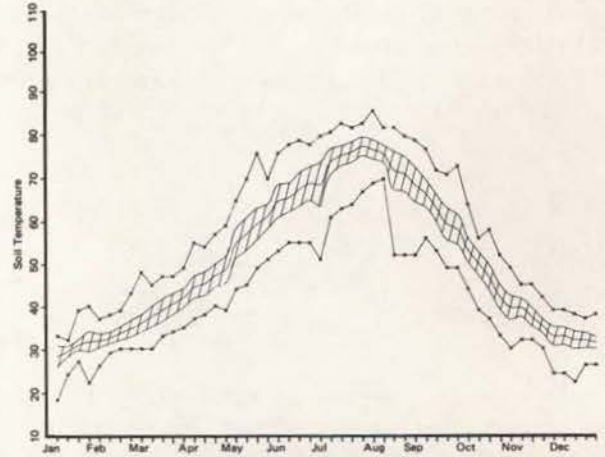
Appendix A

Appendix Table 1. Mean maximum daily soil temperature (°F) at 4 inches for Malheur, OR.

Year	Month												Ave.
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	
1967	37.5	40.4	49.0	55.6	70.4	80.8	91.1	90.7	80.8	63.7	46.2	31.5	62.9
1968	30.9	42.2	57.5	64.7	77.7	88.7	98.1	87.9	79.9	61.1	45.4	35.4	64.2
1969	31.0	31.4	51.1	65.9	81.3	88.1	95.5	96.8	84.3	58.0	43.1	35.5	63.7
1970	34.1	43.6	50.0	57.7	73.0	83.5	92.1	91.0	74.5	56.6	44.3	34.4	61.3
1971	32.7	40.1	45.6	61.5	75.1	80.2	89.9	92.0	75.1	58.6	42.1	34.3	60.6
1972	31.6	36.7	52.7	62.4	77.9	86.9	91.5	92.0	76.0	61.3	44.5	31.8	62.2
1973	30.9	38.0	51.9	64.3	79.1	84.7	92.6	90.2	80.6	60.5	42.3	38.0	63.2
1974	34.1	39.7	50.3	61.9	73.8	87.4	91.0	91.0	82.1	62.5	45.7	34.8	63.0
1975	33.0	34.7	48.3	54.5	70.0	79.6	91.8	85.9	79.3	59.0	42.9	36.6	60.4
Ave.	32.5	38.5	50.7	60.9	75.4	84.4	92.6	90.7	79.2	59.8	44.3	34.6	



Appen. Fig. 1. Mean maximum daily soil temperature (°F) for each week at 4 inches for Malheur, OR.



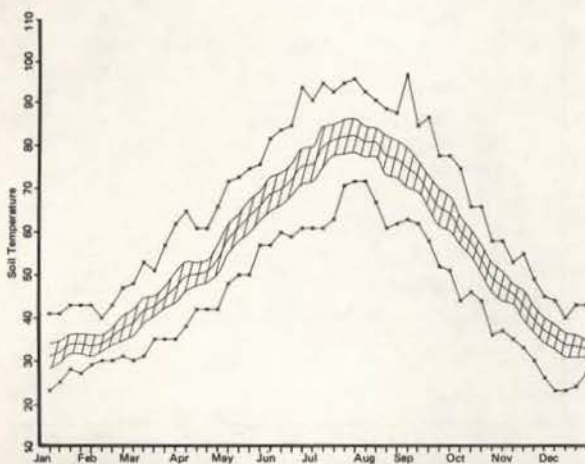
Appen. Fig. 2. Mean minimum daily soil temperature (°F) for each week at 4 inches for Malheur, OR.

Appendix Table 2. Mean minimum daily soil temperature (°F) at 4 inches for Malheur, OR.

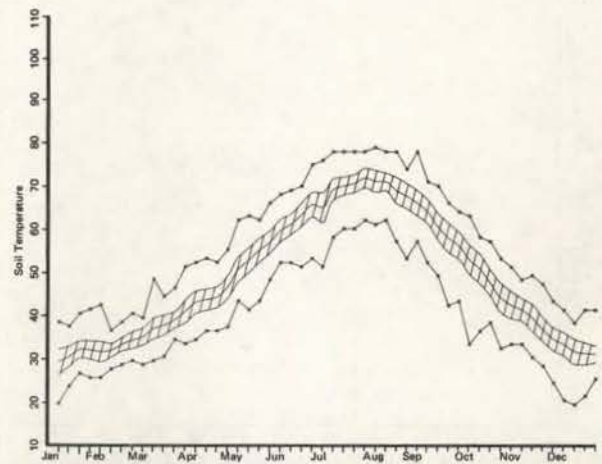
Year	Month												Ave.
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	
1967	34.3	36.1	41.6	46.4	58.0	67.4	80.7	80.6	71.1	54.6	38.7	29.9	54.4
1968	29.2	35.0	40.4	44.7	56.5	66.8	74.6	67.4	61.1	47.3	38.6	33.3	49.6
1969	30.6	31.1	36.2	47.0	60.1	67.6	72.9	72.9	63.2	47.2	37.1	32.5	50.0
1970	31.6	36.0	39.8	44.8	57.0	67.6	75.2	75.9	59.0	48.1	38.6	32.9	50.6
1971	30.1	34.7	37.6	48.3	60.4	63.6	75.1	78.3	63.0	49.8	37.0	34.1	51.1
1972	31.0	33.8	41.0	47.2	61.2	69.3	75.7	75.7	61.1	51.3	39.7	31.5	51.6
1973	29.8	33.4	40.2	48.4	61.3	69.3	77.0	75.6	66.3	50.8	40.0	36.0	52.6
1974	33.0	35.3	40.8	48.1	58.8	72.8	75.5	75.4	67.4	53.3	40.3	33.9	53.0
1975	33.0	33.6	38.9	43.6	56.6	65.6	78.3	71.8	66.4	50.8	38.0	34.7	51.5
Ave.	31.2	34.3	39.6	46.5	58.9	67.8	76.1	74.9	64.3	49.9	38.7	33.1	

Appendix Table 3. Mean maximum daily soil temperature (°F) at 4 inches for Caldwell.

Year	Month												Ave.
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	
1963				53.1	67.5	74.0	77.1	76.5	71.1	61.1	47.5	35.7	
1964	33.9	32.9	41.0	51.4	61.8	70.6	79.3	75.2	65.6	57.5	44.9	38.7	54.5
1965	36.7	39.9	43.8	54.5	62.8	73.9	79.9	78.2	65.9	59.1	50.2	34.9	56.7
1966	36.1	37.4	48.0	58.6	68.2	75.9	77.9	72.9	71.6	55.9	46.2	38.9	57.4
1967	37.3	38.9	42.9	47.6	58.6	69.3	86.0	83.2	69.2	55.2	41.6	29.2	55.0
1968	28.5	36.6	46.3	51.3	63.4	74.1	81.4	69.6	61.9	52.9	41.7	34.7	53.6
1969	32.7	32.5	38.8	49.4	60.0	70.0	83.5	84.2	74.0	51.1	39.3	32.8	54.2
1970	33.2	36.6	42.5	47.6	58.3	77.2	89.6	87.9	68.6	52.4	40.2	32.5	55.7
1971	30.5	34.6	38.1	49.0	60.3	65.9	75.5	81.0	67.3	53.1	39.7	33.1	52.5
1972	31.5	32.7	43.1	48.3	61.2	71.4	77.5	78.3	66.2	54.6	41.8	30.6	53.2
1973	30.6	34.4	42.3	49.1	62.0	70.8	77.9	77.8	67.5	54.0	41.6	36.1	53.8
1974	30.6	34.7	40.9	49.1	57.9	67.6	79.1	81.8	77.4	61.2	45.5	35.1	55.2
1975	31.1	33.5	42.5	46.5	64.8	77.0	90.6	83.8	80.0	60.1	44.7	35.2	57.7
Ave.	32.7	35.4	42.5	50.3	62.1	72.1	81.2	79.3	69.7	56.0	43.5	34.4	



Appen. Fig. 3. Mean maximum daily soil temperature (°F) for each week at 4 inches for Caldwell.



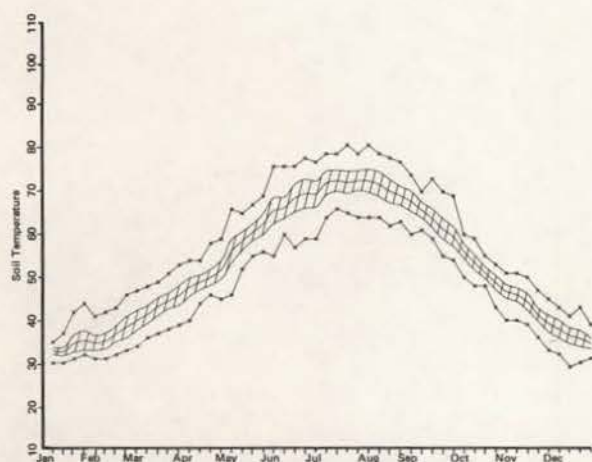
Appen. Fig. 4. Mean minimum daily soil temperature (°F) for each week at 4 inches for Caldwell.

Appendix Table 4. Mean minimum daily soil temperature (°F) at 4 inches for Caldwell.

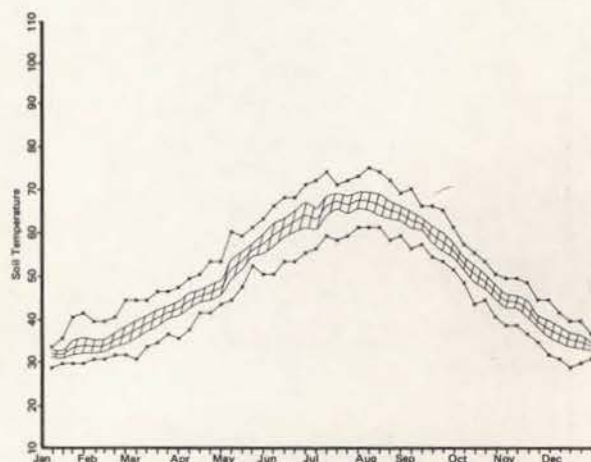
Year	Month												Ave.
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	
1963				46.6	58.4	64.5	68.5	69.8	66.0	57.1	45.3	35.1	
1964	32.9	32.9	37.6	45.5	55.1	64.1	70.8	68.6	60.2	53.6	43.3	37.5	50.3
1965	35.6	37.3	38.2	49.3	55.6	65.5	70.7	71.6	60.4	54.1	46.1	33.3	51.6
1966	34.5	35.0	41.2	50.3	59.7	65.9	68.7	68.6	64.7	51.5	43.9	37.5	51.9
1967	36.0	37.5	41.3	45.4	54.8	63.4	76.1	76.3	66.2	50.8	38.3	27.6	51.2
1968	27.5	33.3	39.6	42.9	52.6	63.0	67.9	63.7	57.5	48.5	39.8	33.4	47.5
1969	31.5	30.9	34.8	44.7	54.3	62.5	70.5	70.5	62.7	42.7	34.8	30.8	47.7
1970	31.0	33.0	36.2	39.8	50.2	63.2	72.5	72.2	54.5	43.9	36.5	30.9	47.1
1971	28.7	32.1	34.2	42.2	55.3	61.4	71.0	75.3	63.0	49.5	38.2	32.1	48.7
1972	30.5	31.1	39.1	43.3	54.5	64.8	70.9	71.5	60.5	50.6	39.9	29.2	48.9
1973	29.6	32.9	39.0	44.3	54.3	63.3	70.9	71.0	61.0	49.1	39.8	34.8	49.3
1974	29.3	32.9	37.7	44.0	51.5	64.5	69.3	70.7	64.8	51.5	40.2	33.1	49.2
1975	29.9	31.8	37.7	40.7	51.9	61.1	72.8	67.2	63.9	50.0	37.9	33.9	48.4
Ave.	31.4	33.4	38.1	44.4	54.5	63.6	70.8	70.5	61.9	50.2	40.3	33.0	

Appendix Table 5. Mean maximum daily soil temperature (°F) at 4 inches for Kuna.

Year	Month												Ave.
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	
1966						71.8	76.4	73.8	67.8	54.0	46.3	38.3	
1967	36.3	39.1	44.1	49.7	57.3	65.6	70.5	70.0	65.1	53.5	45.3	33.1	52.5
1968	31.8	38.6	47.2	50.6	61.9	71.0	75.3	70.7	65.0	53.4	44.4	36.9	53.9
1969	34.6	34.5	41.1	52.5	61.5	66.2	66.6	73.6	67.1	53.0	43.3	36.2	52.5
1970	36.1	39.9	43.9	48.2	57.6	70.6	76.2	72.8	63.1	51.7	44.1	36.8	53.5
1971	33.3	37.2	39.9	49.3	60.2	68.0	74.7	75.8	63.1	53.2	42.4	36.2	52.8
1972	34.2	33.6	43.9	48.3	57.1	70.2	73.3	70.8	62.1	54.2	44.4	35.7	52.4
1973	33.7	35.4	41.7	48.0	57.1	61.7	68.9	68.2	61.2	52.4	45.1	39.3	51.2
1974	32.8	36.1	40.8	48.2	62.2	69.6	69.6	67.5	62.0	53.0	44.7	37.6	52.1
1975	33.0	34.3	41.6	46.2	57.9	62.9	69.5	64.6	60.6	52.5	42.9	38.0	50.6
Ave.	34.0	36.5	42.7	49.0	59.2	67.8	72.1	70.8	63.7	53.1	44.3	36.8	



Appen. Fig. 5. Mean maximum daily soil temperature (°F) for each week at 4 inches for Kuna.



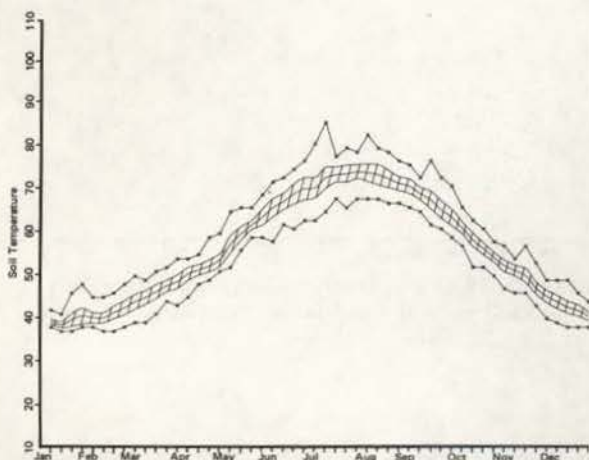
Appen. Fig. 6. Mean minimum daily soil temperature (°F) for each week at 4 inches for Kuna.

Appendix Table 6. Mean minimum daily soil temperature (°F) at 4 inches for Kuna.

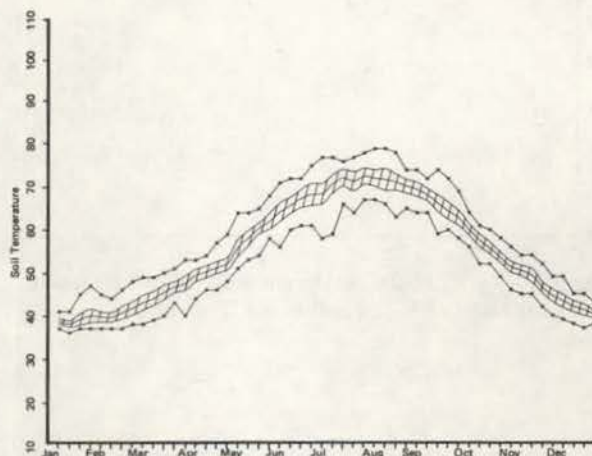
Year	Month												Ave.
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	
1966						61.5	68.2	67.7	63.1	50.7	44.5	37.5	
1967	34.8	37.6	41.1	45.8	53.4	61.9	66.3	66.2	62.4	51.6	43.0	32.5	49.8
1968	31.5	36.7	43.1	45.5	55.3	63.8	68.5	65.3	60.1	50.2	42.5	35.7	49.9
1969	33.8	33.7	37.9	48.0	57.1	63.3	63.7	67.9	63.0	49.1	41.2	35.0	49.5
1970	35.1	37.7	40.9	45.0	54.2	64.7	69.7	67.0	59.3	49.2	42.6	36.1	50.2
1971	32.8	36.1	38.4	46.3	56.6	63.3	68.9	70.6	59.9	51.4	41.6	35.8	50.2
1972	33.5	32.8	42.3	45.9	54.2	65.1	68.0	67.0	59.9	52.7	43.0	34.9	50.0
1973	33.2	34.9	40.7	46.1	53.9	58.7	65.8	65.7	59.3	50.8	43.6	38.3	49.3
1974	32.0	35.3	39.5	45.9	57.1	65.1	66.7	65.1	59.4	51.3	43.7	36.8	49.9
1975	32.6	33.8	39.8	44.0	53.8	60.5	67.5	63.1	58.8	51.4	41.8	37.1	48.9
Ave.	33.3	35.4	40.4	45.8	55.1	62.8	67.3	66.7	60.5	50.8	42.8	36.0	

Appendix Table 7. Mean maximum daily soil temperature (°F) at 8 inches for Kuna.

Year	Month												Ave.
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	
1966						69.9	76.1	75.6	71.4	59.0	51.6	44.4	
1967	41.2	43.1	46.6	51.5	58.9	67.3	72.9	72.7	68.9	59.2	51.2	40.4	56.2
1968	38.1	42.1	49.3	51.9	61.3	70.2	75.2	72.7	67.5	57.7	50.0	43.0	56.6
1969	40.2	39.5	43.7	54.0	62.0	68.0	68.4	74.5	70.5	57.3	48.6	42.0	55.8
1970	41.5	43.6	47.0	50.8	59.6	70.7	76.3	73.3	66.7	56.8	49.2	43.1	56.6
1971	38.5	41.9	43.5	51.6	61.9	69.1	74.7	76.9	66.6	58.3	47.9	42.3	56.2
1972	39.8	38.9	47.5	51.4	59.2	71.0	74.3	72.9	66.6	59.3	50.3	41.6	56.1
1973	39.4	40.5	46.0	51.4	59.3	61.9	71.7	72.0	65.8	57.8	50.4	45.1	55.4
1974	38.6	40.8	44.9	51.1	63.1	70.3	72.4	71.0	66.3	58.2	50.9	43.5	56.0
1975	39.1	40.0	45.2	49.3	59.6	65.7	72.0	68.6	65.0	58.3	49.2	43.6	54.8
Ave.	39.6	41.2	46.0	51.4	60.5	68.6	73.4	73.0	67.5	58.2	49.9	42.9	



Appen. Fig. 7. Mean maximum daily soil temperature (°F) for each week at 8 inches for Kuna.



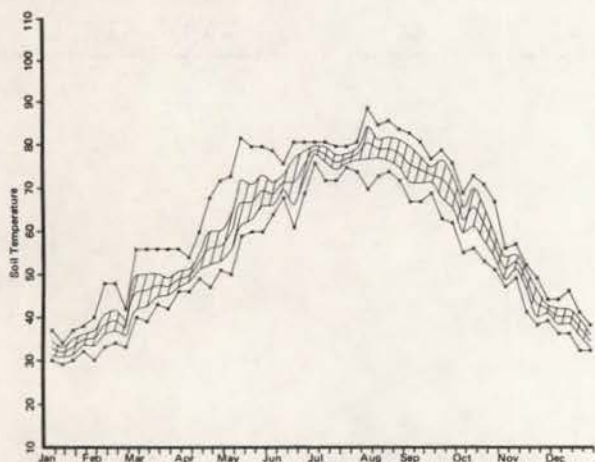
Appen. Fig. 8. Mean minimum daily soil temperature (°F) for each week at 8 inches for Kuna.

Appendix Table 8. Mean minimum daily soil temperature (°F) at 8 inches for Kuna.

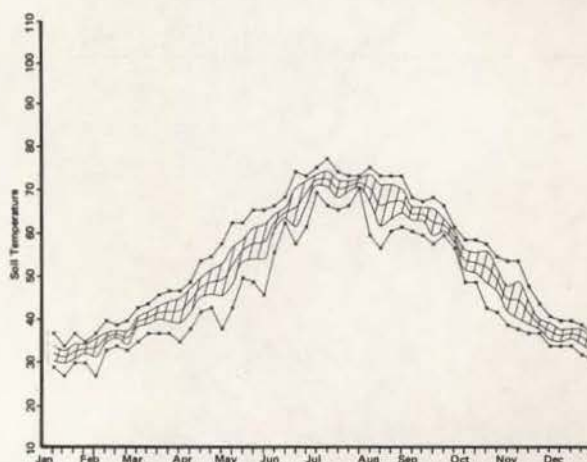
Year	Month												Ave.
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	
1966						67.5	74.0	73.9	70.0	58.1	50.5	44.0	
1967	40.6	42.4	45.9	50.8	57.6	65.3	69.9	70.0	67.7	58.3	50.2	40.0	55.0
1968	37.9	41.5	48.5	50.7	59.3	67.9	72.7	71.1	66.2	56.9	49.2	42.4	55.4
1969	39.8	39.3	43.0	52.6	60.5	66.9	67.0	72.0	69.1	55.9	47.9	41.2	54.6
1970	40.7	42.8	45.8	49.3	57.9	68.1	73.5	71.7	65.4	55.9	48.6	42.4	55.2
1971	38.0	41.3	42.7	50.4	60.5	66.9	72.6	74.9	65.5	57.4	47.4	42.0	55.0
1972	39.2	38.2	46.6	50.0	57.5	68.8	72.0	71.1	65.6	58.3	49.5	41.1	54.9
1973	38.9	39.9	45.2	50.4	57.5	62.2	70.4	70.5	64.8	57.1	49.8	44.4	54.4
1974	38.1	40.0	44.1	50.0	61.4	68.7	70.8	69.7	65.0	57.2	50.0	42.7	54.9
1975	39.0	39.6	44.0	48.2	57.4	64.4	70.8	67.6	63.9	57.5	48.2	42.7	53.8
Ave.	39.1	40.5	45.1	50.2	58.8	66.7	71.4	71.3	66.3	57.3	49.1	42.3	

Appendix Table 9. Mean maximum daily soil temperature ($^{\circ}$ F) at 4 inches for Hagerman.

Year	Month												Ave.
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	
1973	35.6	37.7	44.1	50.9	62.1	69.5	78.4	77.0	68.7	59.2	46.8	39.2	55.9
1974	32.2	37.6	45.2	52.9	64.3	75.9	76.6	81.7	77.6	65.6	50.5	38.2	58.1
1975	32.3	37.5	51.6	56.2	70.2								49.7
Ave.	33.4	37.6	47.0	53.2	65.6	72.7	77.6	79.3	73.1	62.4	48.6	38.7	



Appen. Fig. 9. Mean maximum daily soil temperature ($^{\circ}$ F) for each week at 4 inches for Hagerman.



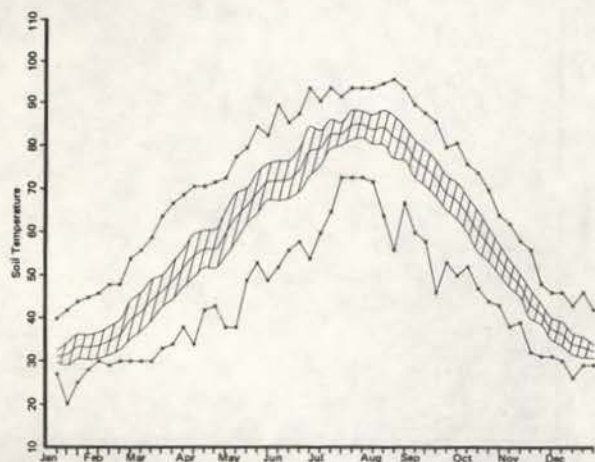
Appen. Fig. 10. Mean minimum daily soil temperature ($^{\circ}$ F) for each week at 4 inches for Hagerman.

Appendix Table 10. Mean minimum daily soil temperature ($^{\circ}$ F) at 4 inches for Hagerman.

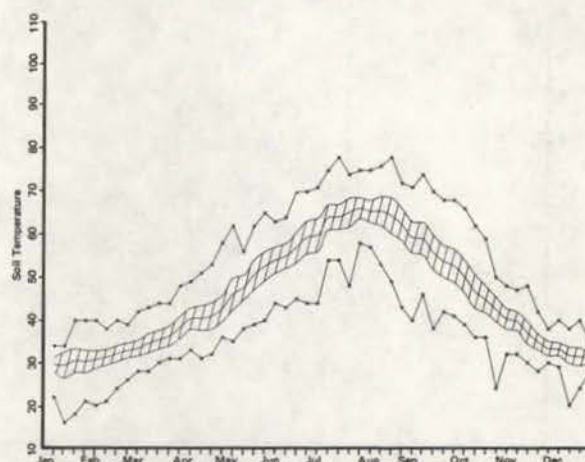
Year	Month												Ave.
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	
1973	35.1	36.9	42.5	48.9	58.8	64.7	73.3	73.1	65.2	55.9	45.1	38.0	53.2
1974	31.4	36.3	42.2	49.6	59.5	69.7	70.9	63.6	61.2	50.4	39.5	34.5	50.7
1975	31.4	33.9	38.9	41.8	50.1								39.3
Ave.	32.6	35.7	41.2	47.1	56.2	67.2	72.2	68.5	63.2	53.2	42.4	36.3	

Appendix Table 11. Mean maximum daily soil temperature (°F) at 3 inches for Buhl.

Year	Month												Ave.
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	
1962						72.2	85.7	83.9	77.1	59.4	45.8	36.5	
1963	29.3	41.2	46.9	51.2	67.1	72.3	86.0	87.9	78.8	66.2	44.9	31.0	58.7
1964	29.3	30.8	38.4	53.9	65.1	68.5	84.9	87.6	74.5	63.8	42.6	35.0	56.3
1965	32.5	37.8	45.2	58.8	64.2	75.6	83.9	80.4	68.7	64.8	50.8	34.9	58.2
1966	33.3	34.4	47.6	63.1	71.4	75.0	80.3	75.6	69.7	57.3	45.3	33.8	57.3
1967	33.6	40.0	46.3	54.6	70.1	75.8	86.4	88.5	78.4	59.8	47.1	32.0	59.5
1968	30.1	38.0	52.5	58.4	69.2	75.3	82.0	74.5	69.5	56.7	43.4	33.1	56.9
1969	32.7	32.3	42.5	57.3	71.6	74.7	83.2	82.6	70.9	54.6	44.4	35.7	57.0
1970	35.6	41.2	46.7	55.5	67.8	78.0	84.2	80.7	66.2	55.1	43.8	34.5	57.5
1971	34.2	38.6	48.6	56.0	68.2	79.2	85.8	87.3	74.4	59.2	43.4	34.0	59.7
1972	34.3	36.0	51.7	56.4	68.6	79.5	84.4	84.4	69.5	57.5	41.6	33.7	58.2
1973	31.0	34.9	47.1	57.7	70.2	76.4	81.3	81.4	68.1	59.2	44.1	37.3	57.5
1974	33.0	34.8	43.1	56.5	67.7	78.8	83.2	81.9	75.1	60.5	46.7	35.3	58.1
1975	32.1	32.4	44.0	46.2	60.8	71.6	83.9	83.6	75.3	57.4	43.3	36.9	56.1
Ave.	32.4	36.4	46.1	55.8	67.8	75.2	83.9	82.9	72.6	59.4	44.8	34.6	



Appen. Fig. 11. Mean maximum daily soil temperature (°F) for each week at 3 inches for Buhl.



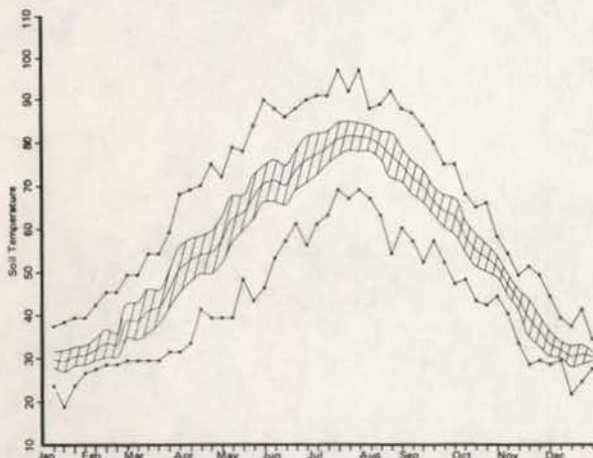
Appen. Fig. 12. Mean minimum daily soil temperature (°F) for each week at 3 inches for Buhl.

Appendix Table 12. Mean minimum daily soil temperature (°F) at 3 inches for Buhl.

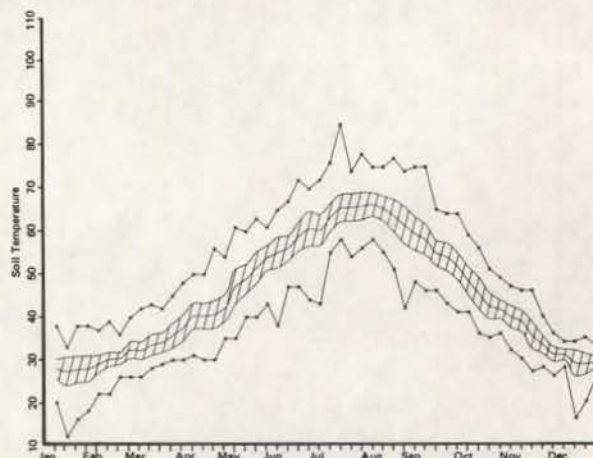
Year	Month												Ave.
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	
1962						60.6	70.2	70.4	65.5	48.2	38.7	33.5	
1963	25.7	34.8	36.7	39.3	52.9	57.8	68.3	69.3	63.8	56.0	38.4	30.2	47.9
1964	25.2	27.4	31.9	40.7	48.2	55.2	66.6	70.2	60.2	52.6	36.5	32.4	45.7
1965	31.7	32.7	35.0	45.3	49.4	54.1	60.1	61.2	51.1	46.2	40.0	30.0	44.8
1966	30.3	30.9	35.0	43.0	49.0	52.6	60.5	59.9	55.9	44.7	38.1	31.4	44.4
1967	31.7	33.5	36.6	38.1	49.8	55.4	64.6	63.4	56.8	43.6	36.6	30.4	45.1
1968	28.4	31.9	35.5	38.9	45.5	54.1	59.8	57.0	52.0	42.4	35.4	30.8	42.7
1969	30.5	30.0	32.3	43.1	51.2	57.7	62.9	62.6	55.6	44.3	37.2	33.4	45.1
1970	32.8	34.2	37.0	38.2	49.2	58.7	65.3	63.9	50.9	43.1	37.9	32.7	45.3
1971	31.4	33.4	38.0	42.5	50.9	57.4	64.2	68.3	55.1	44.7	37.3	33.2	46.9
1972	33.1	32.5	38.8	41.9	47.7	58.6	61.7	63.4	52.0	44.8	35.9	31.7	45.2
1973	28.2	29.8	32.9	39.5	49.5	57.0	64.3	62.7	54.1	46.4	39.0	33.9	44.8
1974	31.4	32.0	35.9	41.2	49.1	59.6	65.5	62.8	57.1	46.8	38.3	33.0	46.1
1975	31.2	31.3	35.0	36.9	45.4	54.2	66.6	62.5	57.3	47.7	37.0	33.9	45.2
Ave.	30.1	31.9	35.3	40.6	49.1	56.7	64.3	64.1	56.2	46.5	37.6	32.2	

Appendix Table 13. Mean maximum daily soil temperature (°F) at 3 inches for Castleford.

Year	Month												Ave.
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	
1962						74.3	77.6	74.5	66.9	56.1	44.1	34.8	
1963	27.4	38.8	44.8	51.5	64.6	67.7	80.6	79.2	70.5	59.4	41.9	31.2	54.9
1964	29.7	30.9	33.4	51.3	65.3	71.6	81.7	79.3	65.8	55.6	37.3	31.7	52.9
1965	30.5	34.3	42.7	59.0								31.6	
1966	32.4	33.8	47.4	63.0	72.7	75.9	86.4	81.7	68.9	57.9	43.5	33.3	58.2
1967	32.2	39.2	48.5	52.8	67.2	76.1	86.2	86.2	73.1	57.8	44.6	29.2	57.9
1968	29.1	35.7	47.3	52.6	68.3	75.6	81.3	72.0	70.2	58.1	39.9	31.2	55.3
1969	31.9	30.7	41.0	60.8	66.2	69.6	78.1	82.0	70.0	49.8	39.8	32.2	54.5
1970	32.1	38.0	42.4	53.1	67.6	78.4	84.7	82.3	64.5				61.2
1971				50.3	62.0	69.5	77.9	78.5	72.3				
1972				54.1	64.3	74.6	76.2	76.2	61.0				
1973				60.1	70.8	78.7	84.5	80.1	64.1	55.7			
1974				56.0	68.0	77.8	78.6	76.9	68.9	55.6			
1975				48.5	62.9	72.7	83.9	76.8	69.2	58.6			
Ave.	30.6	35.1	43.5	54.5	66.7	74.0	81.4	78.9	68.0	56.5	41.6	31.9	



Appen. Fig. 13. Mean maximum daily soil temperature (°F) for each week at 3 inches for Castleford.



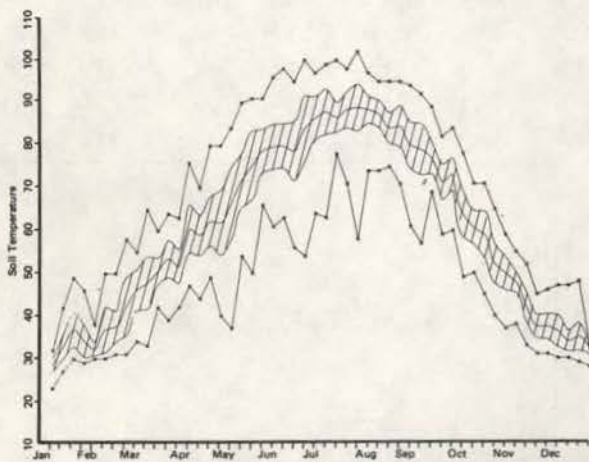
Appen. Fig. 14. Mean minimum daily soil temperature (°F) for each week at 3 inches for Castleford.

Appendix Table 14. Mean minimum daily soil temperature (°F) at 3 inches for Castleford.

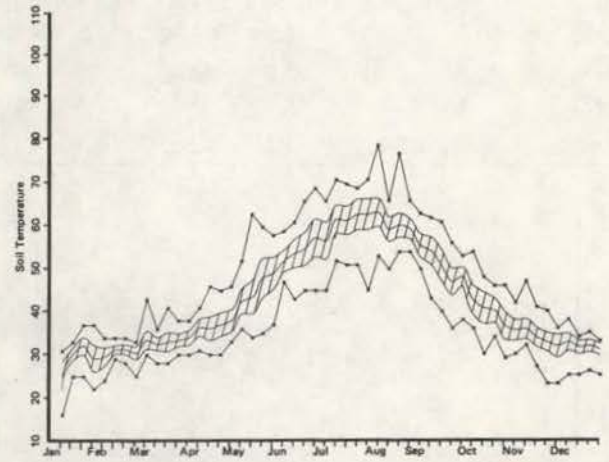
Year	Month												Ave.
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	
1962						57.0	60.5	59.7	53.1	46.1	38.3	31.5	
1963	22.5	31.6	36.4	40.5	52.4	55.5	60.5	61.7	57.1	49.8	37.9	30.1	44.7
1964	26.9	27.7	29.9	37.2	48.7	55.3	63.5	60.0	50.1	43.3	32.7	29.2	42.2
1965	29.4	30.1	32.4	42.0								28.9	
1966	29.0	30.9	36.0	42.8	50.8	53.7	61.2	61.3	54.2	42.2	37.0	31.1	44.3
1967	29.9	31.6	35.8	38.5	49.1	57.4	69.1	72.0	61.9	46.2	37.9	26.8	46.4
1968	26.0	31.6	37.3	40.5	48.1	57.0	64.9	59.5	56.4	45.4	35.2	29.8	44.2
1969	30.1	28.5	32.0	43.0	53.9	58.8	65.7	68.3	58.1	41.5	35.8	30.6	45.6
1970	29.6	33.1	34.9	39.0	50.9	60.5	66.2	65.8	53.3				48.7
1971				40.9	50.7	59.2	65.3	68.8	59.3				
1972				38.6	45.4	56.6	59.0	60.9	51.4				
1973				42.5	52.1	58.4	66.3	61.9	53.2	46.6			
1974				42.0	50.9	63.7	65.9	63.2	56.4	48.1			
1975				37.4	47.7	59.2	70.8	65.8	58.9	51.7			
Ave.	27.9	30.6	34.3	40.2	50.0	57.9	64.5	63.7	55.5	45.5	36.4	29.7	

Appendix Table 15. Mean maximum daily soil temperature (°F) at 2 inches for Twin Falls.

Year	Month												Ave.
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	
1969						81.7	88.3	88.9	82.4	60.6	45.2	34.6	68.8
1970	36.1	45.0	54.2	59.7	74.3	84.2	89.7	86.7	72.6	57.8	44.0	33.3	61.5
1971													
1972											42.9	34.8	38.8
1973	31.3	34.1	50.0	60.0	77.4	81.1	86.6	84.1	69.4	58.8	42.2	35.5	59.4
1974	31.7	33.6	44.8	59.5	72.9	81.3	85.5	86.5	75.5	63.0	45.5	36.1	61.3
1975				48.2	67.6	76.1	89.4	83.3	80.2	60.7	42.4	37.1	66.7
Ave.	33.0	37.6	49.7	59.1	73.0	80.9	87.9	85.9	76.0	60.2	43.7	35.1	



Appen. Fig. 15. Mean maximum daily soil temperature (°F) for each week at 2 inches for Twin Falls.



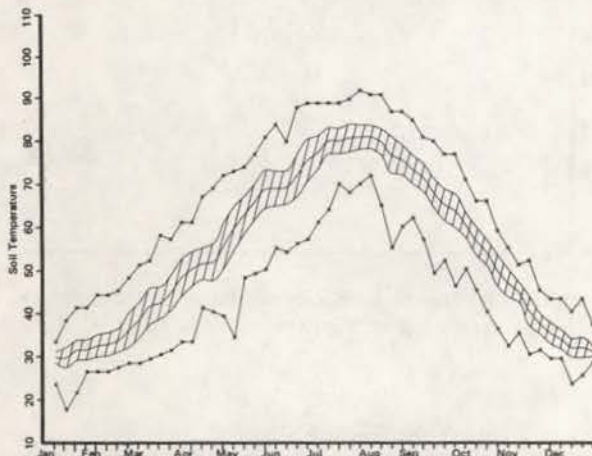
Appen. Fig. 16. Mean minimum daily soil temperature (°F) for each week at 2 inches for Twin Falls.

Appendix Table 16. Mean minimum daily soil temperature (°F) at 2 inches for Twin Falls.

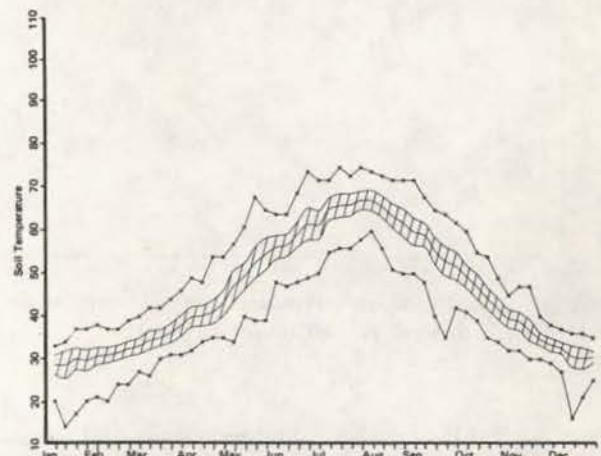
Year	Month												Ave.
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	
1969						53.9	60.6	59.4	51.6	36.7	31.0	30.0	46.2
1970	29.0	30.8	31.6	33.6	45.3	54.8	58.9	59.5	45.6	37.9	34.2	30.6	41.1
1971													
1972											34.4	32.5	33.4
1973	28.0	29.5	33.4	38.2	48.0	54.7	61.5	60.5	52.1	43.0	36.6	33.0	43.3
1974	30.7	31.6	35.0	37.6	46.1	56.6	61.8	61.9	51.7	43.1	34.0	31.6	44.3
1975				36.4	42.5	53.7	65.6	60.7	54.0	43.3	35.5	33.7	48.3
Ave.	29.3	30.7	33.3	36.5	45.5	54.7	61.7	60.4	51.0	40.8	34.3	31.9	

Appendix Table 17. Mean maximum daily soil temperature (°F) at 4 inches (Taylor) for Twin Falls.

Year	Month												Ave.
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	
1962						72.8	78.4	77.1	71.2	58.7	44.8	35.0	62.6
1963	27.9	39.1	44.3	49.1	64.9	68.1	78.4	77.2	65.0	59.2	42.0	30.4	54.4
1964	27.5	29.6	34.9	52.1	64.8	68.7	82.3	81.3	68.0	57.5	39.5	34.0	53.5
1965	31.9	35.8	43.5	55.7	65.2	74.0	80.9	78.9	66.0	59.8	46.0	31.2	55.8
1966	30.9	31.1	42.4	56.3	67.3	73.7	80.9	77.8	71.6	56.2	44.5	34.1	55.7
1967	33.0	38.8	46.9	49.1	63.9	72.3	83.3	81.2	74.8	58.3	45.3	30.8	56.6
1968	30.7	36.6	48.5	53.7	53.9	71.8	84.7	71.9	68.5	57.0	42.0	33.1	50.5
1969	33.8	32.4	69.9	57.2	70.3	73.2	80.2	80.9	72.8	54.9	42.7	34.2	56.2
1970	34.3	39.7	45.9	49.2	63.9	74.3	80.3	80.2	65.8	53.6	42.7	34.6	55.5
1971	32.5	36.5	41.3	51.4	63.9	74.3	65.6	80.1	65.2	53.7	39.1	31.9	54.5
1972	31.5	33.5	47.4	53.8	64.8	75.8	79.6	81.5	66.3	55.3	41.1	34.1	55.5
1973	30.9	32.3	43.0	51.9	66.3	73.8	79.6	77.4	65.0	55.5	42.5	35.7	54.6
1974	31.5	33.1	42.0	54.4	67.6	77.5	82.0	82.9	72.3	59.9	44.4	33.3	56.9
1975	30.6	31.5	41.5	44.3	59.8	70.4	84.6	79.5	73.8	56.4	39.9	35.0	54.1
Ave.	31.3	34.6	43.2	52.2	65.1	72.9	81.8	79.2	69.4	56.9	42.6	33.4	



Appen. Fig. 17. Mean maximum daily soil temperature (°F) for each week at 4 inches for Twin Falls.



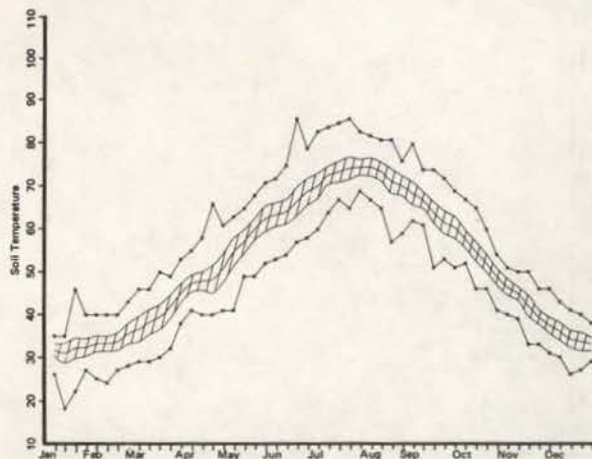
Appen. Fig. 18. Mean minimum daily soil temperature (°F) for each week at 4 inches for Twin Falls.

Appendix Table 18. Mean minimum daily soil temperature (°F) at 4 inches (Taylor) for Twin Falls.

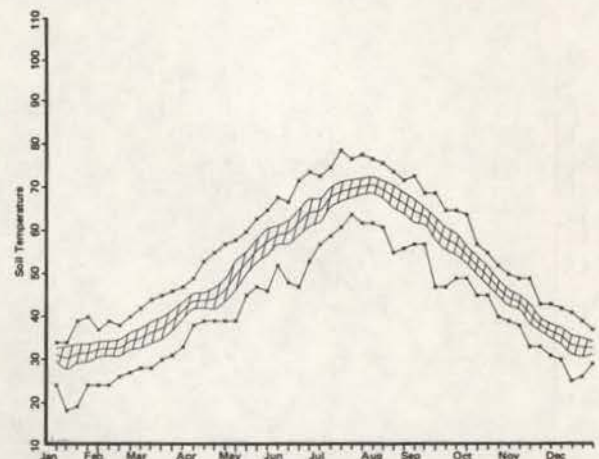
Year	Month												Ave.
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	
1962						58.8	63.5	61.0	54.8	45.4	37.1	31.8	50.3
1963	24.8	33.7	36.0	39.3	52.9	57.8	65.2	65.5	64.7	51.5	37.6	29.0	46.3
1964	23.3	25.9	30.3	39.3	50.2	55.1	65.0	63.6	52.0	44.5	34.7	31.1	43.0
1965	30.9	31.5	33.7	42.6	48.5	58.5	63.9	63.9	51.8	47.2	39.5	29.2	45.2
1966	29.0	29.6	34.0	42.5	50.9	58.2	64.1	62.5	59.1	44.3	38.4	32.0	45.6
1967	31.6	33.4	37.0	39.7	50.1	57.7	68.2	67.2	60.7	46.9	38.3	28.3	46.7
1968	27.7	32.9	37.1	40.6	53.5	60.5	68.5	60.0	55.7	45.3	37.2	32.5	50.1
1969	32.5	31.3	33.6	44.3	54.8	58.8	65.6	66.3	59.2	44.6	36.5	32.3	46.7
1970	31.2	33.5	36.0	38.4	50.9	60.7	65.3	67.3	54.4	44.7	38.2	33.0	46.2
1971	30.1	33.0	34.1	39.4	50.1	58.4	65.4	66.2	52.5	44.0	35.0	30.6	45.0
1972	30.3	30.9	36.3	39.6	50.4	60.9	63.8	65.2	53.0	45.8	36.8	32.5	45.5
1973	29.5	30.8	35.2	41.9	53.4	59.8	66.8	66.2	57.0	48.5	39.0	33.8	46.9
1974	30.5	32.0	36.3	41.7	51.6	60.7	66.1	65.7	57.2	48.2	37.3	31.5	46.7
1975	29.9	30.3	34.2	35.8	44.6	56.3	68.1	62.6	56.4	45.5	34.9	32.1	44.3
Ave.	29.3	31.5	34.9	40.4	50.7	58.7	65.7	64.5	56.1	46.2	37.2	31.4	

Appendix Table 19. Mean maximum daily soil temperature (°F) at 8 inches for Twin Falls.

Year	Month												Ave.
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	
1962						62.5	68.5	68.0	61.9	53.7	44.2	35.2	56.3
1963	28.2	35.0	39.5	44.3	57.4	62.4	70.0	70.7	65.5	56.6	41.5	30.6	50.3
1964	26.9	28.4	31.8	46.6	58.3	63.2	74.5	73.9	62.2	53.4	39.3	34.4	49.5
1965	32.4	34.5	38.7	49.7	57.8	67.5	73.0	72.4	60.9	54.4	44.6	32.1	51.6
1966	31.0	30.9	38.0	50.0	59.9	66.5	73.2	71.4	66.3	52.7	44.0	35.7	51.7
1967	33.4	36.5	42.4	45.3	57.0	65.7	75.7	75.4	68.8	55.5	44.6	32.6	52.9
1968	30.9	35.0	43.7	48.2	57.9	66.0	75.6	66.7	63.6	53.3	42.0	34.2	51.5
1969	34.3	32.5	37.0	51.6	62.4	67.5	72.4	73.0	66.7	52.0	42.1	35.2	52.3
1970	34.9	37.8	42.4	46.4	57.5	67.8	73.5	74.1	62.6	51.7	42.6	36.6	52.4
1971	32.3	36.1	38.0	47.7	58.6	67.5	73.1	73.1	62.0	52.4	40.7	34.8	51.4
1972	33.5	34.3	43.1	48.3	58.5	69.7	73.2	73.8	63.8	53.8	42.2	35.6	52.5
1973	32.9	33.3	40.2	47.5	59.3	68.0	73.8	72.1	62.4	54.0	44.2	37.2	52.2
1974	32.5	34.1	40.2	49.5	60.8	69.3	75.1	74.8	66.1	56.8	44.2	39.6	54.6
1975				44.4	53.7	63.4	76.9	73.4	68.3	55.7	43.4	38.9	58.9
Ave.	31.9	34.0	39.6	47.9	58.4	66.2	73.5	72.4	64.4	54.0	42.8	35.0	



Appen. Fig. 19. Mean maximum daily soil temperature (°F) for each week at 8 inches for Twin Falls.



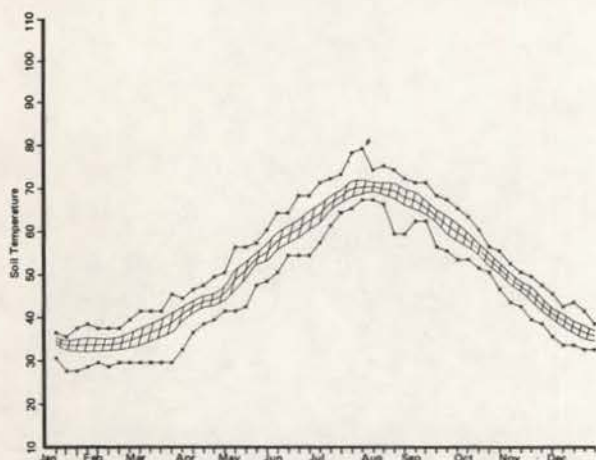
Appen. Fig. 20. Mean minimum daily soil temperature (°F) for each week at 8 inches for Twin Falls.

Appendix Table 20. Mean minimum daily soil temperature (°F) at 8 inches for Twin Falls.

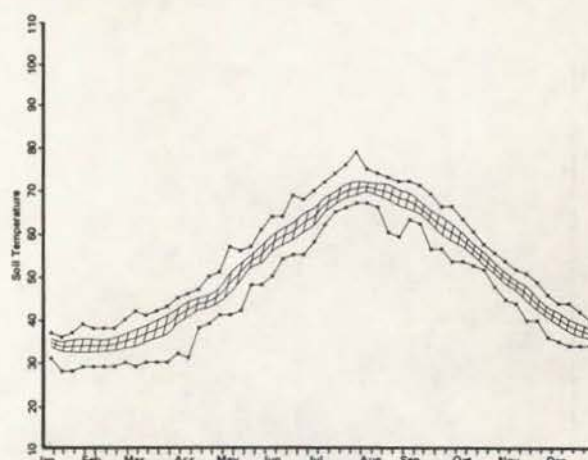
Year	Month												Ave.
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	
1962						60.4	66.3	66.2	60.5	52.2	42.8	34.4	54.7
1963	27.3	34.0	37.9	41.4	53.8	59.1	66.6	67.9	63.0	54.5	40.3	30.4	48.1
1964	25.5	27.5	30.4	41.3	52.5	57.7	68.3	68.5	57.3	49.7	38.0	33.0	45.9
1965	32.1	33.1	35.9	45.1	51.6	61.1	66.8	67.1	56.0	50.6	42.8	31.5	47.9
1966	30.7	30.5	35.6	45.1	54.0	61.3	67.2	66.5	62.4	49.5	42.1	35.1	48.4
1967	32.9	35.1	39.3	41.9	52.4	60.6	70.1	70.9	64.6	51.9	42.6	31.4	49.6
1968	30.4	33.9	40.2	43.9	53.5	62.6	70.5	63.1	59.7	50.2	40.5	34.0	48.6
1969	33.8	32.3	35.3	47.0	57.5	63.0	67.8	69.2	63.0	49.2	40.8	34.6	49.5
1970	33.7	36.9	39.8	42.4	53.3	63.0	69.1	70.4	59.0	49.4	41.2	35.7	49.5
1971	31.4	34.8	36.4	44.1	53.8	62.4	69.3	70.6	59.6	49.9	39.6	34.0	48.9
1972	32.7	33.1	40.7	44.9	55.1	64.9	69.4	70.2	60.4	51.3	40.4	34.9	49.9
1973	32.6	32.9	38.7	45.4	55.5	63.4	70.6	70.1	61.1	52.7	43.2	36.7	50.3
1974	32.3	33.6	38.6	45.8	55.7	65.1	71.7	71.1	62.9	53.4	43.1	38.6	51.9
1975				42.4	49.1	60.0	72.9	70.3	64.8	53.5	42.8	38.5	56.2
Ave.	31.3	33.1	37.4	44.0	53.7	61.8	69.0	68.7	61.0	51.3	41.4	34.3	

Appendix Table 21. Mean maximum daily soil temperature (°F) at 20 inches for Twin Falls.

Year	Month												Ave.	
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.		
1962													39.3	39.3
1963	32.8	34.5	39.1	43.2	52.5	60.2	66.5	68.7	65.0	58.6	45.6	34.5	50.2	
1964	30.3	29.8	30.6	41.8	52.2	57.7	68.8	71.3	61.6	54.0	43.7	37.3	48.3	
1965	34.4	35.4	37.7	45.4	52.6	61.9	67.5	68.9	60.7	54.7	47.6	36.8	50.4	
1966	33.9	32.4	36.1	45.8	54.7	61.6	68.9	69.2	65.6	55.5	47.6	39.9	51.0	
1967	36.0	37.4	40.9	43.8	51.5	60.8	70.0	72.1	67.9	58.1	48.5	37.8	52.2	
1968	34.4	35.5	41.5	45.2	53.1	60.9	68.6	65.4	62.1	54.2	45.9	38.0	50.5	
1969	35.9	34.2	36.2	46.5	55.5	63.2	66.3	69.4	65.0	54.5	45.9	38.3	51.0	
1970	36.0	37.4	40.5	43.6	50.9	61.7	69.0	71.2	63.7	54.4	45.6	39.4	51.2	
1971	34.3	36.3	36.6	44.0	52.7	61.1	66.9	69.7	61.9	53.7	43.8	37.5	49.9	
1972	34.2	33.4	39.7	44.4	53.1	63.7	70.4	70.4	65.3	55.3	45.8	38.5	51.2	
1973	34.8	33.9	38.1	44.0	52.6	62.5	68.9	70.0	63.6	55.6	47.6	40.0	51.0	
1974	34.9	35.0	38.4	49.5	60.8	63.5	71.7	71.5	66.1	56.7	47.5	40.0	52.1	
1975	35.6	34.6	37.7	39.9	47.0	56.2	70.8	72.5	67.5	58.3	47.7	41.5	50.9	
Ave.	34.4	34.6	37.9	44.0	52.5	61.2	68.8	70.0	64.3	55.7	46.4	38.5		



Appen. Fig. 21. Mean maximum daily soil temperature (°F) for each week at 20 inches for Twin Falls.



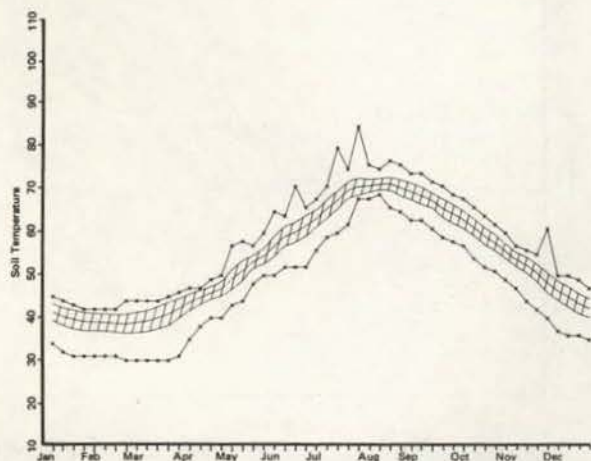
Appen. Fig. 22. Mean minimum daily soil temperature (°F) for each week at 20 inches for Twin Falls.

Appendix Table 22. Mean minimum daily soil temperature (°F) at 20 inches for Twin Falls.

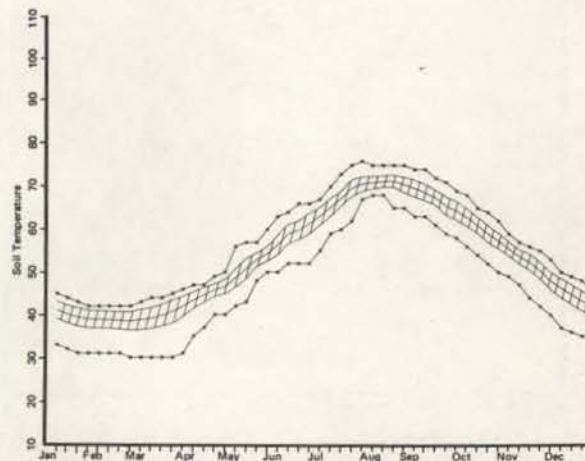
Year	Month												Ave.	
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.		
1962													39.0	39.0
1963	32.7	34.0	38.6	42.6	51.8	59.3	65.8	68.5	64.7	58.1	45.2	34.3	49.7	
1964	29.9	29.6	30.4	40.8	51.4	56.9	67.8	70.5	61.2	53.5	43.2	36.6	47.7	
1965	34.2	34.8	37.0	44.9	51.8	60.9	67.0	68.6	60.1	54.5	47.2	36.5	49.9	
1966	33.7	32.3	35.7	45.2	53.9	60.9	68.1	68.6	65.0	47.1	47.1	39.6	50.5	
1967	35.9	37.0	40.5	43.2	50.6	60.1	69.4	71.7	67.4	57.4	47.9	37.3	51.6	
1968	34.3	35.3	41.2	44.6	52.4	60.4	68.3	64.9	61.6	53.8	45.4	37.8	50.1	
1969	35.7	34.1	35.9	45.9	54.9	62.7	65.6	69.0	64.5	53.8	45.4	38.0	50.5	
1970	35.5	37.3	40.1	42.7	50.3	60.6	68.1	70.8	62.9	53.8	45.1	38.9	50.6	
1971	33.9	35.9	36.1	43.6	51.9	60.3	66.5	69.5	61.5	53.0	43.2	37.0	49.4	
1972	34.7	33.0	39.1	43.9	52.5	62.8	69.9	70.0	64.5	54.7	45.4	38.1	51.9	
1973	34.4	33.7	37.9	43.7	52.3	61.8	68.6	69.5	63.3	55.4	47.2	39.7	50.7	
1974	34.8	34.9	38.1	45.8	55.7	62.9	71.2	71.1	62.9	56.4	47.1	39.5	51.7	
1975	35.4	34.3	37.2	39.1	46.2	55.8	69.8	72.0	66.9	57.8	47.2	41.1	50.3	
Ave.	34.2	34.3	37.5	43.4	51.8	60.4	68.2	69.6	63.8	55.2	45.9	38.1		

Appendix Table 23. Mean maximum daily soil temperature (°F) at 36 inches for Twin Falls.

Year	Month												Ave.		
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.			
1963													37.4	37.3	
1964	32.6	30.9	30.2	38.2	47.1	52.6	63.2	68.5	61.7	54.5	46.2	39.1	47.1		
1965	35.7	35.4	36.0	47.6	52.5	61.4	67.5	70.0	64.6	59.0	53.4	44.6	53.5		
1966	39.7	37.7	38.8	46.3	54.9	61.5	69.2	71.2	68.5	62.0	54.5	47.6	54.4		
1967	42.3	42.0	43.5	46.2	51.5	60.8	69.4	73.1	71.3	64.3	55.4	46.5	55.6		
1968	41.1	40.3	44.0	47.1	53.9	60.3	67.3	68.0	65.1	59.5	52.5	46.0	53.8		
1969	41.6	39.5	39.6	46.9	54.8	63.5	65.8	69.8	67.4	60.4	52.7	45.1	54.0		
1970	41.4	41.0	42.4	44.7	49.8	60.0	68.3	72.4	68.6	60.6	52.5	46.5	54.1		
1971	41.9	40.0	40.3	44.8	51.8	59.1	65.6	69.8	66.0	59.0	50.5	44.1	52.7		
1972													53.3	45.8	48.7
1973	42.0	40.0	40.6	45.0	52.3	62.5	68.8	70.8	68.3	61.6	54.4	47.3	54.5		
1974	42.1	40.0	40.9	45.3	54.2	62.9	72.6	73.9	69.7	63.1	55.5	47.8	55.8		
1975	42.5	40.3	41.0	42.8	47.6	55.4	68.7	74.5	70.7	64.4	55.2	48.7	54.4		
Ave.	40.2	38.8	40.0	44.9	51.9	60.0	67.9	71.1	67.5	60.8	53.0	45.1			



Appen. Fig. 23. Mean maximum daily soil temperature (°F) for each week at 36 inches for Twin Falls.



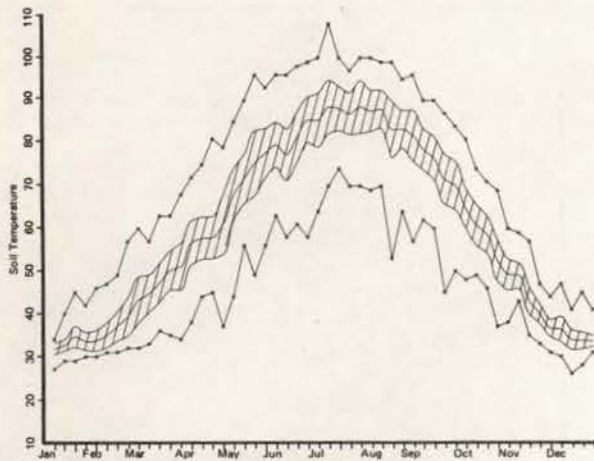
Appen. Fig. 24. Mean minimum daily soil temperature (°F) for each week at 36 inches for Twin Falls.

Appendix Table 24. Mean minimum daily soil temperature (°F) at 36 inches for Twin Falls.

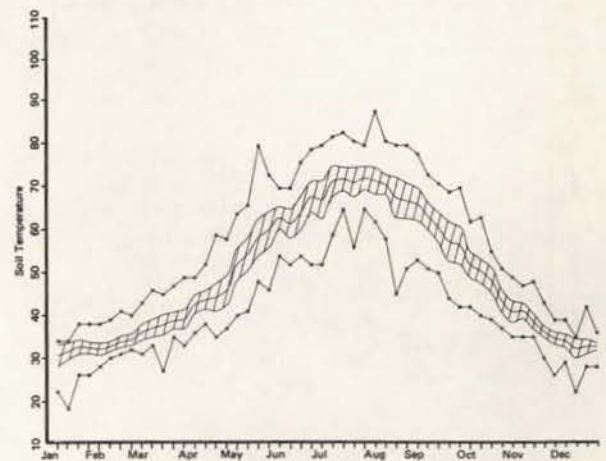
Year	Month												Ave.		
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.			
1963													37.2	37.2	
1964	32.5	30.9	30.1	37.8	46.7	52.3	62.5	68.2	61.4	54.2	45.9	38.8	46.8		
1965	35.6	35.3	35.8	47.3	52.3	60.9	67.1	69.8	64.4	58.8	53.2	44.4	53.3		
1966	39.7	37.7	38.6	46.0	54.4	61.2	68.9	71.0	68.3	61.6	54.2	47.4	54.2		
1967	42.3	42.0	43.3	46.2	51.0	60.5	69.1	72.8	71.1	63.9	55.2	46.1	55.4		
1968	41.0	40.3	43.9	47.0	53.5	60.0	67.1	67.8	65.0	59.2	52.2	45.9	53.6		
1969	41.4	39.5	39.5	46.6	54.3	63.3	65.5	69.7	67.2	60.0	52.4	44.9	53.8		
1970	41.2	41.0	42.4	44.6	49.5	59.6	68.0	72.2	68.2	60.3	52.3	46.2	53.9		
1971	40.8	40.0	40.2	44.6	51.5	58.8	65.4	69.6	65.7	58.5	50.1	43.9	52.5		
1972													53.0	45.6	48.4
1973	41.8	39.9	40.6	44.8	52.1	62.0	68.7	70.7	67.8	61.3	54.0	46.9	54.3		
1974	41.8	39.9	40.8	45.2	53.8	62.1	71.5	73.6	69.5	62.6	55.0	47.6	55.4		
1975	42.3	40.1	40.9	42.6	47.5	55.2	68.2	74.4	70.5	64.1	54.9	48.4	54.2		
Ave.	40.1	38.7	40.0	44.7	51.5	59.6	67.4	70.9	67.2	60.4	52.7	44.9			

Appendix Table 25. Mean maximum daily soil temperature (°F) at 4 inches for Rupert.

Year	Month												Ave.
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	
1967		42.9	49.8	54.3	73.1	80.4	95.4	95.2	82.6	63.5	49.0	31.3	
1968	30.7	37.7	53.7	60.9	74.7	85.7	94.4	79.0	77.5	63.6	45.2	33.8	61.6
1969	33.5	32.1	42.1	66.7	83.9	82.4	81.5	83.5	71.3	54.1	43.4	35.5	59.3
1970	34.7	40.7	44.6	50.6	68.4	76.7	74.9	79.1	63.8	53.7	42.8	35.2	55.7
1971	32.9	37.2	42.2	54.9	67.5	72.3	78.4	85.1	71.8	57.2	41.6	33.7	56.3
1972	32.5	35.8	51.1	58.2	74.1	85.4	91.1	89.9	77.3	34.0	32.5	46.9	61.9
1973				60.9	80.4	86.9	94.5	92.4	77.9	65.1	44.0	35.9	
1974	35.1	38.2	47.7	59.9	69.6	83.0	89.4	86.5	80.4	62.8	45.9	34.8	61.2
1975	32.5	33.2	42.3	47.6	61.8	78.9	90.8	80.1	79.3	61.1	46.5	38.3	57.9
Ave.	33.2	36.6	46.7	57.1	72.7	81.4	87.8	85.6	75.8	60.7	44.8	35.0	



Appen. Fig. 25. Mean maximum daily soil temperature (°F) for each week at 4 inches for Rupert.



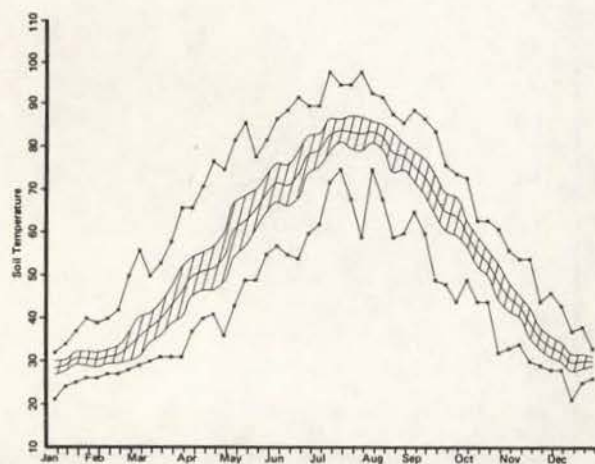
Appen. Fig. 26. Mean minimum daily soil temperature (°F) for each week at 4 inches for Rupert.

Appendix Table 26. Mean minimum daily soil temperature (°F) at 4 inches for Rupert.

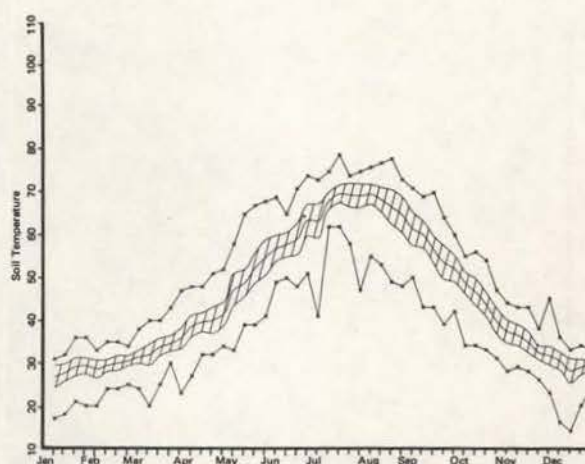
Year	Month												Ave.
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	
1967		35.6	40.7	43.1	57.6	64.8	77.4	77.9	67.7	50.0	39.3	29.3	
1968	27.5	33.3	38.7	42.1	54.8	63.5	69.6	61.2	56.6	45.9	37.6	32.8	47.1
1969	32.5	31.7	35.1	46.2	59.5	62.5	68.4	70.7	63.3	48.2	39.5	34.5	49.4
1970	32.8	35.8	38.3	41.6	50.8	62.1	69.2	68.2	57.1	47.7	39.1	34.1	48.4
1971	30.8	33.9	35.5	42.9	55.0	63.1	69.0	70.7	56.8	47.6	37.6	33.3	48.0
1972	32.4	33.3	40.1	44.4	56.9	64.7	69.0	67.6	55.6	33.0	31.4	36.1	48.8
1973				44.6	58.5	65.4	68.9	68.6	58.9	49.4	38.5	33.6	
1974	33.8	33.8	37.2	45.2	58.8	69.6	73.8	72.0	67.1	53.7	40.8	34.1	51.8
1975	32.1	32.7	37.0	40.3	50.2	65.1	77.1	67.2	64.5	51.5	39.0	34.6	49.5
Ave.	31.9	33.4	37.6	43.4	55.9	64.6	71.3	69.3	60.9	49.2	38.8	33.4	

Appendix Table 27. Mean maximum daily soil temperature (°F) at 4 inches for Aberdeen.

Year	Month												Ave.
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	
1964							84.0	79.8	68.3	57.1	37.7	31.3	
1965	29.7	30.5	36.0	49.3	58.3	71.0	78.2	76.4	61.9	57.0	43.5	29.4	51.8
1966	29.2	28.9	36.5	52.9	65.5	73.1	82.8	79.6	70.6	55.0	42.0	31.8	54.2
1967	29.4	32.7	41.3	46.6	61.8	69.0	83.6	83.0	72.2	56.8	44.9	27.8	54.3
1968	27.7	35.4	49.8	56.7	67.6	79.3	89.3	77.1	73.9	59.3	40.5	30.7	57.3
1969	30.7	29.7	38.6	62.5	76.3	72.0	81.8	83.4	72.2	52.4	39.8	31.3	56.0
1970	31.8	36.0	40.4	44.1	59.5	72.8	79.6	79.6	64.2	51.1	39.2	32.6	52.5
1971	29.7	33.8	35.5	49.5	63.0	72.7	81.8	82.9	65.5	50.3	36.7	29.7	52.7
1972	29.0	30.6	43.9	52.7	65.8	76.0	81.5	81.5	67.8	55.1	39.7	31.0	54.6
1973	30.4	29.9	38.6	50.4	66.3	75.2	82.6	81.6	67.1	55.3	39.0	32.0	54.3
1974	30.1	31.1	40.0	49.9	64.5	78.0	83.2	79.2	72.0	56.5	41.2	31.8	54.9
1975	29.1	29.8	36.9	44.2	59.6	77.2	91.5	85.5	78.0	57.9	37.9	33.6	55.6
Ave.	29.7	31.7	39.8	50.8	64.4	74.3	83.3	80.8	69.5	55.3	40.2	31.0	



Appen. Fig. 27. Mean maximum daily soil temperature (°F) for each week at 4 inches for Aberdeen.



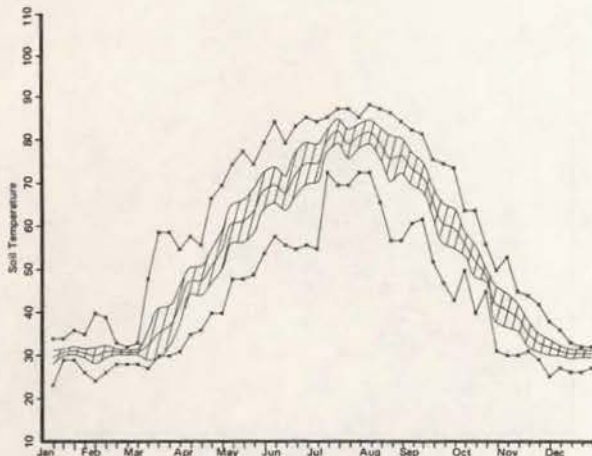
Appen. Fig. 28. Mean minimum daily soil temperature (°F) for each week at 4 inches for Aberdeen.

Appendix Table 28. Mean minimum daily soil temperature (°F) at 4 inches for Aberdeen.

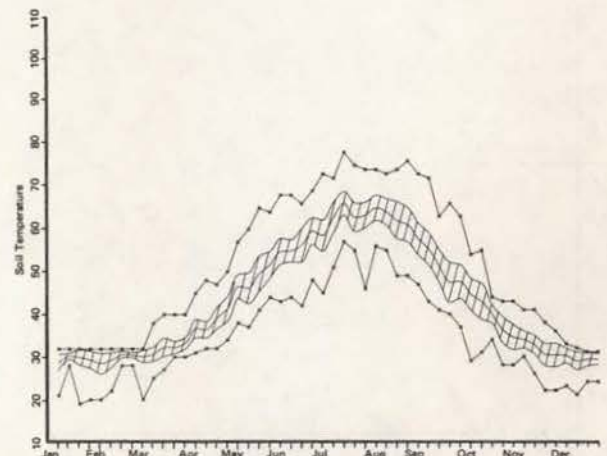
Year	Month												Ave.
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	
1964							68.9	66.8	56.2	47.5	34.3	29.6	
1965	29.6	30.2	32.1	41.3	47.9	58.2	66.2	64.8	52.4	47.2	39.4	28.9	44.9
1966	28.8	28.6	32.0	42.6	53.1	61.6	70.1	68.2	60.0	45.4	37.1	30.9	46.7
1967	29.0	31.3	35.1	38.6	50.3	58.2	70.8	71.7	62.4	46.8	33.1	24.7	46.2
1968	23.0	28.6	32.0	36.1	46.5	56.6	65.3	57.4	50.2	39.7	31.5	28.5	41.3
1969	29.2	27.1	29.5	38.5	53.7	59.6	68.3	70.4	61.9	44.5	35.0	30.9	45.8
1970	30.8	33.0	35.4	37.9	49.7	60.6	67.6	68.9	54.4	44.0	35.3	31.2	45.7
1971	27.5	31.5	31.7	40.2	51.1	59.3	68.0	71.2	53.9	43.3	33.6	28.6	45.1
1972	26.8	28.5	36.0	40.2	52.6	62.2	67.3	68.5	57.1	47.0	35.7	29.6	46.0
1973	29.9	29.6	33.1	39.4	52.3	61.3	69.0	68.4	55.8	46.3	36.2	31.3	46.2
1974	29.2	30.8	35.3	41.3	52.3	64.1	70.7	66.8	60.5	48.2	36.8	31.1	47.3
1975	28.1	28.4	33.1	37.0	45.2	56.3	69.5	62.2	56.5	44.3	32.1	30.4	43.9
Ave.	28.4	29.8	33.2	39.4	50.4	59.8	68.5	67.1	66.8	45.3	35.0	29.6	

Appendix Table 29. Mean maximum daily soil temperature (°F) at 4 inches for Idaho Falls.

Year	Month												Ave.
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	
1964										51.5	39.4	33.5	
1965	32.2	32.5	31.5	46.9	55.8	65.3	73.3	71.2	58.0	51.0	43.2	31.1	49.2
1966	30.8	30.5	34.6	43.4	59.0		74.5	73.8	70.0				
1967				50.3	64.9	67.0	83.7	83.7	74.5	60.8			
1968					62.5	72.4	82.6	73.7	67.6		35.2	29.2	
1969	30.7	29.3	32.3	51.6	71.8	71.7	81.8	80.5	69.7	49.1	37.9	29.8	52.9
1970	29.8	31.5	33.1	44.3	63.5	74.1	80.4	80.6	65.1	48.8	36.5	31.5	51.7
1971	29.7	30.6	34.2	48.1	64.9	75.6	82.1	84.9	66.6	48.7	31.8	31.5	52.6
1972	31.0	31.0	43.7	53.2	63.1	72.3	81.3	79.7	67.0		41.0	29.7	
1973	20.0	30.0	31.6	50.4	66.5	69.1	80.1		57.5	51.3			
1974			32.3	49.4	59.5	74.3	78.8	73.9	67.7	51.3		31.0	
1975	31.0	31.0	31.4	36.1		50.5							
Ave.	30.6	30.8	33.8	47.7	63.9	69.4	80.7	78.8	66.9	50.7	37.4	30.7	



Appen. Fig. 30. Mean minimum daily soil temperature (°F) for each week at 4 inches for Idaho Falls.



Appen. Fig. 29. Mean maximum daily soil temperature (°F) for each week at 4 inches for Idaho Falls.

Appendix Table 30. Mean minimum daily soil temperature (°F) at 4 inches for Idaho Falls.

Year	Month												Ave.
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	
1964										45.9	36.4	32.7	
1965	32.0	32.0	31.4	41.2	47.5	57.0	64.1	62.6	52.1	45.5	39.2	30.4	44.5
1966	30.2	30.0	31.6	34.2	41.0		63.7	64.0	55.0				
1967				42.5	54.5	59.1	72.6	72.4	65.3	51.7			
1968					46.4	55.0	61.4	57.7	51.4		32.2	27.4	
1969	26.6	26.9	29.6	36.7	53.0	55.6	60.8	60.2	52.7	36.6	29.4	26.5	41.2
1970	29.1	29.6	31.2	34.6	46.7	57.8	63.4	62.6	47.0	38.8	33.1	31.5	42.2
1971	29.0	29.9	30.9	35.8	46.7	56.6	61.7	66.9	48.6	38.5	31.0	31.5	42.4
1972	31.0	31.0	34.7	39.4	48.2	57.1	61.7	61.7	49.7		33.7	29.6	
1973	30.0	30.0	31.2	37.0	48.8	53.8	63.7		46.5	42.8			
1974			31.3	37.9	44.9	58.5	60.6	60.5	55.6	42.0		30.8	
1975	31.0	31.0	31.3	33.1		42.4							
Ave.	29.7	30.0	31.5	37.2	48.4	55.2	63.1	62.9	52.0	41.6	33.0	29.8	

Appendix Table 31. Mean maximum daily soil temperature (°F) at 20 inches for Idaho Falls.

Year	Month												Ave.
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	
1964										56.7	48.7	43.4	
1965	40.3	40.3	39.0	44.4	52.6	63.8	69.2	70.1	62.7	56.2	49.9	42.2	52.4
1966	39.6	39.0	38.4	40.8	49.0		70.5	73.5	70.0				
1967				44.8	55.7	63.4	77.0	78.2	72.1	62.2			
Ave.	40.1	40.1	38.9	44.1	54.0	63.6	72.7	74.7	67.1	57.7	49.3	42.7	

Appendix Table 32. Mean minimum daily soil temperature (°F) at 20 inches for Idaho Falls.

Year	Month												Ave.
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	
1964										56.6	48.1	43.2	
1965	40.0	40.0	38.9	43.5	52.0	62.3	68.4	68.4	61.8	55.8	49.4	42.2	51.7
1966	39.4	39.0	38.0	39.6	41.0		66.0	65.0	65.0				
1967				44.5	55.4	63.0	76.6	78.0	71.8	61.5			
Ave.	39.9	39.9	38.8	43.5	53.4	62.7	71.7	72.9	66.4	57.3	48.7	42.6	

Appendix Table 33. Mean maximum daily soil temperature (°F) at 3 inches for King Hill.

Year	Month												Ave.
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	
1964				57.3	73.4	78.0	92.1	92.1					
1965					70.5	81.7	94.5	91.2					
1966					82.6	89.8	96.9	96.4					
1967				56.5	72.1	79.1	92.7	96.6					
1968				59.3	76.1	88.6	96.4	96.2					
1969				68.0	60.0	88.0	92.7	88.9					
1970													
1971				67.7	82.2	87.7	95.2	93.8					
1972				62.3	77.9	84.6	84.8						
1973				61.0	72.4	72.2	78.3	95.0					
1974				67.1	81.2	90.5	94.1	95.1					
1975				58.4	79.3	86.3	100.9	90.6					
Ave.				61.9	75.1	84.2	92.3	93.3					

Appendix Table 34. Mean minimum daily soil temperature (°F) at 3 inches for King Hill.

Year	Month												Ave.
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	
1964				38.5	51.6	58.0	67.3	68.8					
1965					49.8	59.8	69.8	67.2					
1966					55.7	62.2	67.3	70.6					
1967				38.0	53.4	61.9	74.2	76.1					
1968				42.0	54.4	62.4	72.1	76.0					
1969				44.3	54.3	61.6	65.6	62.4					
1970													
1971				44.6	54.0	59.8	65.8	74.0					
1972				42.6	52.7	62.4	63.6						
1973				41.2	54.3	59.4	66.9	74.1					
1974				43.7	52.3	67.1	75.0	74.0					
1975				40.8	55.2	65.0	75.1	68.5					
Ave.				41.7	53.4	61.8	69.2	70.9					

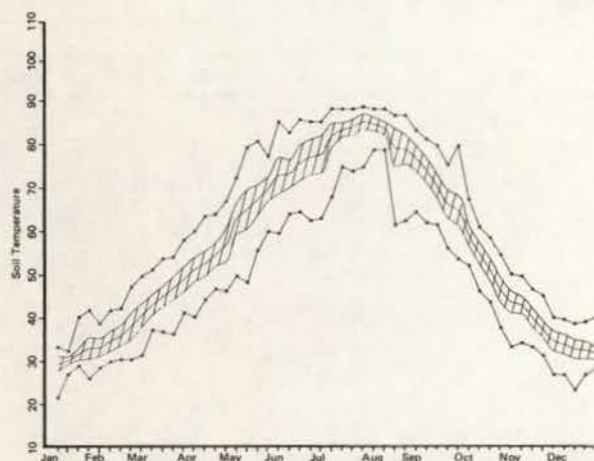
Appendix Table 35. Mean maximum daily soil temperature (°F) at 4 inches for Rigby.

Year	Month												Ave.
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	
1966													31.1
1967	30.8	31.2	38.7	50.4	63.2	70.4	79.6	76.4	64.4	48.8	37.9	32.0	52.2
1968	32.0	32.8	42.5	52.4	62.0	72.4	79.2	68.8	64.4	47.6	38.2	33.7	53.4
1969	32.3	31.0	41.5	53.9	71.4	71.0	80.3	82.4	69.8	58.4	37.8	30.0	60.7
1970	32.0	36.0	42.3	48.1	61.8	70.4			57.0	49.8	38.7	37.5	
1971	33.5	33.0	40.1	49.0	60.6								47.0
1972													
1973									65.1	55.6			
1974				53.8	67.4				71.1	54.8			
1975									77.0	53.4			
Ave.	31.6	31.8	40.8	51.4	64.9	71.3	79.7	75.3	66.7	51.9	38.1	32.0	

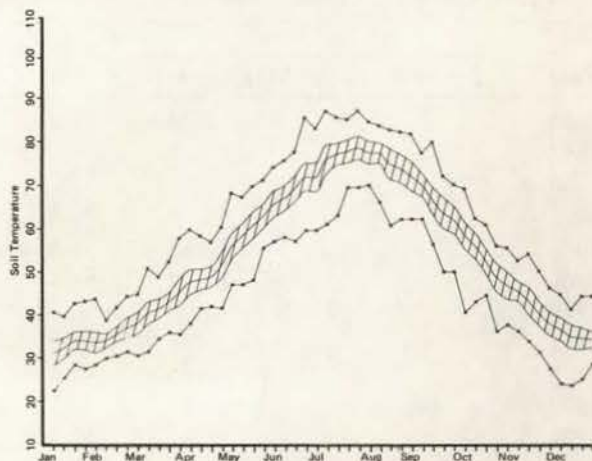
Appendix Table 36. Mean minimum daily soil temperature (°F) at 4 inches for Rigby.

Year	Month												Ave.
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	
1966													30.8
1967	30.8	31.1	34.7	39.3	49.5	57.2	63.6	62.0	54.9	42.8	35.5	32.0	44.6
1968	32.0	32.2	36.6	41.7	49.3	57.8	63.3	58.7	53.1	41.7	36.2	33.7	45.4
1969	32.0	31.0	35.1	42.5	55.5		63.0	64.1	52.4	45.6	32.0	27.0	48.9
1970	30.2	31.0	33.0	36.9	48.2	55.1			47.4	44.8	33.3	34.5	
1971	33.0	33.0	33.6	40.2	48.2								39.1
1972													
1973									49.6	40.2			
1974				43.5	50.0				48.7	41.5			
1975									39.7	39.1			
Ave.	31.4	31.5	35.2	40.8	50.4	57.1	63.3	61.3	50.2	41.6	34.9	31.4	

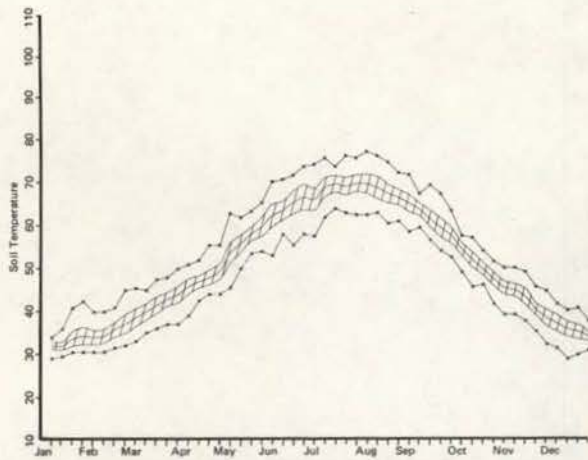
Appendix B



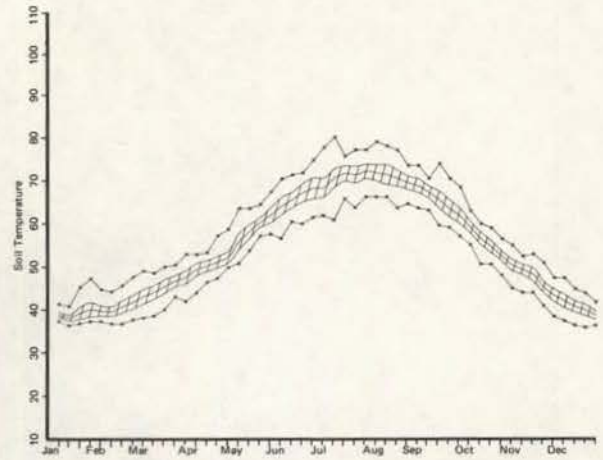
Appen. Fig. 31. Mean daily soil temperature (°F) for each week at 4 inches for Malheur.



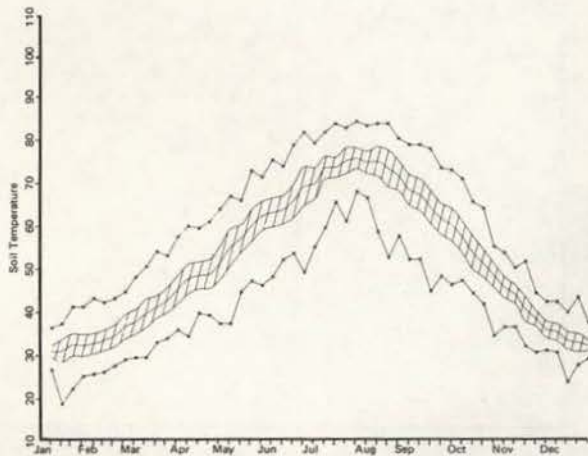
Appen. Fig. 32. Mean daily soil temperature (°F) for each week at 4 inches for Caldwell.



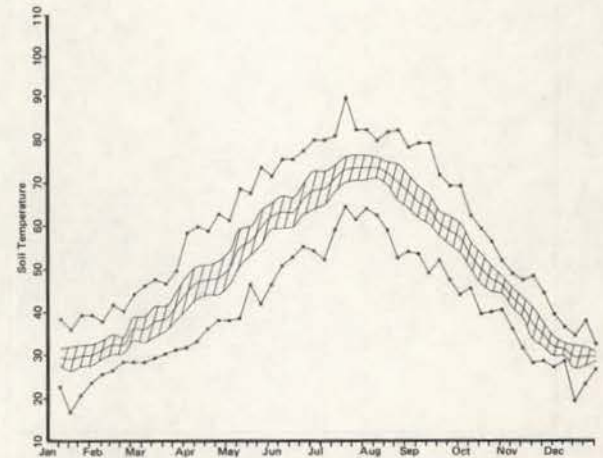
Appen. Fig. 33. Mean daily soil temperature ($^{\circ}$ F) for each week at 4 inches for Kuna.



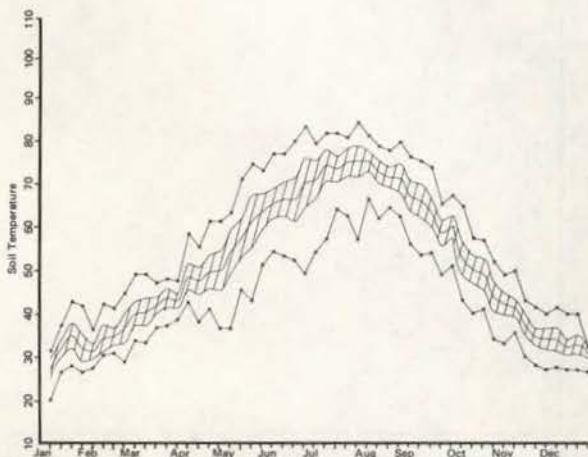
Appen. Fig. 34. Mean daily soil temperature ($^{\circ}$ F) for each week at 8 inches for Kuna.



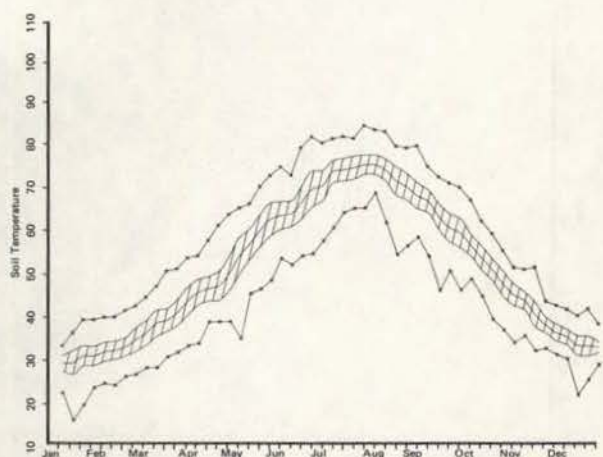
Appen. Fig. 35. Mean daily soil temperature ($^{\circ}$ F) for each week at 3 inches for Buhl.



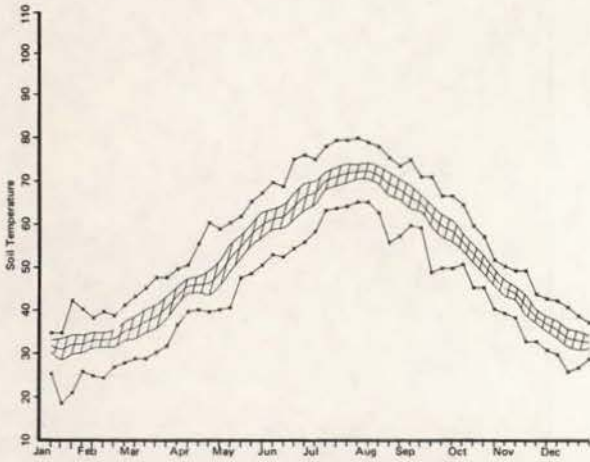
Appen. Fig. 36. Mean daily soil temperature ($^{\circ}$ F) for each week at 3 inches for Castleford.



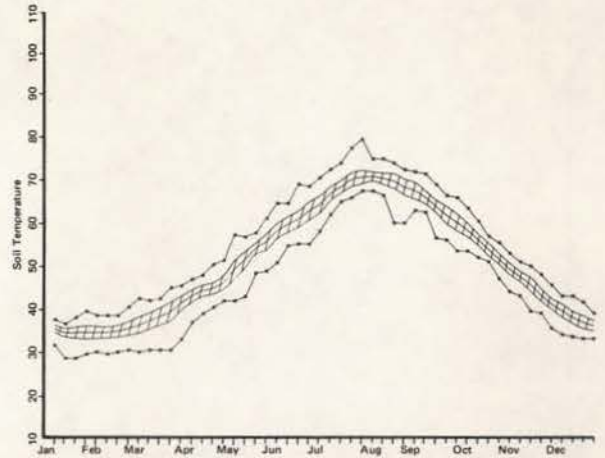
Appen. Fig. 37. Mean daily soil temperature ($^{\circ}$ F) for each week at 2 inches for Twin Falls.



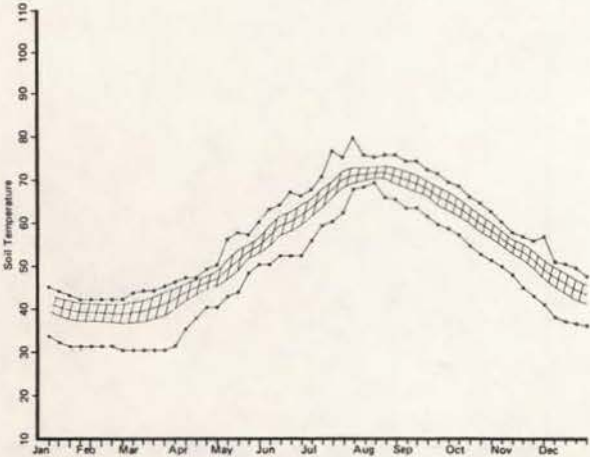
Appen. Fig. 38. Mean daily soil temperature ($^{\circ}$ F) for each week at 4 inches for Twin Falls.



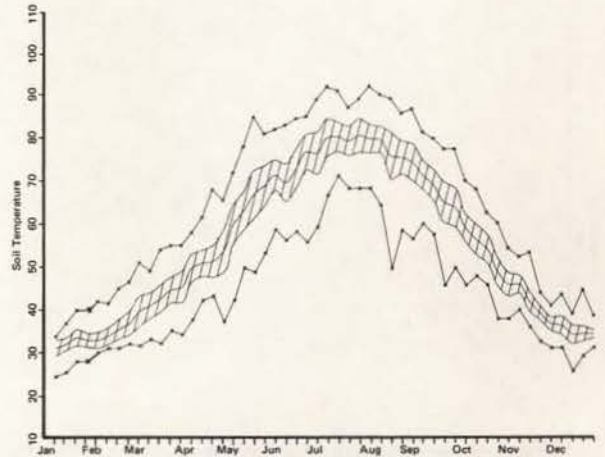
Appen. Fig. 39. Mean daily soil temperature ($^{\circ}$ F) for each week at 8 inches for Twin Falls.



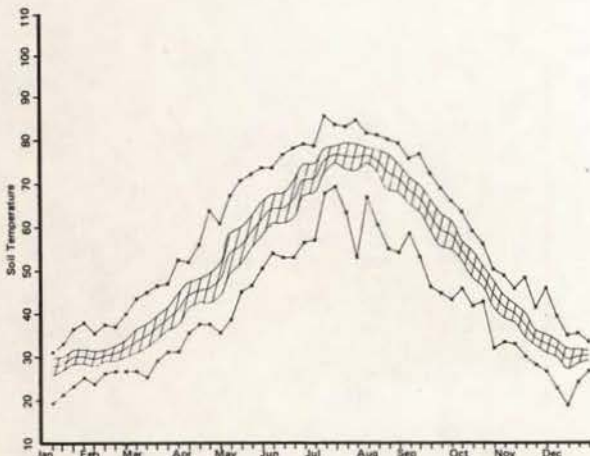
Appen. Fig. 40. Mean daily soil temperature ($^{\circ}$ F) for each week at 20 inches for Twin Falls.



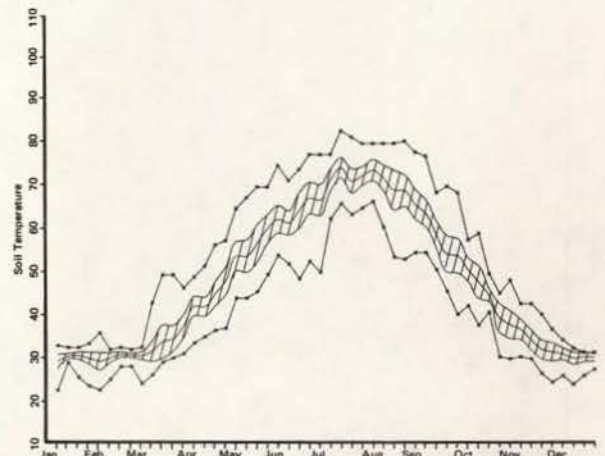
Appen. Fig. 41. Mean daily soil temperature ($^{\circ}$ F) for each week at 36 inches for Twin Falls.



Appen. Fig. 42. Mean daily soil temperature ($^{\circ}$ F) for each week at 4 inches for Rupert.



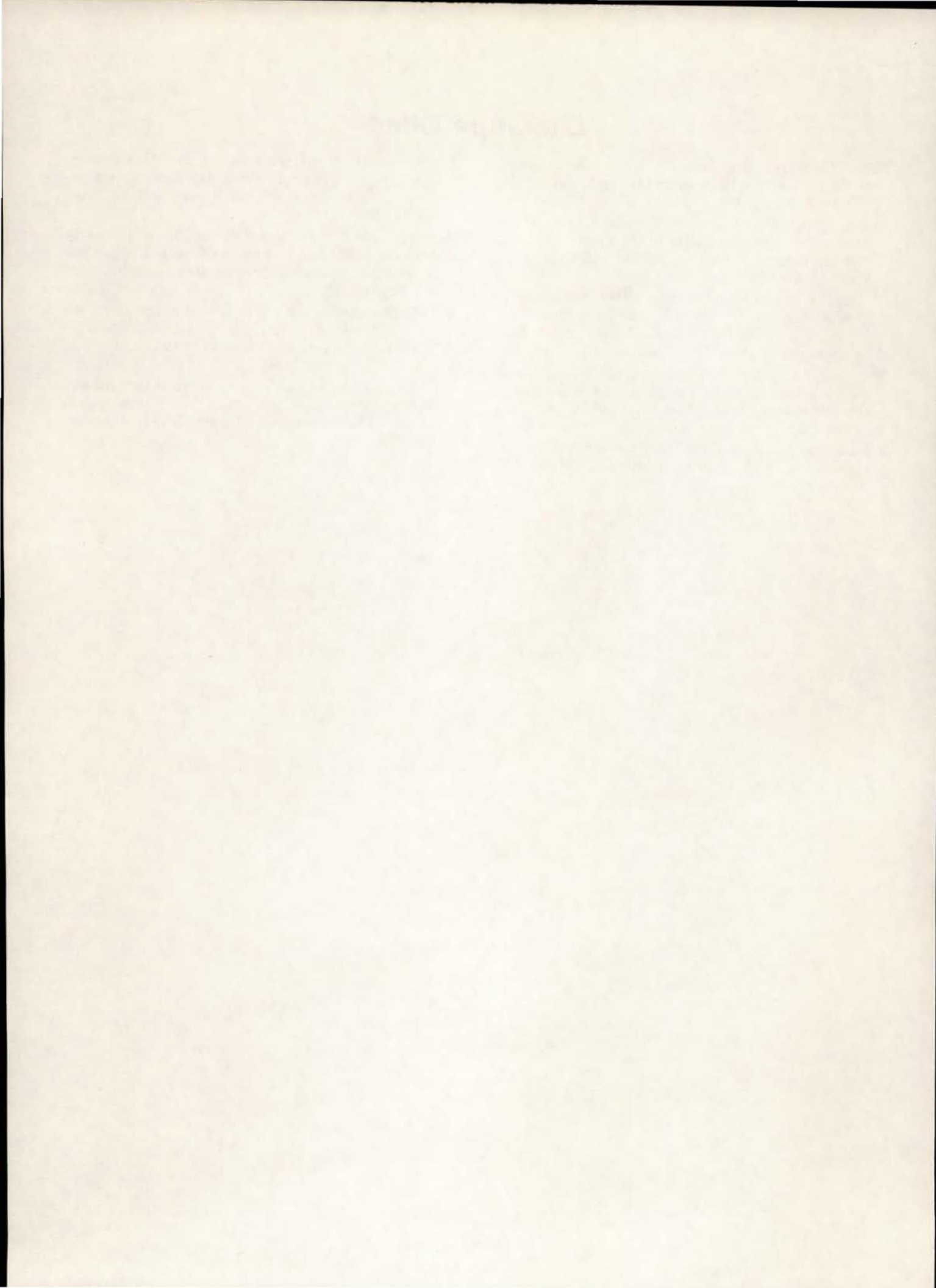
Appen. Fig. 43. Mean daily soil temperature ($^{\circ}$ F) for each week at 4 inches for Aberdeen.

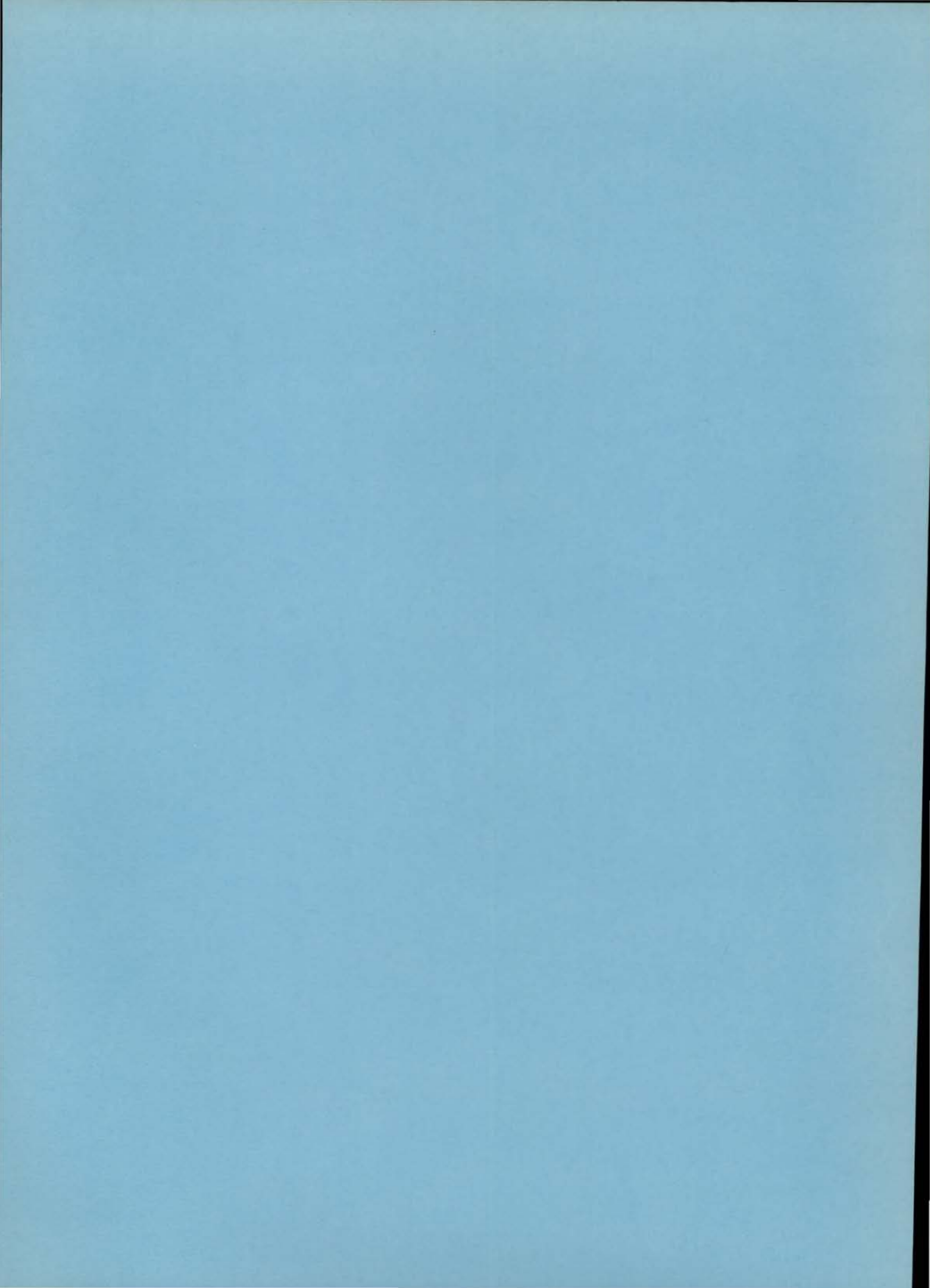


Appen. Fig. 44. Mean daily soil temperature ($^{\circ}$ F) for each week at 4 inches for Idaho Falls.

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