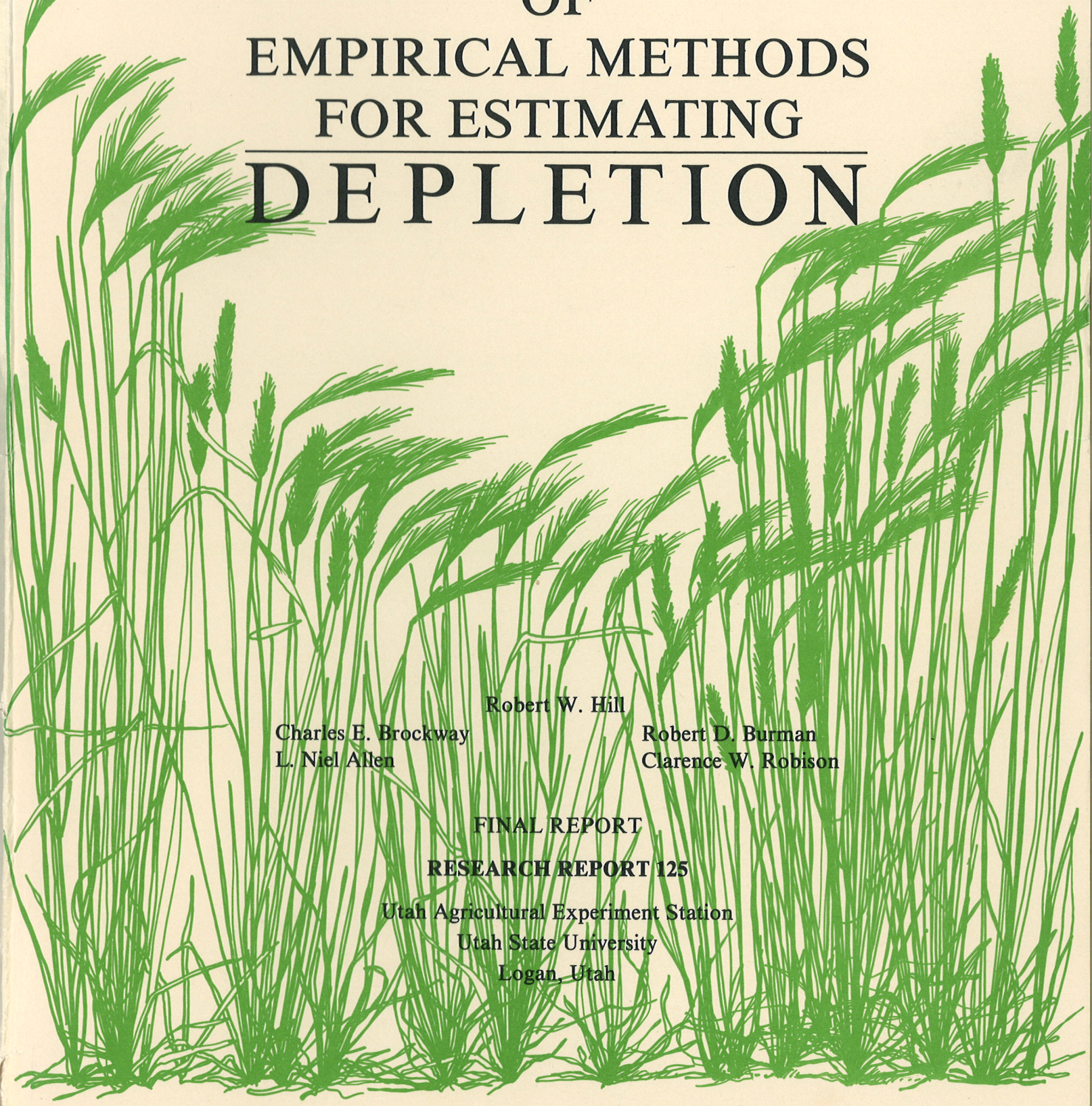
DUTY OF WATER UNDER THE BEAR RIVER COMPACT:

FIELD VERIFICATION OF EMPIRICAL METHODS FOR ESTIMATING DEPLETION



Robert W. Hill

Charles E. Brockway
L. Niel Allen
Robert D. Burman
Clarence W. Robison

FINAL REPORT

RESEARCH REPORT 125

Utah Agricultural Experiment Station
Utah State University
Logan, Utah

DUTY OF WATER UNDER THE BEAR RIVER COMPACT: FIELD VERIFICATION OF EMPIRICAL METHODS FOR ESTIMATING DEPLETION

FINAL REPORT
1982 - 1988

Submitted To The

Bear River Commission

A Three State Cooperative Project
Sponsored by the Bear River Commission

University of Idaho
Agriculture Engineering
C. E. Brockway
C. W. Robison
R. G. Allen

Utah State University
Agricultural &
Irrigation Engineering
R.W. Hill
L.N. Allen

University of Wyoming
Agriculture Engineering
R. D. Burman

Utah Agricultural Experiment Station
Project No. 801
Utah State University Control No. 83-049

Project Coordinator:
Robert W. Hill
Logan, Utah 84322-4105

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ABSTRACT

DUTY OF WATER UNDER THE BEAR RIVER COMPACT: FIELD VERIFICATION OF EMPIRICAL METHODS FOR ESTIMATING DEPLETION

A three state cooperative study was conducted from 1982 through 1987 by Utah State University and the Universities of Idaho and Wyoming for the Bear River Commission to help determine a duty of water under terms of the Bear River Compact. The primary focus was field research in the Upper and Middle Bear River Basin to determine consumptive use of high elevation irrigated meadows and to develop a methodology to estimate historical depletions. Three sites were selected for the field study; Hilliard Flat south of Evanston, Wyoming (elev. 7550 ft), north of Randolph, Utah (elev. 6280 ft), and north of Bear Lake near Montpelier, Idaho (elev. 5928 ft). Lysimeters were located in irrigated meadow at each of these sites and electronic weather stations were placed nearby. The major portion of the field work began in the spring of 1983. Seasonal crop water use for irrigated meadow varied from 15.8 to 32.5 inches among the three sites for 1984 through 1987 seasons.

Crop water use from the lysimeters was used to calibrate empirical evapotranspiration (E_t) equations. A modified Penman equation best matched measured E_t values for the three sites across years when used with crop coefficients derived for those sites. There was more variation across sites or between years with other empirical methods, such as SCS Blaney-Criddle equation. Sufficient data from the electronic weather stations for using the Penman equation were available only for the 1982-1987 period. Thus, to complete the historical sub-basin depletion calculations, equations based on air temperature data could be considered. The modified Penman equation (Kimberly, Idaho, calibration) was used to determine monthly consumptive use values where sufficient data were available in the various subbasins; this was then used to calibrate the simpler empirical methods to estimate E_t.

Depletion was calculated as the water year E_t less the sum of carry over soil moisture and effective summer precipitation. The SCS Blaney-Criddle equation, with calibrated crop coefficients and monthly temperature and precipitation data available from the NWS weather stations, was used to estimate E_t and historical depletions for each of the 10 subbasins for water years 1976-1987.

Hill, Robert W.; Brockway, Charles E.; Burman, Robert D.; Allen, L. Niel; Robison, Clarence W.

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KEYWORDS--crop water use / evapotranspiration / irrigated meadows / lysimeters / river basin depletion / hydrologic data / water resource planning and management

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The outstanding generosity of the cooperators in providing space for the field instrumentation as well as access to their property is greatly appreciated. These cooperators, by state, are: Idaho: Robert Geddes, Banida; Don Rigby, Bancroft; Jim Wallentine, Montpelier; Don Gilbert, Grace; and Rouhn Panting, Malad; Utah: Norm Weston (J.F. Ranch), Kay Thornack, Fred Feller and Bill Cornia, Randolph; Louis Stuart and Greg Simonds (Deseret L & L), Woodruff; Wyoming: Mrs. L. Brown (1982) and Joe Barker, Hilliard Flats, S.E. of Evanston.

We are indebted to Wally Jibson, Bear River Commission Engineer-Manager, for his continuing guidance and encouragement. His extensive and unique knowledge of the Bear River Basin has been a valuable source of insight and understanding. Mike Turnipseed and Bob Fotheringham of the Utah Division of Water Rights Logan office, helped with the initial contacts and instrumentation set up in 1982 and 1983. Their identification of suitable sites and continuing interest and valuable suggestions are appreciated.

Several Utah State University students were responsible for all weekly site visitation, monitoring, maintenance and neutron probe operation. They were: Garry Grabow (82-83), Mark Mulkay (84), Kelvin Anderson (84-85), Richard Humphreys (85-86) and John Prueger (86-88). Their thorough and dependable field work resulted in high quality weather and soil moisture depletion measurements. The assistance of Mr. Lynn Hill, UW, John Buyok, UI, and Chuck Jackens, USU, in the installation of the lysimeters was appreciated. Special acknowledgment is expressed to Brad Duncan for his computer skills and cheerful analysis and re-analysis of the 1983-1987 lysimeter data and for programing the subbasin depletion procedure and to Cheryl Johnson for her patient typing and retyping of the manuscript.

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INTRODUCTION

The Bear River compact (Bear River Commission, 1979), as amended, provides for the equitable apportionment of water among the states of Idaho, Utah and Wyoming. Article V, Paragraph C and Article VI, Paragraph B, state that "Water depletions ... shall be calculated and administered by a Commission approved procedure." [2] This procedure had not been identified by the commission prior to this study.

The Bear River Basin is located in the northeast corner of Utah, the southeast corner of Idaho and the southwest corner of Wyoming. The Bear River Basin covers 7,465 square miles of mountain and valley lands. It is composed of five major valleys ranging in elevation from 4,200 to 7,800 feet. The climate in these valleys varies considerably from a growing season of about 30 frost-free days in the higher valleys to over 150 frost-free days in the lowest valleys. Within the basin there are about 470,000 acres of cropland. The crops include irrigated meadows in the higher valleys and vegetables in the lower valleys.

The implementation of the Bear River Compact requires that water depletion be estimated for irrigated mountain meadows, cropland, rangelands, wetlands and open water. Equitable distribution of water in the river basin depends upon accurate determination of consumptive use from these areas. Field data were not available to verify empirical equations used to estimate these depletions.

The three states currently use equations based on temperature to estimate consumptive water use on cropland. The Blaney-Criddle method as modified by the USDA-SCS (1970) is used in Utah and Wyoming; Idaho is considering the use of the FAO version (Doorenbos and Pruitt, 1977). Based on coefficients reported in the literature, the calculated consumptive crop water use by these methods do not agree.

This project was developed to measure water use by meadowland and alfalfa in the Middle and Upper Bear River Basin, that information will be used to help the Bear River Commission identify a procedure to calculate depletions. The 5-year project also sought to monitor year to year variations in climate.

The major objectives of the project were to:

1. Obtain field data on crop water use in selected areas of the Bear River Basin.
2. Determine which empirical method or methods can be adjusted to adequately represent measured consumptive use.
3. Estimate historical depletions with the appropriate empirical method and available historical weather data.

In addition, close coordination with the commission and state agencies was to be established and maintained with progress reports presented at commission and technical subcommittee meetings.

PROCEDURES

The general objectives were to:

1. Identify regions within the Bear River Basin where field data is important. Select three or four of the most critical areas (at least one such area in each state) and establish weather stations. Also install neutron probes and/or lysimeters where necessary, and collect data for 3 or 4 years to ascertain the effects of seasonal variability. Suggested sites were: Hilliard Flats, Wyoming; Randolph-Woodruff, Utah; and Montpelier and/or Grace, Idaho.

2. Use the weather and field data to calibrate selected empirical consumptive use (E_t) equations. Compare these calibrated equations among the various sites and with research data from Cache Valley and Kimberly, Idaho, to identify which adequately represent field depletions.

3. Develop the methodology to estimate historical water depletion using acceptable empirical E_t equations and available weather data. Historical weather (temperature and precipitation) data were available from National Weather Service stations at Evanston, Sage and Border, Wyoming; Lifton, Montpelier R.S., Soda Springs and Grace, Idaho; Woodruff and Laketown, Utah; and several sites in Cache Valley and elsewhere in the lower basin. Weather data and adjusted equations were correlated with weather data from field sites. Historical depletions were then estimated for time periods approved by the Commission.

We first identified sites where field verification data was urgently needed and contacted and cooperated with farmers and state agencies. After the sites were established, field data collection was scheduled. The appropriate empirical consumptive use equations were analyzed and results were compared to the field data. The method of calculating depletion was developed and demonstrated.

Automated remote weather stations and lysimeters were established at various sites in the Bear River Basin, which were monitored once a week. Field sites were in irrigated mountain meadows in the Upper Bear River near Randolph, Utah, and at Hilliard Flat, Wyoming, and in the middle basin south of Montpelier, Idaho. Similar weather stations were established west of Soda Springs, Idaho, at Talmage and northwest of Preston, Idaho. The general location of these sites is shown in Figure 1. Stations (with satellite transmitters) were also placed at the Bear River near Border and at the Smiths Fork US Geological Survey gage sites in late 1986. During 1988 additional weather data were also collected near Malad and Grace, Idaho, for part of the summer. Neutron probe access tubes were also installed in alfalfa, grain or pasture fields near Preston, Talmage and Randolph sites where the water table was deep.

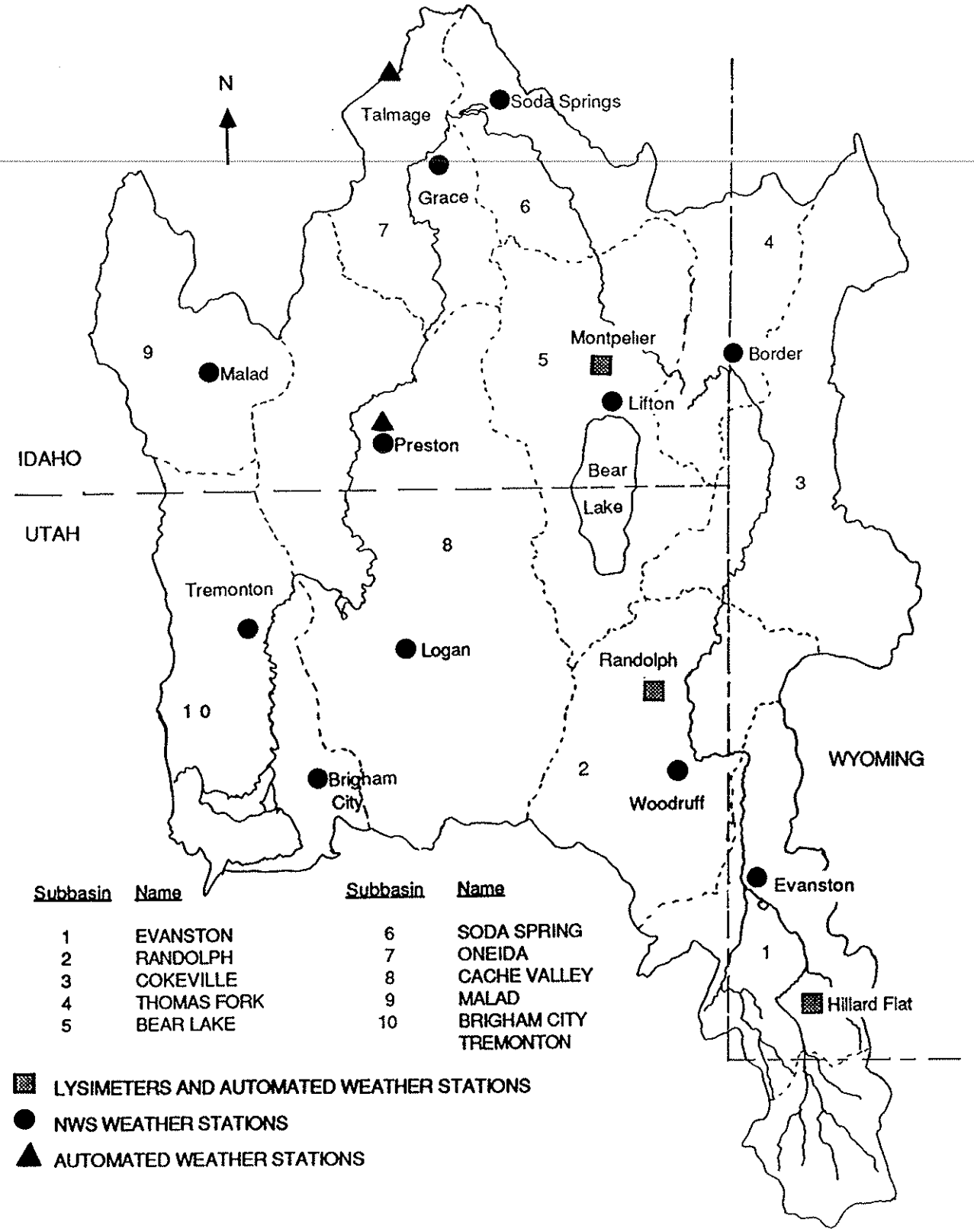


Figure 1. Field data collection locations (map adapted from Hill et al., 1970).

Lysimeter Techniques for Measurement of Crop Water Use

A lysimeter is a tank filled with soil that contains the same vegetation as the adjacent area. A lysimeter isolates the soil mass and vegetation so water cannot enter or leave, thus making it possible to accurately monitor water required to sustain plant growth to determine evapotranspiration (E_t) or consumptive use. E_t is often determined with lysimeters that weigh changes in the soil moisture. The scope of this study and costs meant that we had to use non-weighing lysimeters.

This type of non-weighing lysimeter was used on the Little Laramie River in Wyoming (Borrelli and Burman, 1983), on a large study of E_t in the Upper Green River in Wyoming (Pochop and Burman, 1987), and in a study of E_t from formerly irrigated lands in the South Park area of Colorado (Quinlan et al., 1982). Other water table lysimeters are used in Utah and Colorado (Kruse and Haise, 1974) for field measurements of E_t.

Lysimeters were fabricated in late summer 1982 but wet field conditions delayed installation until late May 1983. Data collection began immediately after a lysimeter was installed even though vegetation had not been fully re-established.

Lysimeters were installed in representative areas of irrigated meadows where the water table was quite shallow. Sod removed during excavation was replaced. The vegetation usually consisted of grasses and sedges and rushes. The vegetation in the lysimeters was managed the same as the adjacent meadows. The meadows in the Upper Bear River are generally grazed until the first part of June and then allowed to grow until about the second week in August, when hay is harvested. The additional growth after harvest is grazed in the fall.

Construction

The lysimeters were constructed from 3/32-inch steel plates, which were cut and bent. The joints were arc-welded and the lysimeters were then painted with a rust inhibitor. The interior welded joints were also sealed with a silicon calk. The lysimeters are 11.1 square feet and 4 feet high. Horizontal and vertical pipes were placed in the lysimeter to facilitate measurement of the water table and to add or remove water. A perforated plastic drainage pipe 4 inches in diameter was placed diagonally across the bottom. The vertical riser of PVC pipe (6 inch dia.) was located in one corner to minimize vegetative disturbance. An aluminum access tube 2 inches in diameter was placed vertically in the center of each lysimeter to determine soil moisture with a neutron soil moisture meter. Figure 2 is a drawing of a lysimeter.

Installation Methods

Installation procedures were patterned after those used by Grable, et. al. (1966). Their lysimeters were 40 inches square and 18 inches deep. They were installed so that sides extended above the soil by about 2 inches to prevent surface water from entering the lysimeter. The bottom of the

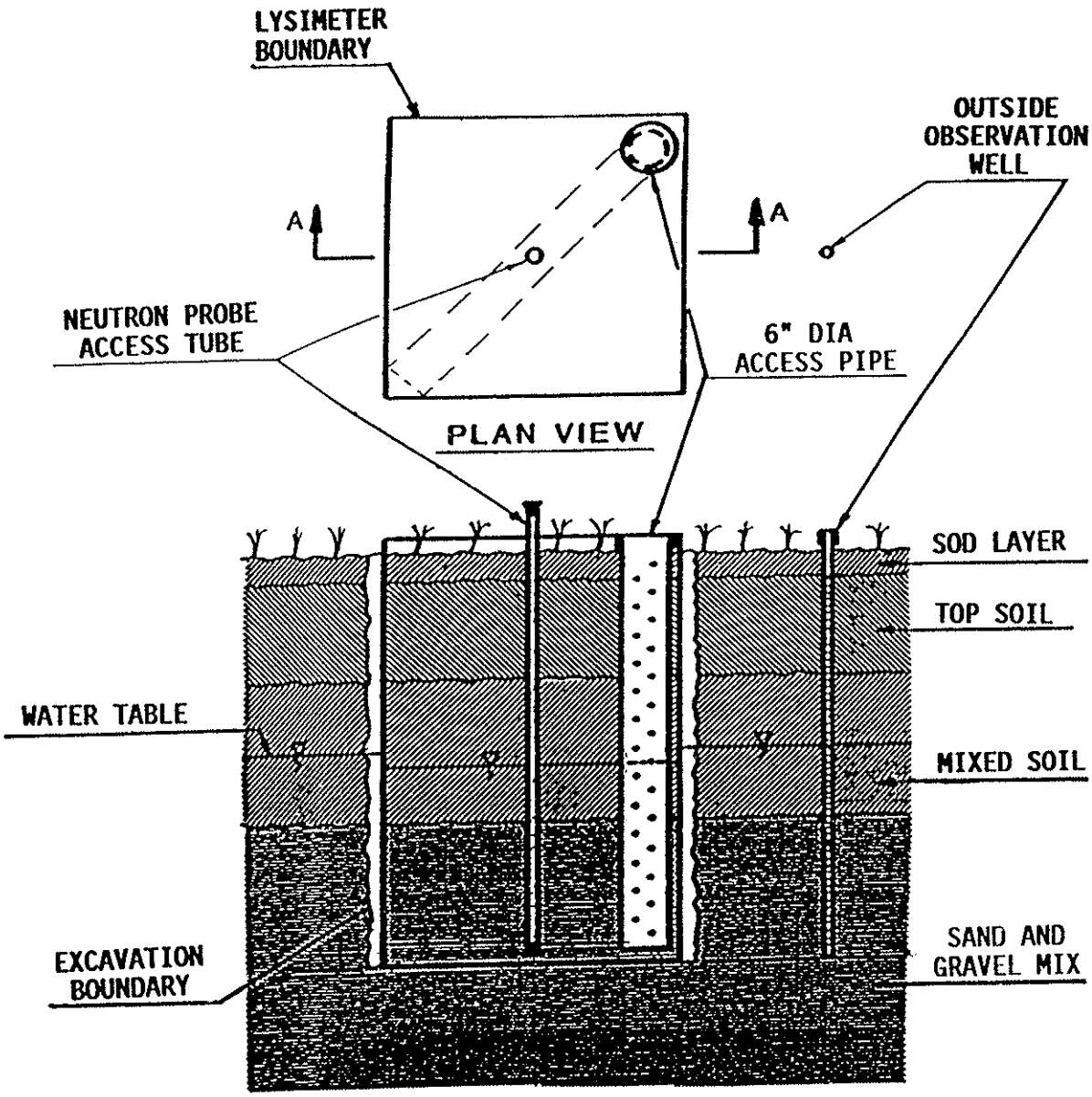


Figure 2. Installed lysimeter.

lysimeter was covered with about 2 inches of gravel. Ten inches of screened soil and about 4 inches of intact sod was then placed on the surface of the lysimeter.

Our lysimeters were about 40 inches square and 48 inches in deep (to reach lower water tables). The sod mat was removed with a shovel and the remaining material was removed and placed on sheets of plywood in the order of removal. A lysimeter was placed in the excavated hole and leveled. A lip of approximately 2 to 4 inches protruded above the ground to prevent surface water from entering the lysimeter. The plastic pipe drainage and water access system were placed in the lysimeter as shown in Figure 2. The drainage pipe was covered by sand and the remaining soil material and sod were replaced and compacted.

Operation

We used similar construction and operating procedures at each location and made sure that the vegetation in the lysimeter was representative of that in the surrounding field.

Field Procedures.- All lysimeter sites were visited weekly during the growing season, usually mid-April and through October.

1. Rainfall and any other appropriate climatic data were recorded.

2. Water table depths inside the lysimeters and in the adjacent field were recorded.

3. Water requirements (removal or addition) of the lysimeter vegetation were estimated.

4. Neutron soil moisture readings were recorded.

5. Enough water was added or removed to maintain the water table as desired until the next visit.

6. Vegetative conditions in and around the lysimeter site were noted. The growth stage of the plants and whether or not vegetation in the lysimeter was representative of the surrounding field were noted.

Method of Adding Water.- Water was added to the lysimeter to simulate the irrigation methods in the adjacent field. In the Upper Bear River, surface flooding is the most prevalent method, so water was poured on the lysimeter surface.

Estimating Amount of Water to Add.- The amount of water added was based on specific yield of soil, E_t and estimated rainfall for the next period. After several visits to a site, it was relatively easy to estimate how much water to add. Weekly visits provided ample opportunities for corrections.

At each visit, water was added or removed to maintain the water level close to that outside of the lysimeters (in 1983-1985). Measuring the soil water content with a neutron probe and recording water added and removed increased the amount of data available to determine crop water use.

Consumptive Use of the lysimeter vegetation was calculated using a simple water balance equation:

$$CU = \Delta SW + IRR + RAIN - DRNG$$

where CU is consumptive use, ΔSW is change in soil water, IRR is irrigation, RAIN is rain and DRNG is drainage water removed. The change in soil water, ΔSW, could be estimated from specific yield and change in water table, change in neutron probe soil water measurements, or a combination of both methods. A combination of both methods was eventually used to account for E_t when the water table was low (and possibly not changing) while water in soil above the water table was depleted.

Specific yield (see Glossary) estimates were made for each lysimeter at the end of the 1987 growing season. The lysimeter was covered with plastic, filled with water, and then periodically pumped out and the water table position was measured three to four days afterwards. This process was carried out for several cycles over a three week period. Soil bulk density samples were taken afterwards to check the neutron probe calibrations.

Automated Weather Station Instrumentation for Weather Data Collection

Most of the automated weather stations were equipped to monitor air temperature, relative humidity, solar radiation, wind speed and precipitation. Soil temperatures and wind directions were monitored at some locations. Specific instrumentation component packages for each station and year are listed in Table 1. The sensor package was compatible with the CR21 Micrologger manufactured by Campbell Scientific, Inc. The specifications for the various sensors are shown in Table 2. The sensor package and data logging equipment were mounted on tripod instrument platforms furnished by Campbell Scientific (Figure 3).

The data loggers scanned the various input sensors once a minute. These observations were used for the following daily (midnight to midnight) weather parameters: minimum and maximum temperature, minimum and maximum relative humidity, total precipitation, total solar radiation, total wind movement and (at some locations) soil temperatures. The loggers were also programmed to record selected information on a 1 to 6 hour basis, depending on the station. These data were used to calculate morning dew-point temperatures and day-to-night wind ratios.

Table 1. Automated weather station instrumentation packages.

Site	Parameter	1982	1983	1984	1985	1986	1987
101	Data Logging Eq.	A	A	A	A		
	Air Temperature	C	C	C	C		
	Relative Humidity	D/E	D	D	E		
	Wind Movement	L	F	F	F		
	Solar Radiation	K					
	Precipitation		H	H	H		
102	Data Logging Eq.	A	A	A	A		
	Air Temperature	C	C	C	C		
	Relative Humidity	D/E	D/E	D/E	E		
	Wind Movement	I	I	I	I		
	Solar Radiation	G	G	G	G		
	Precipitation	J	J	J	J		
103	Data Logging Eq.	A	A	A			
	Air Temperature	C	C	C			
	Relative Humidity	D/E	D/E	D/E			
	Wind Movement	L	F	F			
	Solar Radiation						
	Precipitation						
104	Data Logging Eq.		A	A	A	A	A
	Air Temperature		C	C	C	C	C
	Relative Humidity		E	E	E	E	E
	Wind Movement		I	I	I	I	I
	Solar Radiation		G	G	G	G	G
	Precipitation		J	J	J	J	J
201	Data Logging Eq.	A	A	A	A	A	A
	Air Temperature	C	C	C	C	C	C
	Relative Humidity	E	E	E	E	E	E
	Wind Movement	I	I	I	I	I	I
	Solar Radiation	K	K	K	K	K	K
	Precipitation	H	H	H	H	H	M
301	Data Logging Eq.	B	A	A	A	A	A
	Air Temperature	C	C	C	C	C	C
	Relative Humidity		E	E	E	E	E
	Wind Movement		I	I	I	I	I
	Solar Radiation	K	K	K	K	K	K
	Precipitation		H	H	H	H	H

A Campbell Scientific CR21 Data Logger
B Omnidata DP219 Datapod
C Thermistor temperature probe
D Vaisala Humicap Humidity Probe
E Campbell Scientific/PhysChem Humidity Probe
F Weathertronics Pulse Anemometer
G Epply 8-48 Precision Pyranometer
H Sierra Misco Tipping Raingage (1mm/tip)
I Met 1 Pulse Anemometer
J Weather Measure Tipping Raingage (.01"/tip)
K Li-Cor LI200S Pyranometer
L Belfort Pulse Anemometer
M Belfort Weighing Raingage

Table 2. Instrumentation specifications

A.	CSI[a] CR21 Micro Logger - Scan interval 1 minute, Analog accuracy 0.2%, Integration - 200 ms
B.	Omnidata DP 219 Datapod[b]
C.	CSI - 101 Thermistor - Based on Fenwal Electronics UUT51J1 Thermistor, ±0.5°C
D.	Vaisala Humicap Humidity Sensor - Thin film capacitive 0-100%; ±2.5%
E.	CSI-201/Phys Chem. Humidity Sensor - Thin film impedance 0-100%; ±2.5%
F.	Weathertronics - Micro Response Contact Anemometer 3 cup .5-100 mph, threshold .5 mph, Distance constant 5 ft.
G.	Epply 8-48 Precision Pyranometer
H.	Sierra Misco Tipping Bucket Raingage - 1mm/tip, 8" dia., catch ±3%
I.	Met One 014A Wind Speed Sensor - 3 cup, 1-100mph, ±.25% mph, Distance constant 15 ft.
J.	Weather Measure Tipping Bucket Raingage - .01"/tip, 8.214 inch dia., catch ±.5% @ 5"/hr.
K.	LI-COR LI200S Pyranometer - 0-1.43 langley/min, ±5%
L.	Belfort Pulse Anemometer
M.	Belfort Weighing Raingage

[a]Campbell Scientific Incorporated, Logan, Utah.
[b]Omnidata International Inc., Logan, Utah.

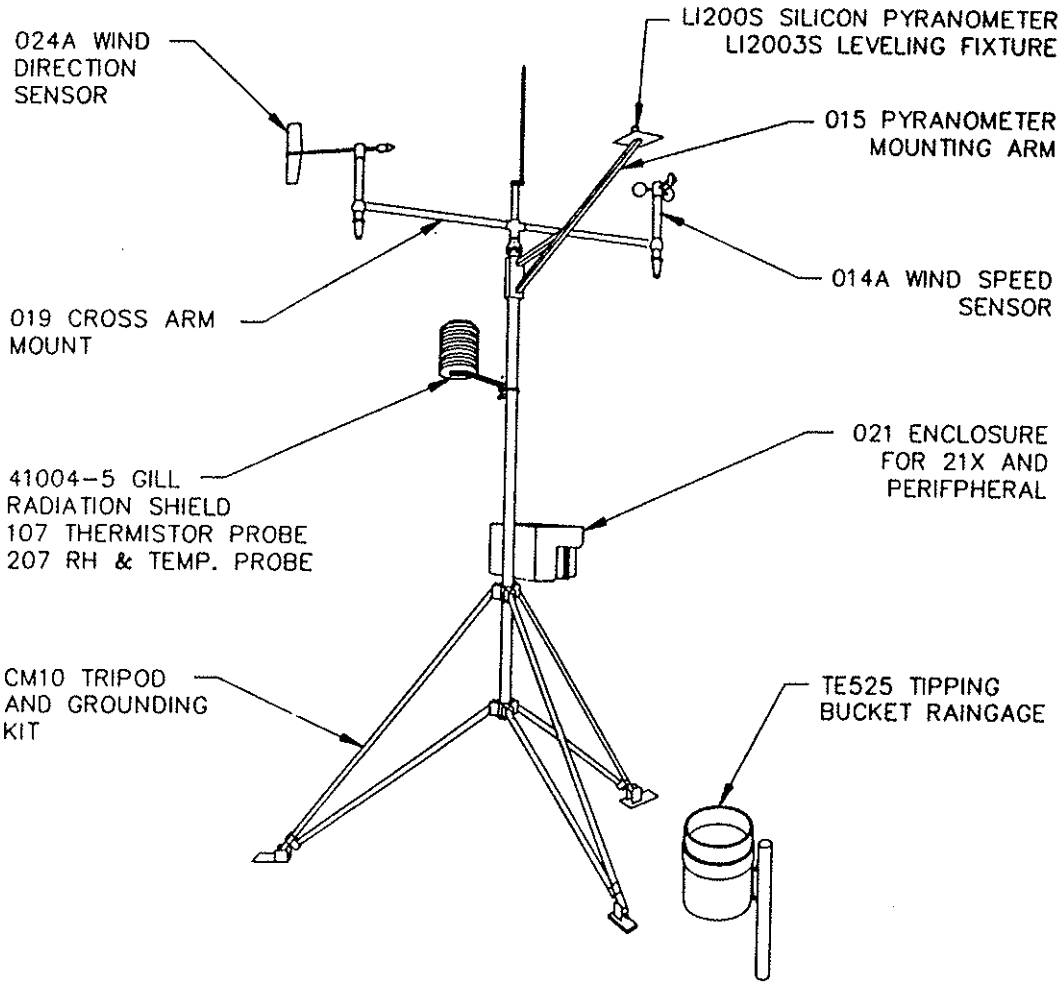


Figure 3. Typical CR21 micrologger weather station hardware configuration (after CSI CM10. IM 2186).

Field Study Site Descriptions

Seven non-weighing lysimeters were located (Figure 1) in the Upper Bear River Basin in the spring of 1983; three were located southwest of Montpelier, Idaho, two were located north of Randolph, Utah, and two were located south of Evanston, Wyoming at Hilliard Flat. All lysimeter, weather station and neutron meter access tubes were situated on land owned by cooperators.

Electronic weather sensing and recording stations were located adjacent to the lysimeters and at various other sites throughout the upper and middle Bear River Basin during 1982; some of these sites were changed in 1983 and later. Station names and locations are listed in Table 3 and shown in Figure 1. Data at the Bear River stations were usually recorded from late April or early May through mid October. The sites were visited at 1-week intervals. During each visit, readings with a hand-held psychrometer were taken to verify electronic measurements of air temperature and relative humidity. Water table depth was measured in the lysimeters and irrigation water was added as needed. Soil moisture was measured with neutron probes and routine maintenance was performed. Field data were transferred to computer files every other week. A brief description of each site follows.

Preston Station.- The Preston station (101) was located in a non-irrigated alfalfa hay field 100 yards east of US Highway 91 (Figure 4) approximately 9 miles northwest of the city of Preston, Idaho (Figure 1). This site was surrounded by alfalfa for over 450 feet on all sides. The soil was a deep, lacustrine, silty clay loam with slopes of less than 1%. Neutron probe access tubes were augered to a depth of 9 feet, where dry soil was encountered. During the 1982 season, this station recorded the weather parameters listed in Table 1. During 1983 through 1985, the station did not record solar radiation or wind direction. The morning dewpoint was based on the 8 AM air temperature and relative humidity. The day-to-night wind ratio was calculated using day-time winds between 8 am and 8 pm.

Talmage Stations.- The Talmage stations, irrigated alfalfa (102) and dryland winter wheat (103), were located 8.5 miles north of Grace, Idaho, and approximately 10 miles west of Soda Springs, Idaho (Figure 1). The irrigated alfalfa station, 102, was established approximately 200 yards east of a north-south county road in an sprinkle irrigated alfalfa field (Figure 5) with over 600 feet of irrigated alfalfa on all sides. Access tubes were augured to 7 and 8 feet, where lava rock was encountered. This station recorded the full complement of weather parameters during 1982 to 1985.

The dryland winter wheat station, 103, was situated in three different fields within a mile of the irrigated alfalfa station. The site was surrounded by dryland wheat and small areas of lava rock and sagebrush for about 300-600 feet. Both of the Talmage sites have a silt loam surface soil and compact, highly calcareous silt loam subsoil overlying basalt bedrock. This soil is predominately aeolian in origin. Access tubes were augered to a depth of 6 and 9 feet, where lava rock was encountered. The dryland station did not record solar radiation, wind direction or precipitation from 1982 to 1984.

Table 3. Names and locations of automated weather sites in the Bear River Basin of Idaho, Wyoming and Utah, 1982-1988.

Site Code	Name	Crop	Location	Lat.	Elev.
101.	Preston, Id. (12km NW)	Dryland Alfalfa	T14S,R39E,S8	42° 13'	4800
102.	Talmage, Id.	Irrigated Alfalfa	T9S,R40E,S27	42° 42'	5600
103.	Talmage, Id.	Dryland Alfalfa	T9S,R40E,S27 (or vicinity)	42° 42'	5600
201.	Randolph, Ut (J.R. Ranch)	Irrigated Meadow	T12N,R8E,S30	41° 45'	6280
104.	Montpelier, Id.(Wallentine)	Irrigated Meadow	T14S,R44E,S15	42° 43'	5928
301.	Hilliard Flat (Brown, 1982) (Barker, 1983-88)	Irrigated Meadow	T13N,R119W,S28 (S34, in 1982)	41° 5'	7550
108.	Malad, Id. (1988)	Irrigated Pasture	T14S,R36E,S20	42° 11'	4500
109.	Grace, Id (1988)	Irrigated Alfalfa	T10S,R40E,S28	42° 32'	5180

Note: The Randolph (J.F. Ranch) station was moved 1/4 mile to the west and incorporated into the Utah Agriculture Weather Network in 1986 and has been equipped with a telephone modem for real time access. The data set was converted to hourly time increments.

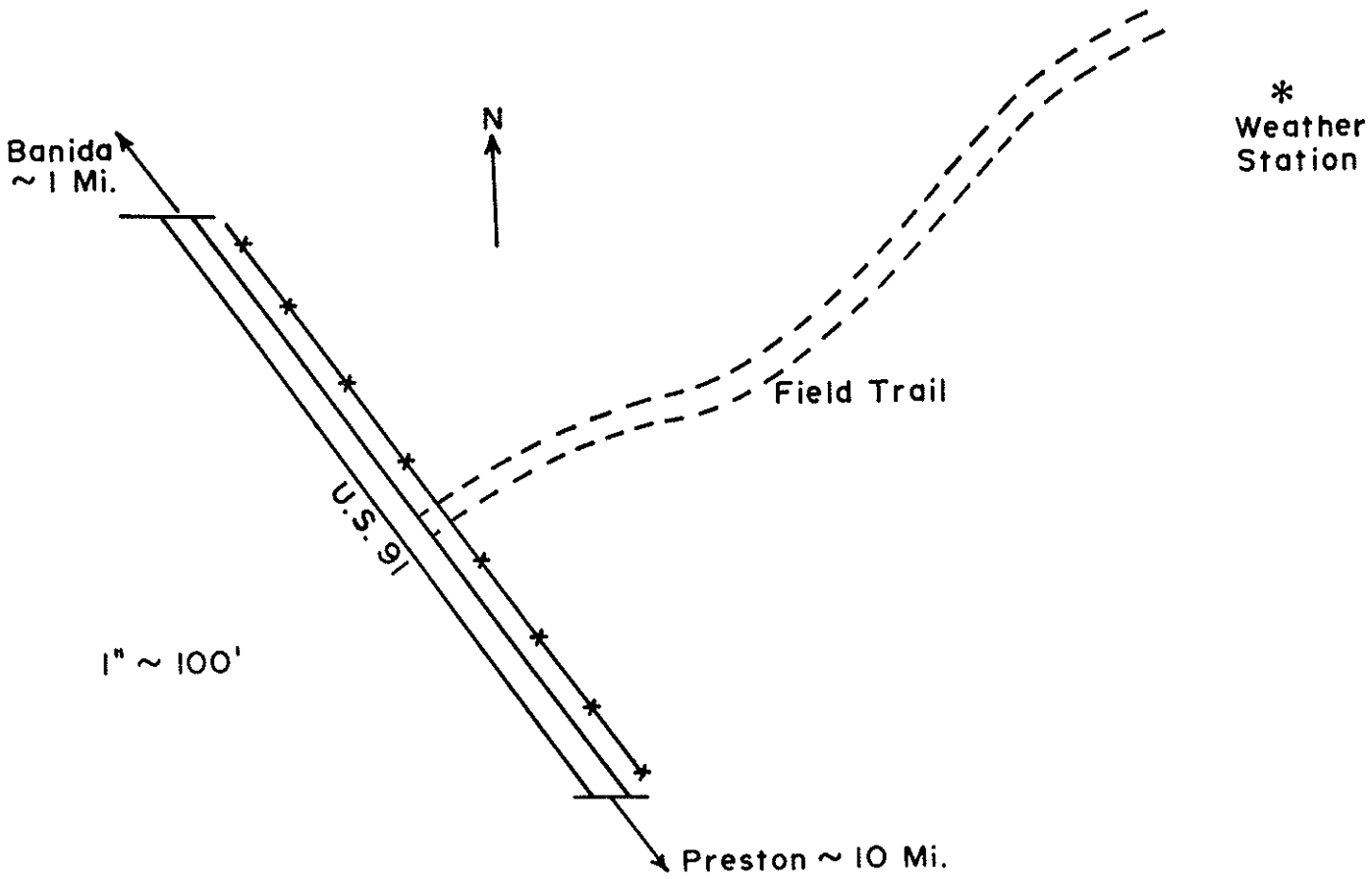


Figure 4. Map of Preston, Idaho, site.

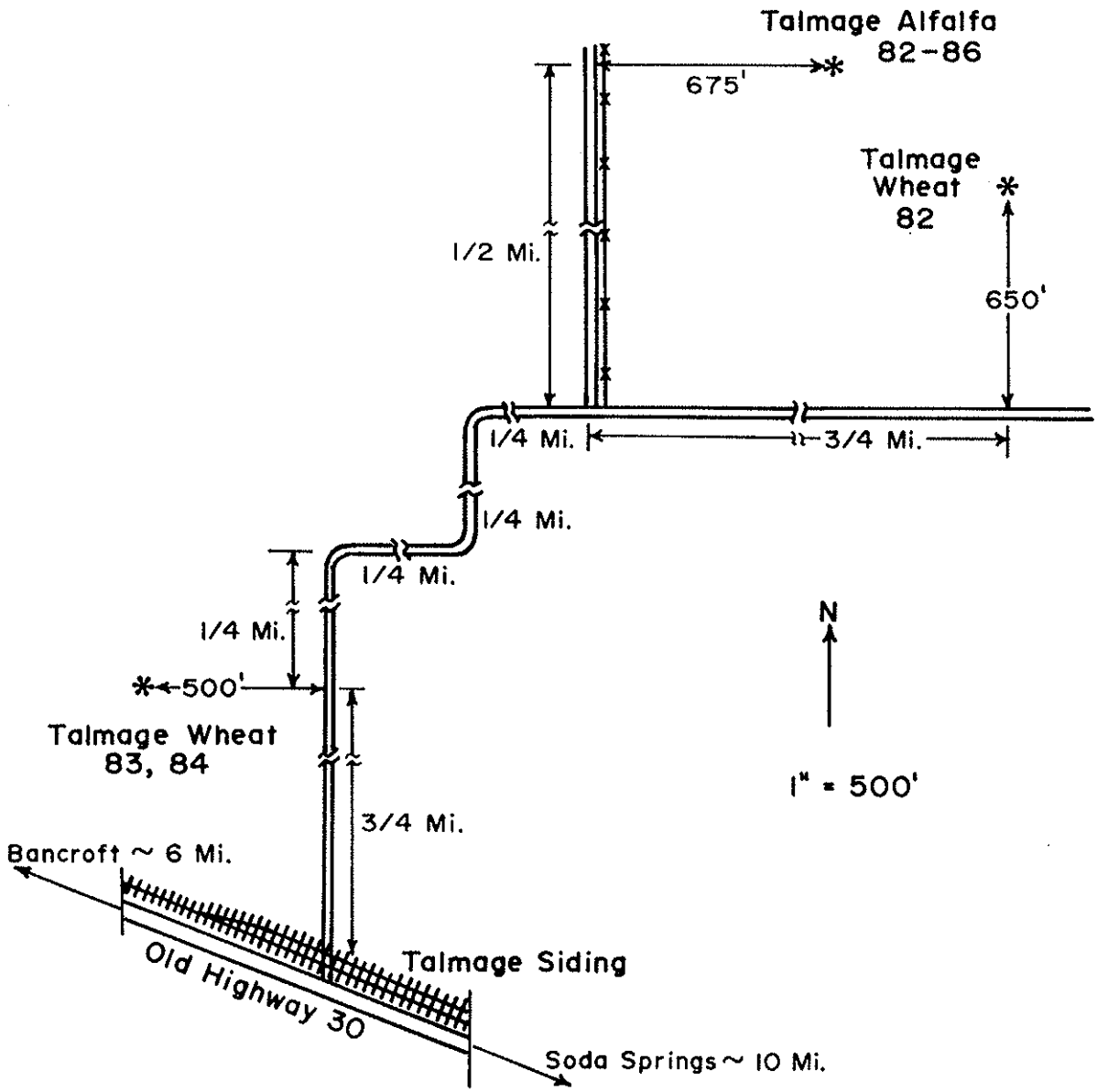


Figure 5. Map of Talmage, Idaho, site.

The morning dewpoint temperature for both stations were calculated using the 8 a.m. air temperature and relative humidity. The day-to-night wind ratios for both stations were calculated using daytime winds between 8 a.m. and 8 pm.

Montpelier Station.- From 1983 through 1986, the Montpelier, Idaho, station (104) was established in the stack yard of the Wallentine ranch approximately 150 yards north of the east-west road connecting Paris with Dingle, Idaho (Figure 6). During 1987, the station was moved approximately 200 feet southeast to an irrigated meadow hay/pasture field. Three lysimeters were installed on the June 9 and 10, 1983. Each lysimeter was located in a different native vegetation mix. The soil type was a dark loamy clay to a depth of about 20 inches overlying a clay subsoil. In 1986, two additional lysimeters were installed in the adjacent meadow.

This station recorded the full complement of weather parameters. The morning dewpoint temperature and day-to-night wind ratio for this station were calculated as for the Preston and Talmage stations.

Randolph Stations.- The Randolph station (201) (Figure 1), was located in the Bear River Valley about 8 miles northeast of Randolph, Utah, some 600 feet north of an east-west ranch road in an irrigated meadow hay field (Figure 7). Two lysimeters were installed on May 26 and 27. The soil was silty-clay loam 15-16 inches deep underlain by medium sand. Irrigated meadow extended 1 to 2 miles on all sides. The access tubes were installed in alfalfa in a deep loamy sand soil approximately 3/4 mile to the west. The station recorded the full complement of weather parameters from 1982 through 1987. However, the data was recorded in 6 and 24 hour summaries from 1983 to 1986 and in hourly and 24 hour summaries in 1987. The morning dewpoint temperature was calculated from the 8 a.m. summaries for 1987 and was estimated from the average air temperature and average relative humidity for 1983 to 1986. The day-to-night wind ratios were based on daytime winds between 6 a.m. and 6 p.m. from 1983 to 1987. The 1982 morning dewpoint temperature was assumed to be the minimum air temperature and the day-to-night wind ratio could not be determined. The anemometer was 6.5 feet (2 meters) above the vegetation surface from 1982 through 1985 and 9.8 feet (3 meters) above the vegetation surface from 1986 to 1987.

The Randolph sagebrush site was located 4 miles north of Randolph just west of Highway 16 on the Thornock Ranch. Sagebrush surrounded the station for a least 1/4 mile in all directions. Two access tubes were installed to a depth of 8 feet just west of the station on land owned by the Bureau of Land Management. Soil was a clay loam with a gravel layer at 8 feet.

Hilliard Station.- The Hilliard Flat (Barker) meadow site was located about 15 miles southeast of Evanston. The weather station (301) was 1/8 mile east of Highway 150 and two lysimeters were 1/8 mile west of the highway (Figure 8). All installations were in irrigated meadow. Two lysimeters were installed on June 7 and 8, 1983. Soil type was a clay loam to about 1 foot overlying a kaolinitic clay subsoil with large cobbles. The Hilliard Flat (Brown, 1982 only) irrigated meadow site was located approximately 16 1/2 miles southeast of Evanston, 1/2 mile east of Highway 150. During 1982,

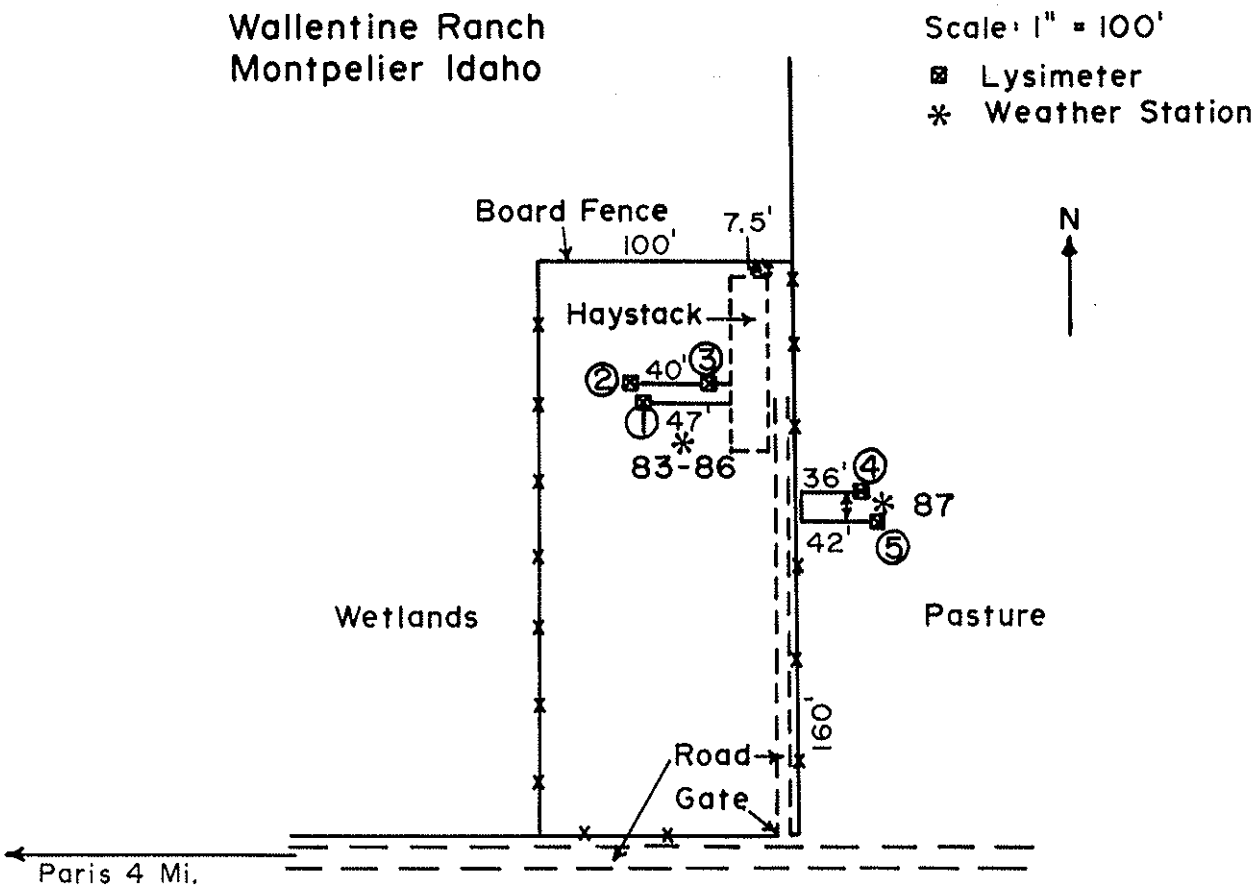


Figure 6. Map of Montpelier, Idaho, site.

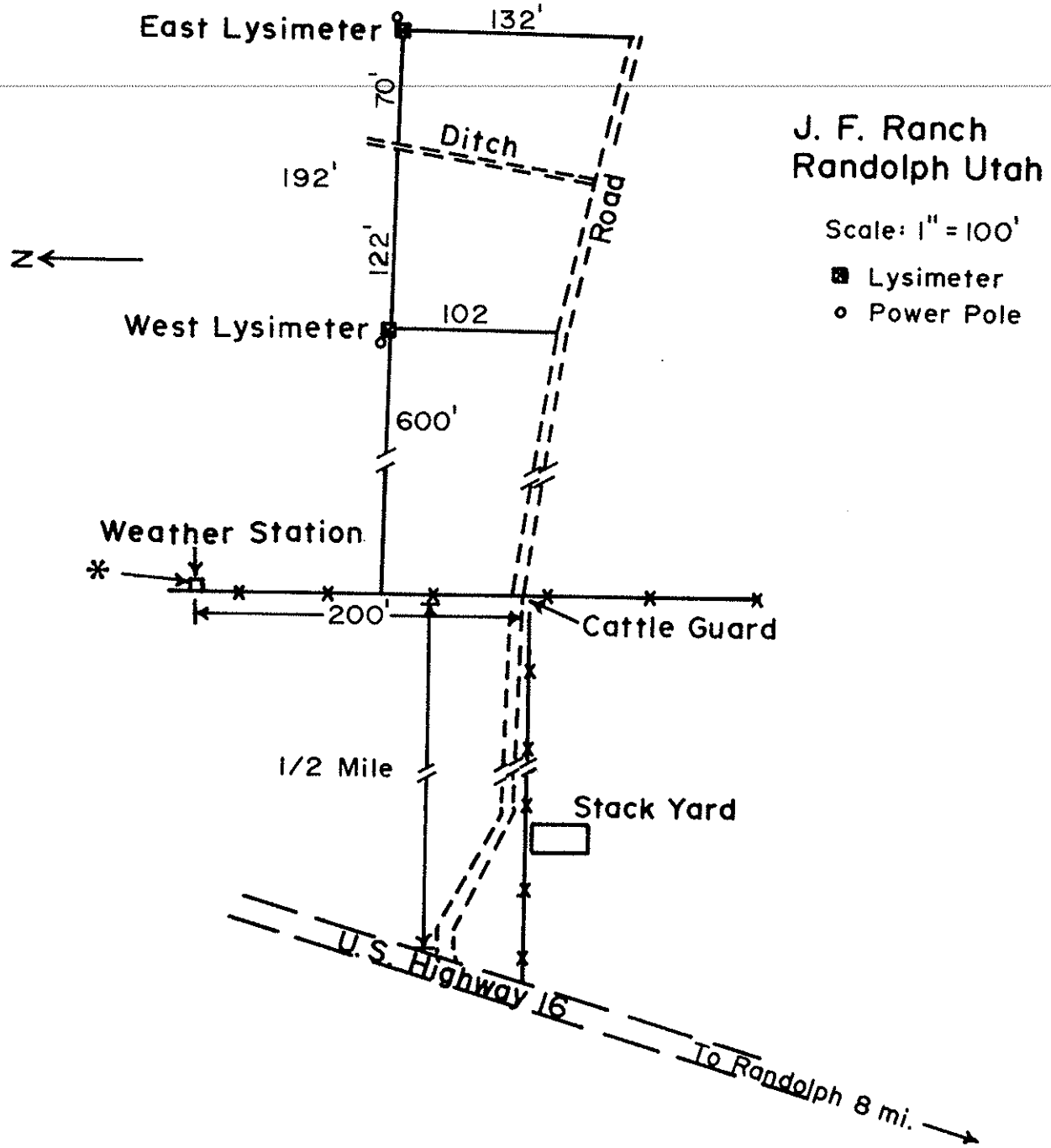


Figure 7. Map of Randolph, Utah, site.

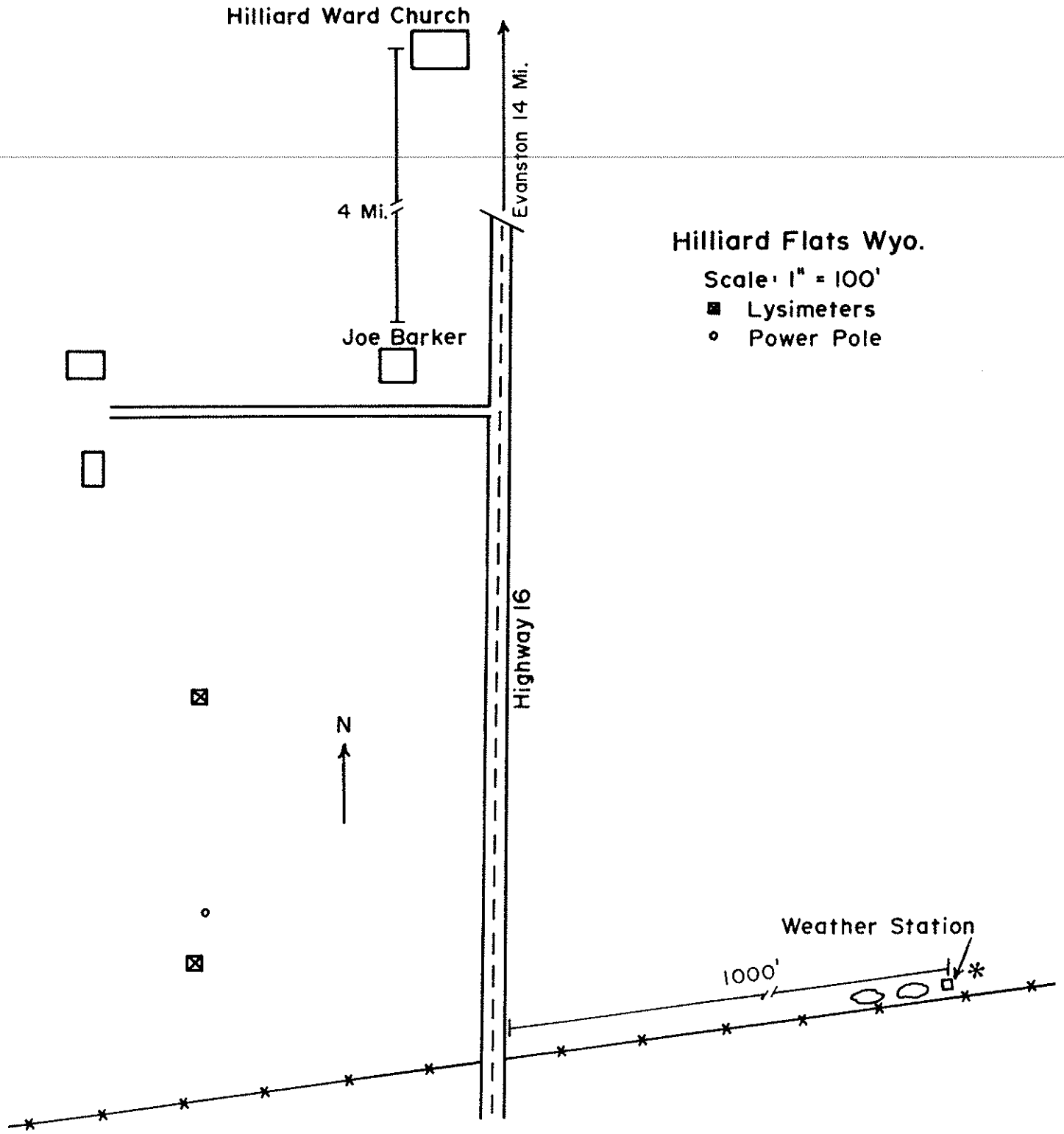


Figure 8. Map of Hilliard, Wyoming, site.

only air temperature and solar radiation were recorded with an Eprom storage unit. From 1983 through 1987, all weather parameters were recorded (Table 1). Data summaries were recorded on 24 hour basis for 1982 through 1987 and 6 hour summaries were recorded from 1983 through 1987. Morning dewpoint temperatures were estimated from the average air temperature and relative humidity for 1983 through 1987. Morning dewpoint temperature was not estimated in 1982. The day-to-night wind ratio for 1983 to 1987 was calculated from daytime winds between 6 am and 6 pm. The wind anemometer was 6.5 feet (2 meters) above the vegetation surface from 1983 through 1985 and 9.8 feet (3 meters) above the vegetation surface from 1986 to 1987.

Weather Data Analysis

Recording equipment failed several times during the study due to electronic problems or human error. During these times, the weather data for the station were estimated by regression based on readings from other automated stations and nearby National Weather Service observation stations. Missing data were estimated except precipitation and day-to-night wind ratio.

The data from the stations were converted to appropriate units, and the morning dewpoint temperature and day-to-night wind ratio were calculated. When morning observations were not available, the dewpoint temperature was based on the average of minimum and maximum air temperatures and relative humidities [1]. Analysis of the resulting vapor pressures calculated from 8 a.m. dewpoints and other combinations of air temperatures and relative humidities indicated that the vapor pressure based on the "mean" temperature and relative humidity (RH) was the closest approximation to the vapor pressure based on the 8 a.m. reading. Table 4 shows the sum of squared vapor pressure residuals for the different methods. The method with lowest value is the most accurate.

Table 4. Estimated vapor pressure at 8 a.m.

Method	Station 101	102	103	104	201
	Mean of Residuals Squared				
Dewpoint assumed to be					
Minimum air temperature	5.35	5.10	6.92	6.77	6.41
Minimum temperature & maximum RH	3.99	7.25	7.44	8.27	7.97
Maximum temperature & minimum RH	6.56	11.22	8.68	9.62	8.65
Mean temperature & mean RH	2.57	2.51	4.28	2.51	1.87

The resulting data sets for each station consisted of daily minimum and maximum air temperature, morning dewpoint temperature, minimum and maximum relative humidity, daily wind movement, daily solar radiation and daily precipitation.

NOAA - National Weather Service Stations

Data from the automated weather stations were compared to weather observations from the NWS stations, which are operated by individuals and firms in cooperation with NWS. The stations selected were Grace, Preston, Lifton Pumping Station, Woodruff, Border, and Evanston (Table 5). These are temperature and precipitation stations, with the exception of the Lifton Pumping station, which has pan evaporation and some wind information.

Table 5. Period of record for selected NWS weather stations in the Bear River Basin.

	Station	Precipitation	Temperature
Grace, Idaho	10-3732	1-1907 to 12-1987	*
Lifton P.S., Idaho	10-5275	10-1919 to 12-1987	*
Malad, Idaho	10-5559	1-1944 to 12-1987	*
Preston KACH, Idaho	10-7346	9-1964 to 12-1987	*
Brigham, Utah	42-0928	7-1894 to 12-1987	4-1913 to 12-1987
Corinne, Utah	42-1731	1-1870 to 12-1987	1-1897 to 12-1987
Laketown, Utah	42-4856	1-1910 to 12-1987	*
Logan 5SW, Utah	42-5194	5-1969 to 12-1987	*
Logan USU, Utah	42-5186	9-1890 to 12-1987	1-1891 to 12-1987
Richmond, Utah	42-7271	8-1949 to 12-1987	9-1911 to 12-1987
Tremonton, Utah	42-8817	4-1913 to 12-1987	*
Woodruff, Utah	42-9595	1-1897 to 12-1987	*
Border, Wyo.	48-0915	1-1902 to 12-1987	*
Evanston, Wyo.	48-3100	4-1898 to 12-1987	*

* Indicates the same period of record as precipitation.

Evapotranspiration Estimation

Consumptive use, evapotranspiration (E_t), or crop water use (see Glossary for definition of technical terms) can be estimated by many different techniques depending on study objectives and financial and data resources. These techniques range from equations that use only monthly average temperatures to thoroughly instrumented field research sites with weighing lysimeters. Additional data on crop water use are available from irrigation scheduling, experimental plots and field research studies such as this. Differences in E_t as calculated by various equations are a concern, as are estimates of field crop E_t from irrigation scheduling and research plots that differ from calculated values. Hill et al. (1983) compared E_t values calculated by 16 different equations, or variations, for selected sites throughout the 17 western states with field research consumptive use. They found considerable variation between calculated and field estimates of E_t.

The general form of consumptive use equations is:

$$E_t = K_c \, E_{tr} \qquad (1)$$

where

E_t is the estimated crop evapotranspiration;

K_c is an empirically determined crop coefficient relating crop Et to reference crop E_t; and

E_{tr} is calculated E_t for a reference crop such as alfalfa at 16 inches of top growth adequately irrigated so that transpiration is not limited by available soil moisture. Another common reference is that of clipped grass, water not limiting.

The value of a crop coefficient (K_c) at a particular growth stage depends on plant transpiration as well as evaporation from the soil surface. Care must be exercised in applying K_c values for one research site to other sites with different conditions.

Empirical E_t equations were developed to simulate crop water use using readily available climatological measurements instead of having to directly measure E_t. This did not completely model the actual physical behavior of the complex plant-environment interaction but proper local calibration and the selection of appropriate crop coefficients (K_c) mean that empirical equations can provide reasonable estimates of E_t accurate enough for engineering purposes.

The physically based energy budget Penman combination E_t equation is one of the more widely used methods to calculate reference crop evapotranspiration (E_{tr}) where sufficient weather data is available. In the Penman equation, daily E_{tr} estimates depend on air temperature, solar radiation, relative humidity and wind speed. A modified Penman equation, as calibrated at Kimberly, Idaho (Wright and Jensen (1972) and Jensen (1974)), was used as a standard in this study. Appendix A contains a detailed description of the Kimberly (1972) version of the modified Penman equation.

Water use by crops other than the irrigated meadow (as estimated from lysimeter data) was obtained with "mean" crop coefficients (K_{cm}) from Kimberly, Idaho (Wright, 1981), and the Penman equation. The USU CRPSM computer model (Hill, Hanks and Wright, 1984) calculated crop E_t (eq. 1) from Penman E_{tr} using the available data in each of the various subareas of the Bear River.

The K_{cm} crop curves are represented in the CRPSM model by polynomial equations of the form:

$$K_{cm} = a_0 + a_1 r + a_2 r^2 + a_3 r^3 \qquad (2)$$

or

$$K_{cm} = b_0 + b_1 d + b_2 d^2 + b_3 d^3 \qquad (3)$$

where K_{cm} is the estimated daily value of the mean crop coefficient, E_t/E_{tr}, and is generally constrained by maximum and minimum limits; a_0, a_1, a_2, a_3, and b_0, b_1, b_2, b_3 are polynomial coefficients determined by regression analysis; r is the fraction of time from planting to effective cover, (i.e., days from planting to the present divided by days from planting to effective cover, percent/100) for estimating K_{cm} before effective cover; and d is days after cover for estimating K_{cm} after effective cover. Coefficients for the K_{cm} polynomials are in Appendix A, Table A1.

Empirical Equations

Four empirical equations were selected (for the historical depletion calculation) which use only monthly temperature as available at NWS stations. Their definitions are (numbers in [] refer to references):

SCS Modified Blaney-Criddle [18]

$$u = k_c\, k_t\, (tp/100) \tag{4}$$

where

u is monthly consumptive use, inches;

t is mean monthly temperature, °F;

p is percentage of daylight hours of the year occurring during a particular month;

k_c is monthly growth stage coefficient; and

k_t is a climatic coefficient calculated by:
$k_t = 0.0173t - 0.314$, subject to $k_t \geq 0.30$.

SCS Blaney-Criddle, calibrated k_t

$$u = k_c\, (at + b)\, (tp/100) \tag{4a}$$

This equation is the same as eq.(4) except that $k_t = at + b$ where a and b are calibrated for a given region. For the Bear River Basin a and b were 0.0097 and 0.3534, respectively.

FAO Modified Blaney-Criddle [4]

$$ET_o = b_{bc}\, [p\, (0.46T + 8)] + a_{bc} \tag{5}$$

where

ET_o is reference Et, clipped grass, mm/day (1 inch = 25.4 mm).

p is mean daily percentage of daylight hours of the year [4];

T is mean daily temperature, °C (°C = 5[°F -32]/9); and

a_{bc} and b_{bc} are adjustment factors, determined as described in reference 4, p. 110. The value of a_{bc} depends upon minimum relative humidity and sunshine. The b_{bc} values range from 0.38 to 2.63 depending on minimum relative humidity, sunshine, and daytime windspeeds. A regression equation for b_{bc} is given in Appendix C of [8].

The authors suggest ET_o values be increased by 10 percent for each 1000 meters altitude above sea level in arid or semiarid areas. Crop coefficients given in [4] should be used only with FAO equations.

Hargreaves delta temperature [6, 17]

$$E_{trg} = 0.0075\ T\ R_S \qquad (6)$$

where

E_{trg} is reference Et, well-watered grass, langleys per day; (multiply by 0.000673 to convert to inches)

T is mean temperature, °F; and

R_S is incident global solar radiation, langleys per day.

Since R_S was not measured at the NWS stations, it was estimated by:

$$R_S = c_1\ (Tmax - Tmin)^{0.5}\ R_A$$

where Tmax and Tmin are maximum and minimum air temperatures, respectively, °F; R_A is the theoretical daily solar radiation at the top of the atmosphere (extraterrestrial), Langleys; and c_1 is a calibration and units constant. We used a value of 0.127 for c_1.

Calibration of Empirical Et Equations

Two procedures were used to calibrate the empirical E_t equations to the water use measured by lysimeters. The first was calibrated by calculating the monthly E_t with a selected empirical equation using NWS weather data. A crop coefficient value of one was assumed for equations 4 and 4a. The E_t calculated from the equation was then divided into the measured water use value for the same time period to determine an estimated crop coefficient. Thus,

$$K_C \text{ estimated} = E_t \text{ measured} / E_t \text{ calculated.}$$

Prior to data analysis, it was anticipated that the estimated K_C values for a given E_t method (eq. 4, 4a, 5 or 6) would exhibit some consistency among years at the same site and, perhaps, among sites as well. However, the results of preliminary analysis indicated that this was not so. Thus, an alternate procedure was adopted.

The Penman method was used in the second procedure to calculate the E_t. The irrigated meadow estimated K_C values were then determined for each

week, as described, for the three sites and all years. Crop coefficient curves to be used with the Penman equation, similar to those for other crops (Hill, et al. 1983 and Wright 1981 and 1982), were developed for irrigated meadow using regression analysis techniques and judgement. The Penman equation, with these derived meadow K_c values and the K_{cm} curves (Appendix A), was the standard for developing crop coefficients for equations 4-6 for the several crops in each subbasin.

Depletion Calculation

Depletion was calculated as the water year E_t less the sum of carry-over soil moisture (SM_{co}) and effective precipitation. In equation form:

$$Dpl = E_t - SM_{co} - Pef \qquad (7)$$

where

Dpl is estimated depletion for a given site or subbasin;

E_t is calculated cropwater use from one of the calibrated empirical E_t equations;

SM_{co} is moisture which is "carried over" from the previous non-growing season (Oct 1 - April 30) as stored soil water in the root zone available for cropwater use subsequent to May 1; and

Pef is an estimate of that portion of precipitation measured at an NWS station during May - September which could be used by crops in the corresponding subbasin.

Estimated depletion, which accounts for the effect of winter and summer precipitation and evapotranspiration, thus represents a net irrigation requirement at 100% irrigation efficiency.

Crop water use, E_t, was a weighted average for the several crops in a given subbasin. E_t for each crop was multiplied by that crop's fraction of total irrigated crop area. These "weighted" E_t values for all crops were then added to determine the weighted average subbasin E_t. Crop acreages given in the Bear River Hydrologic Inventory [19] were used to determine the crop weighting fractions. Water-related land use by subbasin from that report is shown in Table 6. The corresponding irrigated crop area percentages for each crop are given in Table 7. Crop growth dates used for each subbasin are given in Appendix D.

The carry-over soil moisture (SM_{co}) was estimated by assuming that 67% of adjusted precipitation from October through April could be stored in the root zone. If this exceeded 75% of the available soil water-holding capacity of the average root zone in the subbasin, the excess was considered as lost to drainage or runoff and not available for crop use. Adjusted precipitation was equal to total precipitation minus 1.25 times any calculated E_t occurring during October-April. This adjustment (1.25 E_t) for crop water use during the "non-growing" season was consistent with how

Table 6. Summary of water-related land use in the Bear River Basin (acres)*.

Crops	Classi-fication	Evanston 01	Randolph 02	Cokeville 03	Thomas Fork 04	Bear Lake 05	Soda 06	Oneida 07	Cache Valley 08	Malad 09	Tremonton 10(b&c)	Brigham City 10(a)	Summary By States Utah	Idaho	Wyom.	Total Basin
Alfalfa	A1	670	1,916	577	425	8,959	2,677	11,873	52,429	8,066	17,282	2,808	58,657	47,687	1,278	107,622
Pasture	A2	11,718	5,518	9,076	7,435	12,347	3,703	6,221	27,563	13,114	13,301	2,516	40,911	49,259	22,342	112,512
Other hay	A3	19,037	40,025	18,982	13,064	20,121	6,098	4,087	6,058	753	1,187	164	52,552	39,183	37,183	129,576
Small grains	A4	502	1,213	510	319	10,098	3,022	7,927	50,020	5,064	17,645	1,878	55,449	41,792	957	98,198
Corn	A5					42		36	9,469	182	6,393	1,331	14,023	3,430		17,453
Sugar Beets	A6							1,471	4,827	137	8,547	1,796	13,555	3,223		16,778
Potatoes	A7							1,363	289	91	115	3	303	1,558		1,861
Orchard	A8								392		283	1,042	1,523	104		1,627
Peas	A9	(This crop was included with small truck in model.)														
Tomatoes	A10								3		447	180	630			630
Small Truck	A11					46		466	683		118	48	687	674		1,361
Idle	A12	(Idle acreage was deleted from the modeled area.)														
Beans	A13								275		273	17	513	52		565
Total		**31,927**	**48,672**	**29,145**	**21,243**	**51,613**	**15,500**	**33,444**	**152,008**	**27,347**	**65,591**	**11,733**	**238,803**	**186,962**	**62,418**	**488,183**
Open Water	B	2,434	2,073	803	924	8,030[a]	1,890	1,005	7,775	163	5,490	4,350[a]	24,298	9,995	2,751	37,044
Marshes, tules cattails	C1	90	884	0	291	21,283	848	597	7,515	1,172	978	3,678	10,863	25,982	109	37,057
Grasses, willows cottonwoods	C2	70	2,145	68	720	7,307	0	0	15,863	1,758	3,678	10,863	24,679	17,795	99	42,573
Grasses, & med. density trees	C3	4,572	765	1,344	199	3,100	2,886	1,233	15,771	2,960	8,855	11,558	28,899	18,477	5,837	53,213
Low water table, light density	C4	285	608	15	0	2,636	0	0	5,776	0	4,264	6,271	15,479	4,337	39	19,855
TOTAL (B&C)		**7,451**	**6,475**	**2,230**	**2,134**	**42,356**	**5,624**	**2,835**	**52,700**	**6,023**	**23,265**	**36,428**	**104,321**	**76,562**	**8,835**	**189,742**

* From Table 18, page 112, Hydrologic Inventory of the Bear River Study Unit, Utah Division of Water Resources, Utah Water Research Laboratory, Logan, Utah, February 1973.

a Area of Bear Lake and Bird Refuge are not included in these quantities.

Table 7. Subbasin crop weighting percentages for agricultural land use in the Bear River Basin.

Subbasin	Crop									
	Al-falfa	Other hay	Pas-ture	Sprng wheat	Wntr wheat	Sprng barley	Sugar[a] beets	Corn	Orch-ard	Pota-toes
1. Evanston	2	60	37	1						
2. Randolph	4	82	11	3						
3. Cokeville	2	65	31	2						
4. Thomas Fork	2	62	35	1						
5. Bear Lake	17	39	24			2				
6. Soda Sprng	17	39	24	7	6	7				
7. Oneida	37	12	19	8	8	8	4			4
8. Cache Vly	35	4	18	6	15	12	3	6		
9. Malad	29	3	48	5	9	5		1		1
10. Tremonton	28		20	6	14	7	13	10		2
11. Brghm City	25		21	5	5	6	15	12	9	2

[a]The area shown in sugar beets, while historically correct, does not reflect the current situation. The cropland previously in beets is probably now in corn or small grains.

effective precipitation was estimated in the growing season. The growing season was assumed to be May 1 through September 30. Thus, some E_t occurs in the non-growing season, particularly in the lower subbasins.

Growing season precipitation was considered to be 80% effective in contributing to crop water use. The effectiveness factor of 80% allows for precipitation depths throughout a subbasin that might differ from NWS rain gage amounts. It also includes a reduction for mismatches in timing between rainfall events and irrigation scheduling.

The value of 67%, while somewhat arbitrary, was based upon neutron probe soil moisture readings in alfalfa at the J.F. Ranch near Randolph and at Etcheverry's ranch near Border. Years were selected in which the soil water content was relatively low in the fall, ie., late fall irrigation was apparently not applied. The over winter soil moisture gain in two access tubes at each site was averaged for 1982-83, 1983-84, 1986-87 at the J.F. Ranch and for 1985-86 at Etcheverry's. The corresponding stored soil water gain was 71%, 46%, 70% and 66%, respectively, for an average of 63% comparing October-April precipitation at Woodruff with soil moisture gain at the J.F. Ranch and Border precipitation with that at Etcheverry's. However, deleting the lowest single moisture gain (29%) increased the average to 68%.

Weather data needed to calculate the historical depletion was obtained for NWS sites (see Table 5) throughout the Bear River Basin. Monthly average maximum and minimum temperatures and total monthly precipitation were obtained for Evanston and Border, Wyoming; the Lifton pumping station, Grace, Malad and Preston, Idaho; and Woodruff, Laketown, Richmond, Logan 5SW, Tremonton and Brigham City, Utah. Missing values were estimated using multiple linear regression techniques. The completed weather data sets by station for water years 1976 through 1987 are given in Appendix C.

RESULTS AND DISCUSSION

Estimated Crop Water Use for Irrigated Meadows

Seasonal irrigated meadow water use varied from 15.8 to 32.5 inches for 1984 through 1987 under the established growth conditions (Table 8). These E_t estimates were based on balance equations. Weekly soil water changes were estimated from neutron probe and water table observations with specific yield estimates. Specific yields and weekly field observations for each individual lysimeter are summarized in Appendix B. Water use for 1986 and 1987 was higher than other years, possibly because the growing season was longer than usual and irrigation continued on through September.

The irrigation season in the Upper Bear River is generally over by mid-July. The lysimeters, particularly in 1986 and 1987, were irrigated through late August and September to keep the vegetation healthy and to enhance root development. The estimated E_t was adjusted to obtain values as if the lysimeters had been allowed to dry out after mid-July. This adjustment reduced seasonal E_t up to 5 inches and was largest in 1986 and 1987 (Table 8). The length of the growing season varied considerably because of the different dates at which measurements were taken in the spring.

Weather Data Collection and Analysis

NWS Station Weather

NWS station average daily weather data for 1982-1987 are summarized in Table 9. July is the warmest month (higher average maximum temperatures) at stations at the lower elevations (Lifton, Grace and Preston-Kach) whereas August is the warmest at Woodruff, Border and wettest and driest months were September and June, respectively, at the six stations. Minimum air temperatures for all months were higher at Lifton than at the other stations (except for August and September at Preston-Kach) whereas Woodruff had the lowest average minimum. Lifton's maximum temperatures were the lowest of any site. Maximum temperatures at Border, Woodruff and Evanston were similar. May-September precipitation was highest at Grace and lowest at Hilliard.

Monthly average maximum and minimum air temperature and total precipitation (1975-1987) for these and all other NWS stations used in the depletion calculation are in Appendix C. The wettest calender year was 1983, followed closely by 1982, except at Lifton where the converse was experienced. Precipitation during 1983 averaged 154% and varied from 140% (Grace) to 170% (Evanston) of the 13-year (1975-1987) station average total annual precipitation. September 1982 was the wettest month at Evanston, Woodruff, Border, Lifton and Brigham City. However, precipitation in 1985 and 1987 was lower than average. Thus, during the 5 years of this study, 1982-1987, there were both relatively wet and dry years.

Table 8. Seasonal water use of irrigated meadows at three sites in the Bear River Basin (1983-1987).

	1983	1984	1985	1986	1987
	. . . . .		inches		. . . . .
Unadjusted					
Montpelier					
old	13.8	20.0	23.6	23.1	27.8
new				15.8	32.5
Randolph	17.5	22.5	26.2	27.0	28.7
Hilliard	16.5	15.8	20.5	28.7	29.5
Adjusted[a]					
Montpelier					
old	13.8	20.0	20.7[b]	20.2	24.5
new				12.2	27.5
Randolph	17.5	22.5	23.2	23.2	24.9
Hilliard	16.5	15.8	20.5	24.5	26.4

Season Duration

	1983	1984	1985	1986	1987
Montpelier	Jun13-Oct10	May12-Oct13	May17-Sep23	May02-Oct17	Apr24-Oct15
Randolph	Jun28-Oct11	May13-Oct13	May18-Oct15	Apr21-Oct17	Apr24-Oct16
Hilliard	Jun14-Oct11	May19-Oct03	May18-Oct15	Apr21-Oct17	Apr25-Oct16

Note: Each value represents the average of two lysimeters.

[a] Adjusted to remove the effect of continued irrigation in the lysimeters, when irrigation had ceased in the surrounding meadows after mid July.

[b] Corrected for excessive dryness in June by correlation with the Randolph data.

Table 9. Average daily weather parameters for the NWS stations (1982-1987).

Minimum air temperature

Month	105	106	107	202	302	303
May	40.2	36.3	40.0	31.2	33.4	32.8
June	47.7	41.8	46.4	39.2	40.0	39.4
July	52.2	47.2	51.7	44.8	45.2	45.8
August	49.2	47.2	51.5	43.4	43.6	47.0
September	39.7	38.0	41.7	34.0	33.4	36.8

Maximum air temperature

Month	105	106	107	202	302	303
May	61.2	66.2	67.0	64.2	64.0	62.2
June	72.3	76.0	76.6	74.0	74.2	73.6
July	78.7	81.0	84.5	80.6	80.4	81.8
August	77.3	80.2	83.3	81.8	82.2	82.2
September	67.0	71.3	72.7	68.4	69.0	67.2

Monthly precipitation

Month	105	106	107	202	302	303
May	1.94	1.47	1.80	1.36	1.92	1.00
June	0.54	1.25	1.07	0.85	1.03	0.53
July	1.69	2.12	1.44	2.09	1.41	1.22
August	1.15	1.79	1.50	1.24	1.30	2.06
September	2.30	2.46	2.69	3.12	2.47	2.71

Wind movement

Month	105	106	107	202	302	303
May	65.2					
June	69.0					
July	61.7					
August	53.5					
September	61.2					

Note: Stations are Lifton (105), Grace (106), Preston-Kach (107), Idaho; Woodruff (202), Utah and Border (302) and Evanston (303), Wyoming.

Monthly mean temperatures and precipitation at Lifton, Woodruff, Border and Evanston are shown in Table 10 for various periods. If the study period (1982-1987) were a true representation of the entire period of record, these averages would equal long-term averages. Study period and 1975-1987 July-September temperatures at Lifton during the study period and during July-September 1975-1987 were lower than normal. September temperatures were lower than normal at all sites during 1982-1987, but other months were warmer at Woodruff, Border and Evanston. Temperatures for June-September 1975-1987 were higher than normal, except at Lifton.

The 6-year (1982-1987) period was significantly wetter than normal. Precipitation during the 13-year period was also higher than normal. Typically, the wettest month (Table 10) of the year was September during the study period. However, June normal precipitation was higher than the other summer months at all sites. Except during June (and May at Border), average rainfall from 1982-1987 for each month was greater than normal.

Automated Weather Stations

Study period (1982-1987) average weather parameters for each automated weather station are shown in Table 11. Some of the parameters from the automated stations (Montpelier, Randolph and Hilliard Flat) differed from those at corresponding NWS stations (Lifton, Woodruff and Evanston). Maximum temperatures at the automated stations decreased as elevation increased, contrary to the trend at the NWS sites. However, trends in minimum temperatures were similar at both types of stations. Precipitation (May-September) at the NWS stations was more than 1.5 inches greater than at the other stations, perhaps due to differences in locations and other unknown factors. The NWS stations were situated in communities near buildings, whereas the automated units were in farm fields, where humidity may be higher, temperatures lower and more wind. Daily weather data along with calculated E_{tr} are presented for each of the automated stations in Appendix G (in a separate volume).

Monthly average maximum and minimum air temperature, wind run, relative humidity and solar radiation are shown in Figures 9, 10 and 11 for Montpelier, Randolph and Hilliard Flat, respectively. The highest maximum and minimum temperatures generally occurred in August and occasionally in July at the three sites (Figs. 9, 10 and 11). Except during September 1987, monthly air temperatures were consistent from year to year, similar to NWS station temperatures.

The average daily maximum relative humidity at Montpelier was similar from year to year, but varied between years at Randolph and Hilliard. Relative humidity was not consistently higher during any particular month although it seemed to decrease from May to September at all three sites.

The greatest average wind speed was in May; wind speed tended to decrease from May to July and then increase from July to September (Figs. 9, 10 and 11). The highest average wind speed was observed at Hilliard, followed by Randolph and Montpelier.

Table 10. Average monthly mean temperature and precipitation for NWS stations at Lifton, Idaho, Woodruff, Utah and Border and Evanston, Wyo., for 1982-1987, 1975-1987 and the "normal" period, 1951-1980.

	Mean Temperature, °F				
	May	June	July	Aug	Sept
Lifton					
1982-87	50.7	60.0	65.5	63.3	53.4
1975-87	49.7	59.5	66.1	63.2	54.2
Normal	50.5	58.9	66.6	63.5	54.2
Woodruff					
1982-87	47.7	56.6	62.7	62.6	51.2
1975-87	47.5	56.3	62.8	60.7	52.3
Normal	47.5	55.4	62.5	60.3	51.8
Border					
1982-87	48.7	57.1	62.8	62.9	51.2
1975-87	48.5	56.7	63.3	61.2	53.0
Normal	48.2	55.4	62.8	60.7	52.3
Evanston					
1982-87	47.5	56.5	63.8	64.6	52.0
1975-87	47.2	56.4	63.7	62.3	53.7
Normal	47.4	54.5	62.7	61.0	52.5

	Precipitation, inches					
	May	June	July	Aug	Sept	Calender Year Total
Lifton						
1982-87	1.94	0.54	1.69	1.15	2.30	14.08
1975-87	1.88	0.85	1.10	1.06	1.49	12.76
Normal	1.14	1.20	0.59	0.84	0.89	9.90
Woodruff						
1982-87	1.36	0.85	2.09	1.24	3.12	11.59
1975-87	1.22	0.65	0.91	0.84	1.49	9.81
Normal	0.89	1.12	0.72	0.74	0.79	8.74
Border						
1982-87	1.92	1.03	1.41	1.30	2.47	17.00
1975-87	2.13	1.01	1.38	1.25	1.77	15.72
Normal	1.32	1.48	0.76	0.94	1.12	13.47
Evanston						
1982-87[a]	1.00	0.53	1.22	2.06	2.71	13.55
1975-87[a]	1.74	0.94	0.90	1.08	1.49	12.31
Normal	1.23	1.30	0.60	0.90	0.74	10.98

[a] Includes a substantial number of estimated values.

Table 11. Average daily weather parameters for the automated stations (1982-1987).

Minimum air temperature, °F

Month	101	102	103	104	201	301
May	35.3	33.5	33.6	35.2	30.5	31.5
June	40.9	37.7	39.3	43.0	39.0	37.9
July	50.1	45.2	45.0	45.2	44.5	44.4
August	48.9	44.3	47.4	40.3	39.5	44.0
September	38.7	35.5	36.9	30.9	35.8	33.8

Maximum air temperature, °F

Month	101	102	103	104	201	301
May	65.6	62.7	61.2	63.5	62.6	58.2
June	75.8	70.8	70.0	74.0	73.3	67.1
July	85.7	80.6	81.4	80.8	79.4	72.9
August	85.6	79.7	85.0	80.8	79.9	75.0
September	71.8	67.3	70.8	69.0	67.7	63.9

Morning dewpoint temperature, °F

Month	101	102	103	104	201	301
May	37.7	34.6	34.4	38.8	34.7	29.9
June	44.0	44.4	41.7	46.7	41.2	36.4
July	49.1	49.7	47.8	51.2	47.2	41.2
August	45.9	46.6	48.5	46.6	43.6	40.9
September	38.8	37.3	36.5	37.8	33.7	31.2

Minimum relative humidity, °F

Month	101	102	103	104	201	301
May	37.8	32.5	34.0	36.2	29.6	31.8
June	32.0	33.8	34.3	32.8	25.6	26.8
July	27.3	26.3	28.0	32.0	25.0	26.0
August	24.5	24.0	25.0	24.2	23.6	26.0
September	31.8	28.0	26.3	27.4	26.4	26.0

Maximum relative humidity, °F

Month	101	102	103	104	201	301
May	91.0	86.8	84.3	95.6	91.2	81.0
June	91.5	91.5	88.3	95.2	91.4	81.2
July	87.3	90.3	92.0	96.0	90.8	79.4
August	81.0	85.8	88.7	94.4	89.4	77.6
September	88.8	87.3	82.3	95.2	88.4	76.4

Table 11 (continued)

Wind movement, miles per day

Month	101	102	103	104	201	301
May	116.0	147.7	141.1	116.9	132.5	177.9
June	95.8	94.6	95.8	84.5	104.1	151.8
July	95.1	80.0	76.2	65.3	91.5	137.5
August	103.9	97.4	81.0	76.1	93.8	142.1
September	106.4	120.1	116.7	88.4	105.1	168.0

Day to night wind ratio

Month	101	102	103	104	201	301
May	1.85	1.97	1.74	1.81	2.09	1.67
June	1.57	1.86	1.53	1.59	2.12	1.38
July	1.71	2.38	2.06	1.75	2.12	1.38
August	1.85	2.10	2.30	2.06	2.15	1.29
September	1.84	1.91	1.84	2.09	2.15	1.42

Solar radiation, langley (cal/cm^2) per day

Month	101	102	103	104	201	301
May		535		561	559	544
June		601		613	641	612
July		587		579	604	573
August		546		540	559	529
September		410		417	430	412

Total precipitation, inches

Month	101	102	103	104	201	301
May	2.13	1.44		1.43	1.14	0.98
June	1.82	2.53		0.74	0.67	1.25
July	1.99	2.56		1.23	1.07	1.33
August	1.70	1.75		1.05	1.23	1.47
September	2.24	1.40		1.52	1.94	1.15
Total	9.88	9.68		5.97	6.05	6.18

Note: See Table 1 for site descriptions. Stations are: Preston, Idaho (101), Talmage, Idaho (irrigated, 102 and dry, 103), Montpelier, Idaho (104), Randolph, Utah (201) and Hilliard Flat, Wyo. (301).

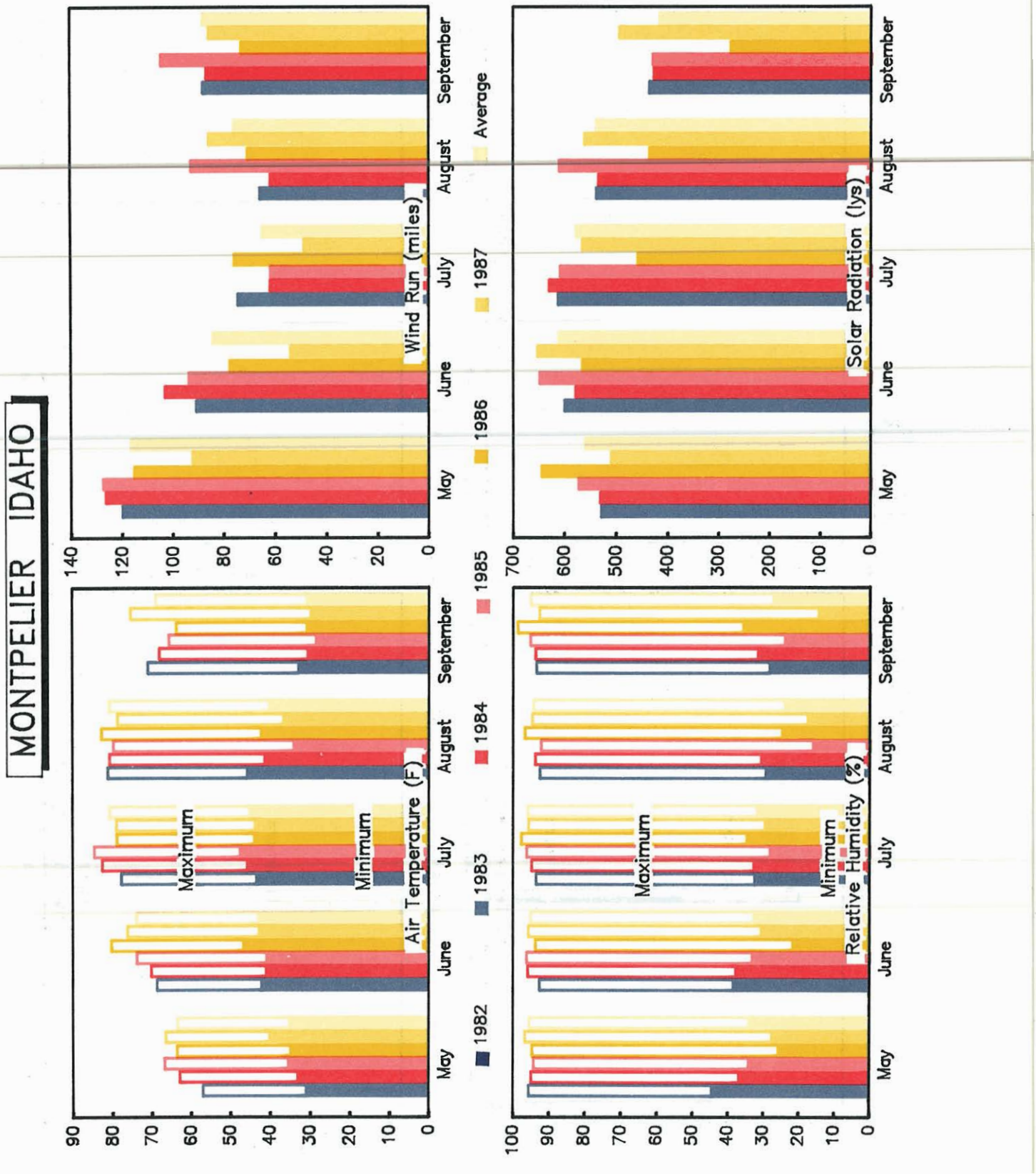


Figure 9. Weather parameters at Montpelier automated station (1983-1987).

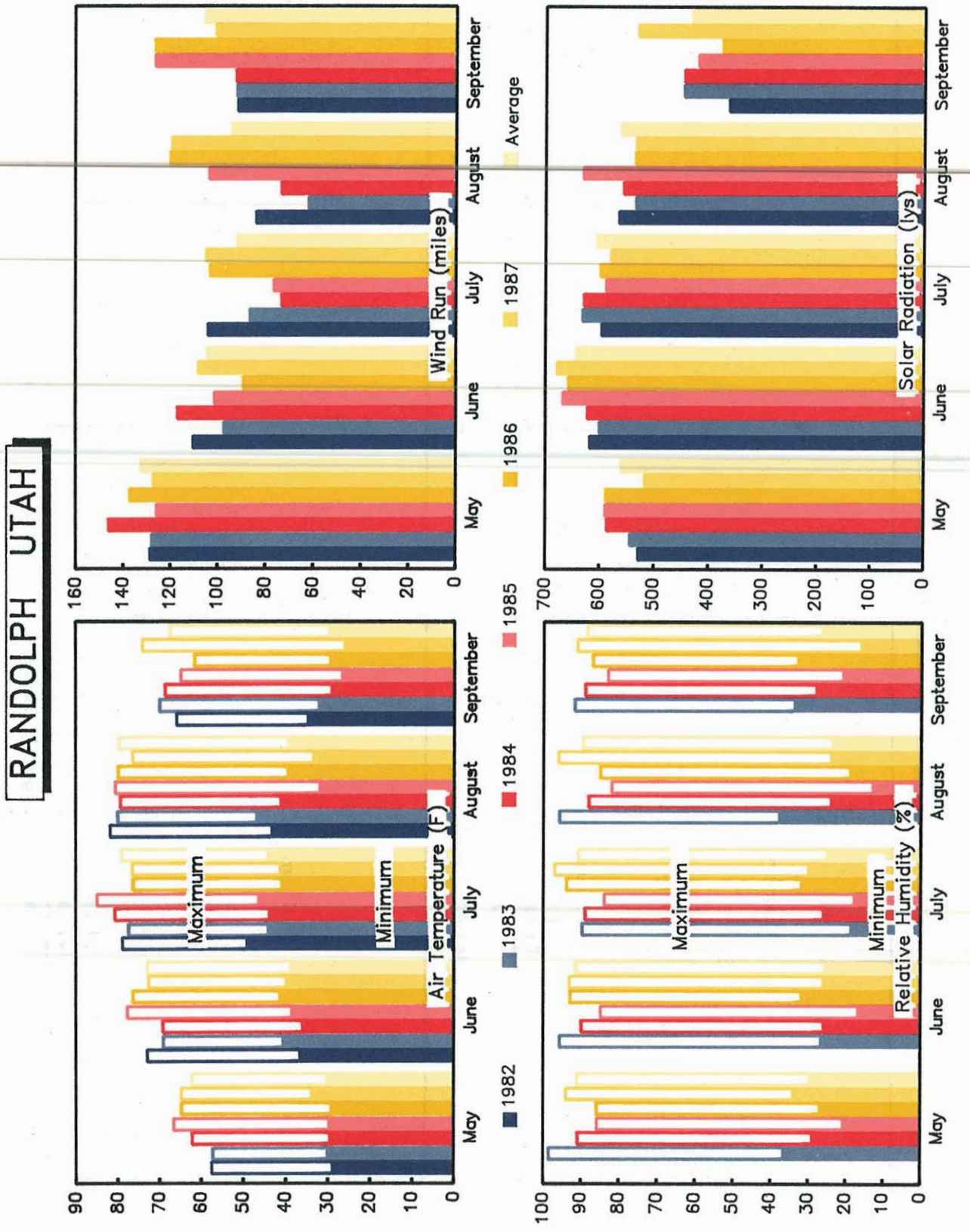


Figure 10. Weather parameters at Randolph automated station (1982-1987)

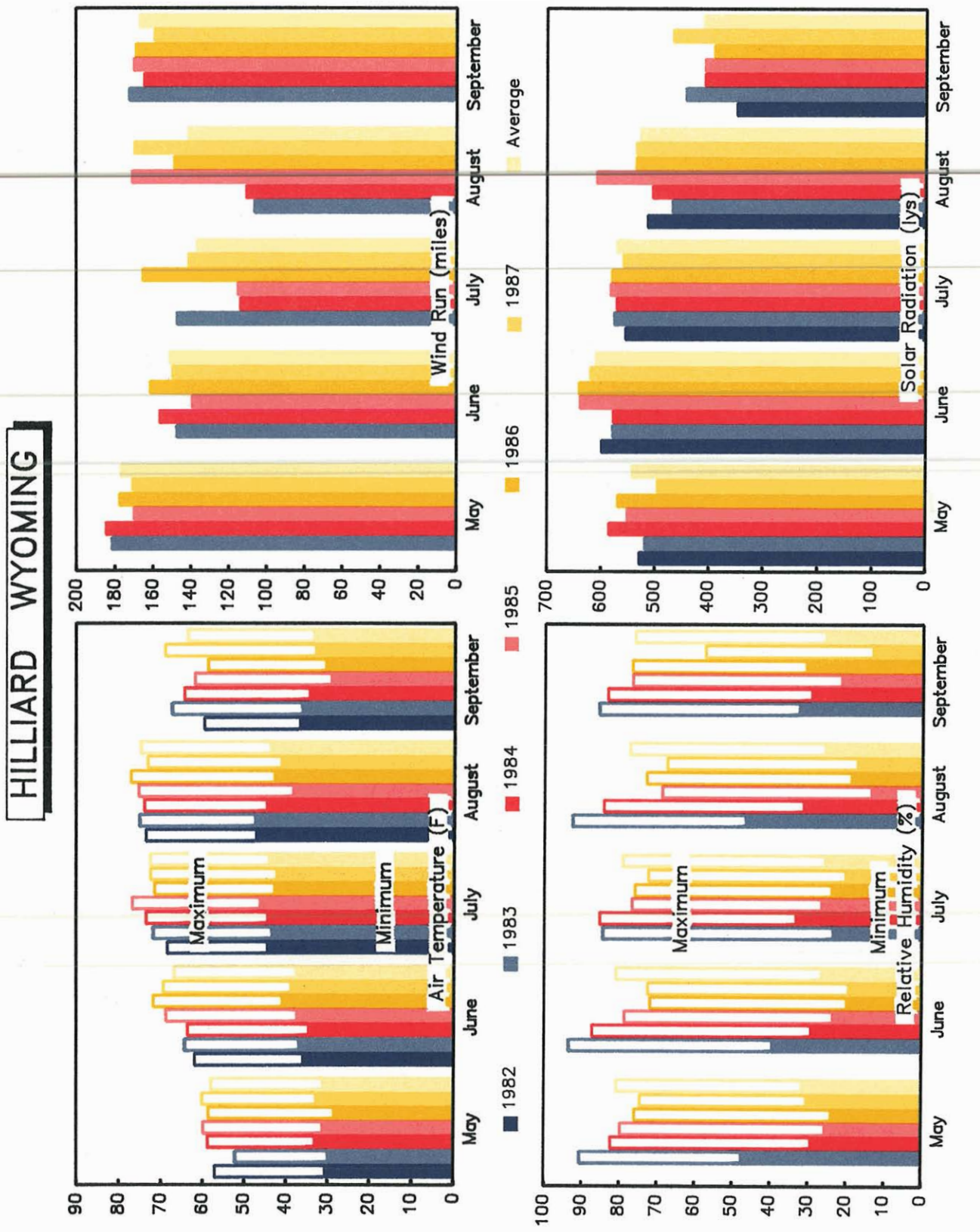


Figure 11. Weather parameters at Hilliard automated station (1982-1987).

The greatest solar energy usually occurred in June, as expected in the northern hemisphere. In 1985 solar radiation at Montpelier was lower than usual for this station, a trend different from the other stations.

Comparison of NWS and Automated Station Data

Average monthly values of weather parameters at automated weather stations and NWS stations indicated that monthly and seasonal variations and trends are similar. Thus, either set of weather parameters could be utilized to estimate E_t. However, the variable relationship of temperature between individual NWS and corresponding automated stations indicates the importance of calibrating local E_t equation coefficients.

Calibration of Empirical Et Equations

The modified Penman equation (1972 Kimberly version) was used to calibrate the four empirical E_t equations to the lysimeter data. The Penman equation with the Kimberly coefficients has accurately matched measured water use of alfalfa and other crops at several research sites in the Western U.S. (Hill, Johns and Frevert, 1983) and in Cache Valley (Hill, Hanks and Wright, 1984). Its appropriateness for the Upper Bear River is evident from a comparison of calculated soil water and soil water measured with a neutron probe in an alfalfa field near Randolph, Utah (Fig. 12). The good agreement between measured and calculated soil water depletion trends prior to the two cuttings (in July and August) of both 1983 and 1987 indicates that the Penman equation accurately estimates alfalfa (reference condition) water use.

Three-week running average estimated crop coefficients, K_c, for Penman E_{tr} values are shown in Figures 13 and 14, respectively, for lysimeter conditions representing adequate irrigation before July 15 and no irrigation after cutting. The representative crop coefficient curves (before and after cutting, respectively) are:

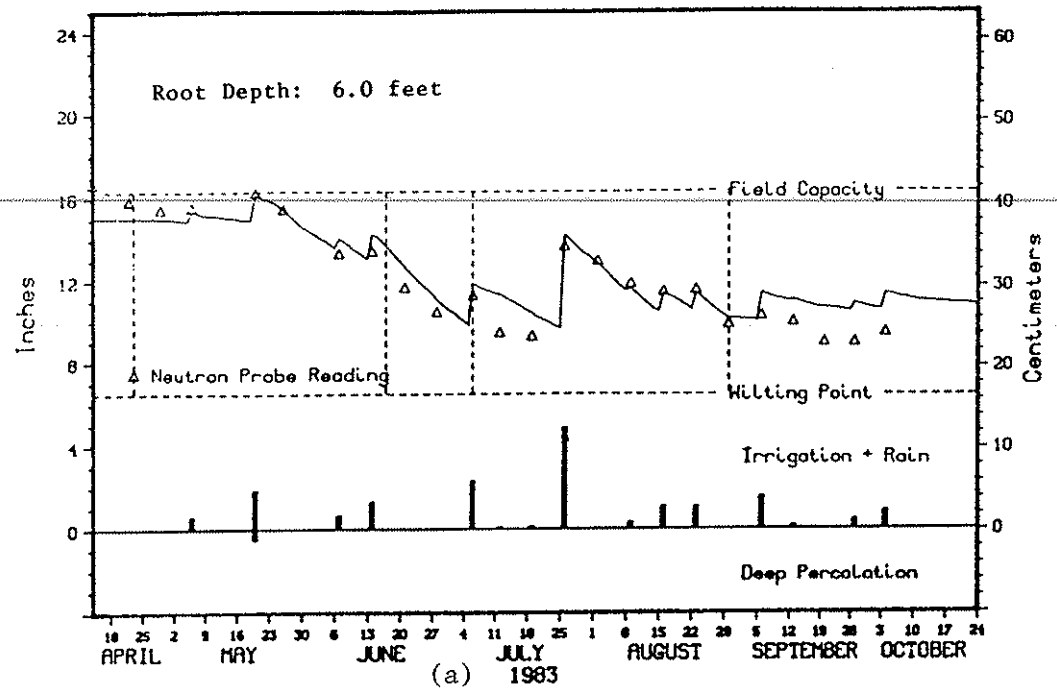
$$K_c = 0.35 + 2.335r - 1.73r^2 - 0.1849r^3 \quad (8)$$

and

$$K_c = 0.44 - 0.00275d - 7.539E\text{-}6d^2 \quad (9)$$

where the parameters are as defined for equations 2 and 3. The value of K_c was limited to a maximum of 1.05. The considerable variation in K_c estimates (Fig. 13-14) reflects the variability of lysimeter data associated with infrequent (7-14 day intervals) irrigation and resulting large water table fluctuations.

Monthly average crop coefficients for 1983-1987 for the empirical E_t equations were determined from equations 8 and 9 using the Penman method. These "calibrated" K_c values are shown in Table 12 for the four empirical E_t equations (4-6) at Montpelier, Randolph and Hilliard Flat. Considerable variability is evident across the sites for a given equation and month. The effect of alfalfa harvest on K_c is apparent in July and September. The



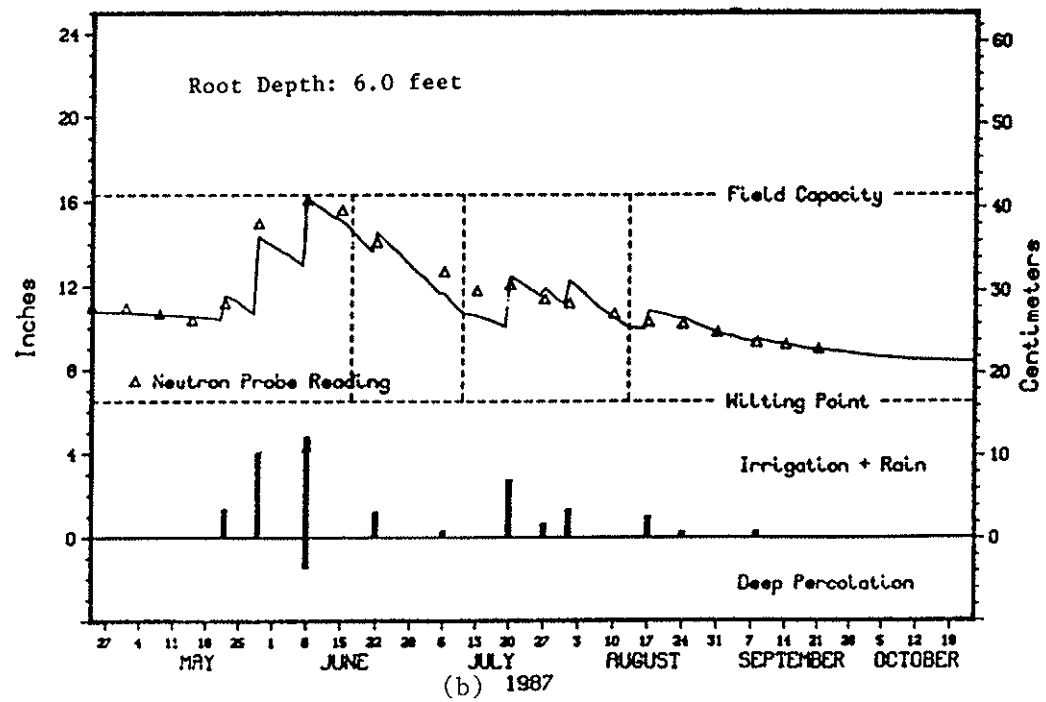


Figure 12. Equation estimated soil water (solid line) versus neutron probe measurements in an alfalfa field near Randolph, Utah (a, 1983 and b, 1987). Effective cover and cutting dates are vertical dashed lines.

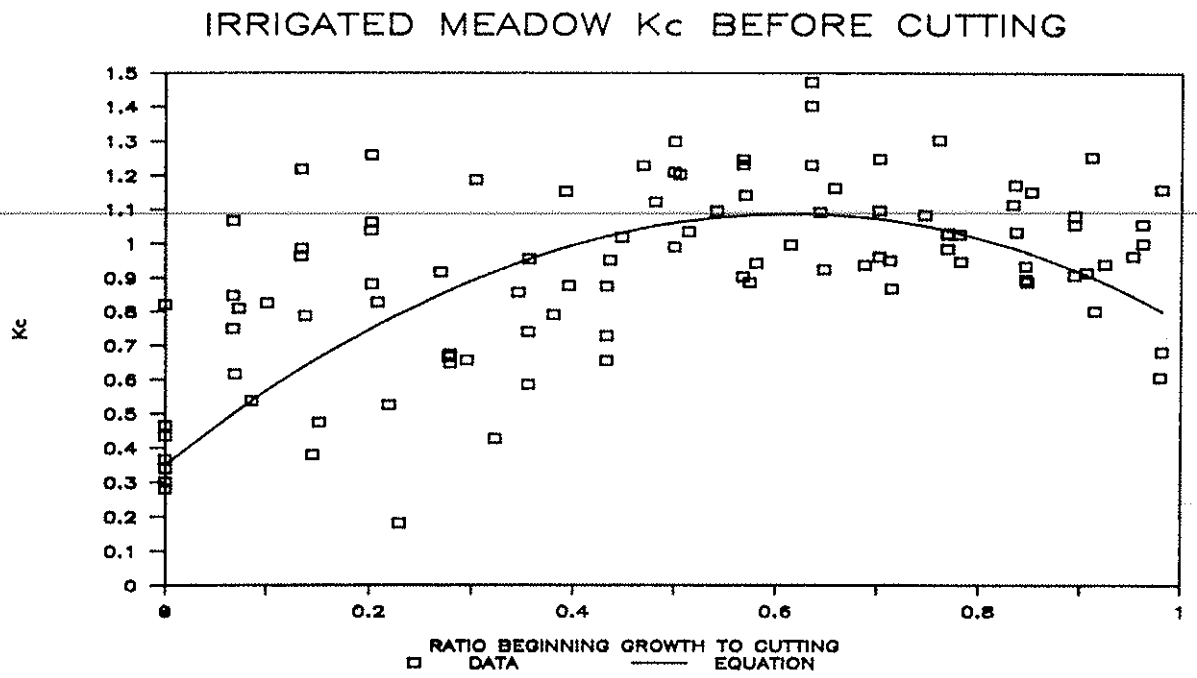


Figure 13. Estimated crop coefficients (3-week running averages) for meadow water use before cutting and representative crop curve (K_c). Montpelier, Randolph and Hilliard Flat(1986-1987).

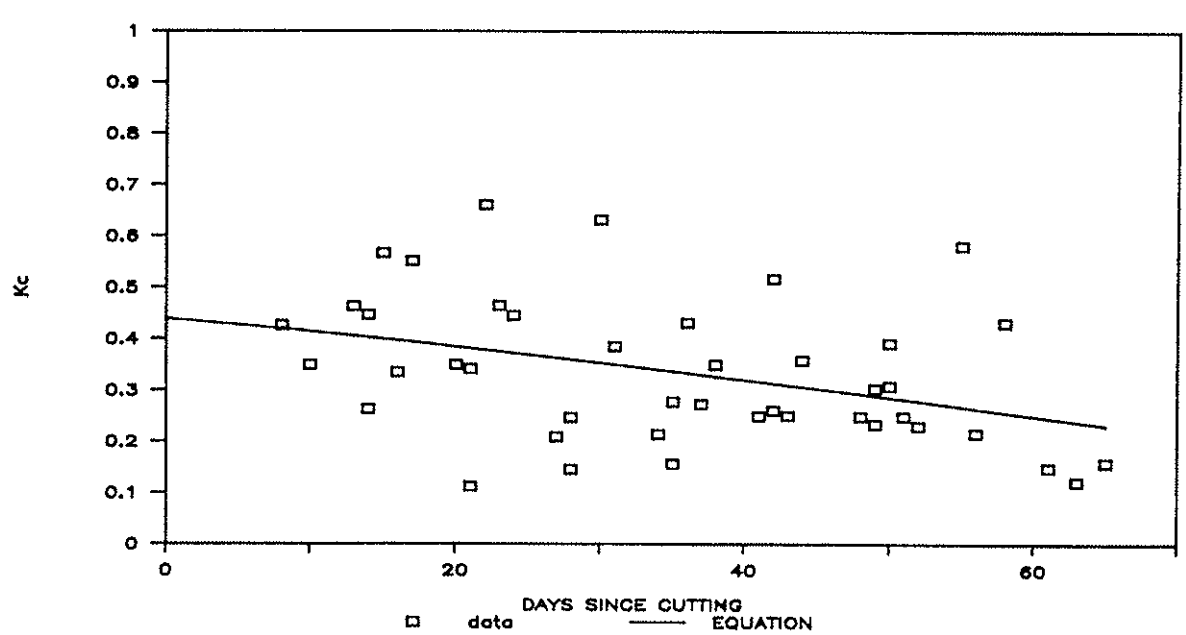


Figure 14. Estimated crop coefficients (3-week running averages) for meadow water use after cutting and representative crop curve (K_c). Montpelier, Randolph and Hilliard Flat (1984-1985).

Table 12. Average monthly crop coefficients for various equations at three sites in the Bear River Basin (1983-1987).

	May	Jun	Jul	Aug	Sep	Oct
	SCS Blaney-Criddle					
Irrigated meadow						
Montpelier	1.28	1.47	1.23	.74	.54	.26
Randolph	1.40	1.80	1.48	.85	.61	.41
Hilliard	1.20	1.71	1.42	.77	.55	.30
Alfalfa						
Montpelier	1.30	1.73	.88	1.05	.49	.33
Randolph	1.55	1.78	1.07	1.25	.55	.52
Hilliard	1.48	1.72	1.01	1.05	.50	.38
	Hargreaves					
Irrigated meadow						
Montpelier	.85	1.14	1.02	.58	.37	.16
Randolph	.68	1.07	1.00	.56	.35	.20
Hilliard	.62	1.02	.97	.56	.36	.17
Alfalfa						
Montpelier	.86	1.11	.75	.82	.34	.21
Randolph	.75	1.05	.72	.83	.32	.25
Hilliard	.76	1.03	.70	.76	.32	.22
	SCS Blaney-Criddle Calibrated k_t					
Irrigated meadow						
Montpelier	.86	1.14	1.02	.60	.37	.15
Randolph	.88	1.32	1.18	.67	.41	.21
Hilliard	.76	1.26	1.14	.62	.38	.17
Alfalfa						
Montpelier	.87	1.11	.73	.85	.34	.18
Randolph	.98	1.31	.85	.99	.37	.27
Hilliard	.93	1.27	.82	.85	.35	.21
	FAO Blaney-Criddle					
Irrigated meadow						
Montpelier	.82	1.12	1.18	.66	.41	.17
Randolph	.81	1.26	1.27	.70	.41	.24
Hilliard	.62	1.12	1.14	.62	.35	.16
Alfalfa						
Montpelier	.83	1.18	.85	.93	.37	.22
Randolph	.89	1.25	.91	1.03	.37	.30
Hilliard	.76	1.12	.81	.85	.31	.20

calibrated K_c values are higher in early summer than reported in the literature [USDA, 1970] for the SCS Blaney-Criddle equation (Table 13) for alfalfa and pasture. Seasonal E_t estimates using K_c's reported in the literature may underestimate calibrated E_t by 34% and 12%, respectively, for irrigated meadow and alfalfa.

Example Depletion Calculation

Calculated alfalfa and crop area weighted E_t and depletion (eq. 7), and precipitation for the 10 Bear River subbasins are shown in Table 14. The 12-year averages (water years 1976-1987) show increasing E_t in downstream order. The considerable variation in depletion among subbasins is a result of differences in annual precipitation and land use patterns. As small grains and other non-forage crops make up a larger proportion of the crop area, the depletion decreases in relationship to E_{tr}. This is evident at Soda Springs and below. Depletions are also given in Tables 15, 16, 17 and 18, respectively, for the SCS Blaney-Criddle, Hargreaves, SCS Blaney-Criddle (calibrated k_t) and FAO Blaney-Criddle equations. The 12-year average depletions for a given subarea exhibit excellent agreement among the various equations. However, there is some variability among equations for any given year, i.e. Bear Lake 1979 with 16.8, 18.3, 16.7 and 16.8 inches, respectively, for the four equations previously cited. The estimated 12-year average water year depletion varied among the various equations and sites from 0.99 ac-ft/ac (Tables 17 and 18) to 1.37 ac-ft/acre (Randolph, Table 16).

There were several wetter than normal seasons during the 12 water years, 1976-1987. Therefore, monthly temperature and precipitation data for as long a period as possible were utilized at four sites in the Bear River Basin. Depletions for 59 water years (1928-1987) were calculated for the Evanston, Border, Logan USU and Corinne subareas using the SCS Blaney-Criddle equation. The depletions shown in Figures 15, 16, 17 and 18 are based upon constant crop coefficients and acreages. The 12-year average depletions were lower than the 59-year averages by 0.1, 0.7, 2.5 and 2.9 inches, respectively, at Evanston, Border, Logan USU and Corinne. This difference is less significant in the upper Bear River subbasins than in the lower subbasins. The larger differences in the lower Bear River can be attributed to relatively greater precipitation during water years 1982-1984 and 1986 than in other areas of the Basin.

Table 13. Consumptive use estimates at Woodruff (normal temperatures) for the SCS Blaney-Criddle equation using crop coefficients reported in the literature and those calibrated in the field.

	May	June	Aug	Sep	Oct	Nov	Season
Woodruff normal Temp.°F,t	47.50	55.40	62.50	60.30	51.80	41.50	
% hours of day-light,p	10.13	10.24	10.35	9.62	8.40	7.70	
k_t[a]	0.51	0.64	0.77	0.73	0.58	0.40	
k_t (tp/100)	2.44	3.66	4.96	4.23	2.53	1.29	
			Literature k_c				
Pasture, k_c[b]	0.90	0.92	0.92	0.91	0.87	0.79	
E_t[c]	2.20	3.36	4.57	3.85	2.20	1.02	17.20
alfalfa, k_c[b]	1.08	1.13	1.11	1.06	0.99	0.91	
E_t[c]	2.64	4.13	5.51	4.48	2.51	1.17	20.44
			Field calibrated k_c				
Irr. Meadow k_c[d],	1.40	1.80	1.48	0.85	0.61	0.41	
E_t[c]	3.42	6.58	7.35	3.60	1.55	0.53	23.02
Alfalfa k_c[d]	1.55	1.78	1.07	1.25	0.55	0.52	
E_t[c]	3.79	6.51	5.31	5.29	1.39	0.67	22.96
			Field calibrated E_t/Literature E_t,%				
Irr.Meadow[e]	155	196	161	94	70	52	134
Alfalfa[f]	144	158	96	118	55	57	112

[a] k_t = 0.0173 t - .314
[b] crop coefficient from SCS TR #21 [18]
[c] C.U. = k_c k_t tp/100, inches
[d] crop coefficient from Table 12, as calibrated herein.
[e] Irrigated meadow E_t calculated from pasture k_c's in [18] underestimates seasonal calibrated E_t by 34% (34=100 [23.02-17.2]/17.2)
[f] Alfalfa E_t calculated from literature k_c's [18] underestimates seasonal calibrated E_t by 12% (12=100 [22.96-20.44]/20.44).

Table 14. Average precipitation and alfalfa and subbasin crop weighted consumptive use, water years 1976-1987, in the Bear River Basin. E_t determined with the SCS Blaney-Criddle equation and calibrated crop coefficients.

Subbasin	Consumptive use		Depletion		Precipitation	
	Alfalfa	Crop area Weighted	Alfalfa	Crop area Weighted	Total	*Usable
	inches					
Evanston	22.8	21.8	13.5	12.5	12.4	9.3
Randolph	24.2	23.8	16.6	16.2	10.0	7.6
Cokeville	24.5	23.4	13.6	12.5	15.9	10.9
Thomas Fork	24.5	23.3	13.6	12.4	15.9	10.9
Bear Lake	22.4	21.3	13.2	12.1	12.9	9.2
Soda Springs	27.7	23.4	16.4	12.1	16.9	11.3
Oneida	27.5	23.3	16.2	12.0	17.4	11.3
Cache Valley	29.9	25.2	16.7	12.0	20.7	13.2
Malad	28.9	26.2	16.9	14.1	16.5	12.1
Tremonton	32.6	26.6	19.1	13.1	19.8	13.5
Brigham City	33.1	28.3	18.7	13.9	27.8	14.4

*Usable precipitation includes winter carry-over soil moisture and effective precipitation.

Table 15. Estimated depletion for various subareas of the Bear River Basin as based on calibrated crop coefficients used with the SCS Blaney-Criddle equation for water years 1976-1987.

Year	Evanston 01	Randolph 02	Cokeville 03	Thomas Fork 04	Bear Lake 05	Subbasin Soda 06	Oneida 07	Cache Valley 08	Malad 09	Tremonton 10(b&c)	Brigham City 10(a)
						inches					
1976	13.1	16.7	12.6	12.5	11.6	13.5	13.3	14.2	13.7	15.4	15.8
1977	15.1	19.1	13.8	13.6	13.2	11.2	15.7	15.5	18.0	16.0	16.2
1978	10.9	15.1	10.8	10.7	11.1	12.4	13.3	11.9	14.4	13.5	14.0
1979	16.0	20.3	15.9	15.8	16.8	13.9	17.2	16.8	16.3	15.6	18.1
1980	11.7	15.5	11.2	11.1	9.2	10.0	7.9	9.4	11.5	9.0	9.1
1981	14.0	18.3	16.3	16.1	15.2	15.5	14.0	15.6	19.9	18.7	18.1
1982	8.4	12.0	9.7	9.6	7.0	11.7	10.2	8.0	7.8	10.5	8.0
1983	6.1	12.2	8.3	8.2	7.1	10.6	7.7	6.2	8.9	6.6	8.7
1984	9.6	13.7	9.7	9.6	11.9	10.1	8.8	8.1	9.3	8.5	12.0
1985	16.2	18.1	15.4	15.3	15.3	11.9	12.6	12.8	17.5	14.2	15.8
1986	12.6	15.9	12.4	12.3	13.2	10.9	10.1	11.1	14.4	11.8	14.0
1987	16.7	17.9	14.4	14.3	13.5	13.8	13.3	14.3	18.0	16.9	16.7
IN	12.5	16.2	12.5	12.4	12.1	12.1	12.0	12.0	14.1	13.1	13.9
AF/A	1.04	1.35	1.04	1.04	1.01	1.01	1.00	1.00	1.18	1.09	1.16

Table 16. Estimated depletion for various subareas of the Bear River Basin as based on calibrated crop coefficients used with the Hargreaves Delta temperature equation for water years 1976-1987.

	Subbasin										
Year	Evan-ston 01	Ran-dolph 02	Coke-ville 03	Thomas Fork 04	Bear Lake 05	Soda 06	Oneida 07	Cache Valley 08	Malad 09	Tre-monton 10(b&c)	Brigham City 10(a)
	inches										
1976	13.9	17.5	13.6	13.4	12.9	14.1	13.9	14.6	14.6	16.1	14.7
1977	14.8	18.3	13.8	13.6	14.6	11.3	14.6	15.4	17.8	15.0	14.2
1978	11.8	16.5	12.3	12.2	13.2	13.3	14.8	13.0	16.1	15.1	13.8
1979	16.6	21.4	17.7	17.6	18.3	13.8	17.5	17.6	17.2	16.3	17.8
1980	12.4	15.5	11.3	11.2	9.3	9.8	8.6	9.5	12.3	10.0	11.0
1981	14.4	18.6	16.0	15.9	15.8	14.7	13.9	15.5	20.3	18.5	17.3
1982	8.9	12.1	9.5	9.4	6.7	11.6	10.1	8.5	7.4	10.5	7.2
1983	6.0	11.6	7.7	7.6	6.3	9.3	7.4	5.2	8.3	6.6	7.1
1984	9.8	13.6	9.7	9.6	11.4	10.1	8.8	8.1	9.0	8.6	11.0
1985	16.0	18.3	16.6	16.4	15.8	12.6	12.7	13.0	17.7	14.3	15.6
1986	12.2	15.6	11.4	11.3	12.9	11.2	10.2	10.3	14.1	11.5	14.0
1987	16.2	17.8	14.1	14.0	14.2	14.0	13.5	14.6	18.1	16.9	17.0
IN	12.8	16.4	12.8	12.7	12.6	12.2	12.2	12.1	14.4	13.3	13.4
AF/A	1.06	1.37	1.07	1.06	1.05	1.01	1.02	1.01	1.20	1.11	1.12

Table 17. Estimated depletion for various subareas of the Bear River Basin as based on calibrated crop coefficients used with the SCS Blaney-Criddle, calibrated k_t, equation for water years 1976-1987.

	Subbasin										
Year	Evan-ston 01	Ran-dolph 02	Coke-ville 03	Thomas Fork 04	Bear Lake 05	Soda 06	Oneida 07	Cache Valley 08	Malad 09	Tre-monton 10(b&c)	Brigham City 10(a)
	inches										
1976	13.2	16.9	12.6	12.5	11.7	13.4	13.1	14.1	14.1	15.5	15.5
1977	14.8	18.6	13.3	13.1	13.2	11.1	15.1	15.3	18.1	15.8	15.8
1978	11.3	15.5	11.1	11.0	11.6	12.6	13.7	12.2	15.0	13.9	14.1
1979	15.9	20.2	15.8	15.7	16.7	13.3	16.6	16.7	16.4	15.6	17.9
1980	11.8	15.5	11.2	11.1	9.4	9.7	8.2	9.5	12.1	9.5	9.7
1981	13.7	17.9	15.7	15.6	15.0	14.4	13.6	15.4	19.8	18.4	17.7
1982	8.7	12.2	9.7	9.6	7.1	11.9	10.3	8.3	8.2	10.7	8.1
1983	6.6	12.5	8.4	8.3	7.3	10.4	7.8	6.3	9.3	7.1	8.8
1984	9.7	13.7	9.8	9.7	12.0	10.1	8.9	8.2	9.6	8.9	12.1
1985	15.5	17.7	15.3	15.1	15.1	11.4	12.2	12.4	17.5	14.1	15.8
1986	12.3	15.5	12.0	11.8	13.0	10.9	9.9	10.8	14.5	11.7	14.1
1987	16.4	17.6	14.1	14.0	13.4	13.3	12.6	14.1	18.0	16.8	16.6
IN	12.5	16.1	12.4	12.3	12.1	11.9	11.8	11.9	14.4	13.2	13.9
AF/A	1.04	1.35	1.03	1.02	1.01	0.99	0.99	0.99	1.20	1.10	1.15

Table 18. Estimated depletion for various subareas of the Bear River Basin as based on calibrated crop coefficients used with the FAO Blaney-Criddle equation for water years 1976-1987.

	Subbasin										
Year	Evan-ston 01	Ran-dolph 02	Coke-ville 03	Thomas Fork 04	Bear Lake 05	Soda 06	Oneida 07	Cache Valley 08	Malad 09	Tre-monton 10(b&c)	Brigham City 10(a)
	inches										
1976	13.3	17.0	12.6	12.5	11.8	13.4	13.1	14.1	13.9	15.5	15.5
1977	14.7	18.5	13.2	13.1	13.1	11.0	15.0	15.1	17.5	15.2	15.1
1978	11.4	15.5	11.2	11.1	11.6	12.6	13.8	12.3	15.2	14.1	14.1
1979	15.9	20.3	15.9	15.8	16.8	13.2	16.6	16.7	16.0	15.2	17.4
1980	11.8	15.6	11.3	11.2	9.4	9.6	8.4	9.6	11.7	9.4	9.9
1981	13.7	17.9	15.7	15.6	14.9	14.1	13.5	15.3	19.2	17.8	17.1
1982	8.7	12.2	9.7	9.6	7.1	12.0	10.3	8.4	8.3	10.8	8.2
1983	6.6	12.5	8.4	8.3	7.3	10.4	7.9	6.3	9.4	7.3	8.9
1984	9.8	13.7	9.8	9.7	12.0	10.1	8.9	8.2	9.8	9.1	12.2
1985	15.3	17.6	15.2	15.1	15.0	11.3	12.1	12.2	17.1	13.7	15.3
1986	12.2	15.5	11.9	11.7	12.9	10.9	9.8	10.6	14.1	11.7	14.1
1987	16.4	17.6	14.2	14.0	13.4	13.3	12.6	14.1	17.4	16.4	16.2
IN	12.5	16.2	12.4	12.3	12.1	11.8	11.8	11.9	14.1	13.0	13.7
AF/A	1.04	1.35	1.04	1.03	1.01	0.99	0.99	0.99	1.18	1.09	1.14

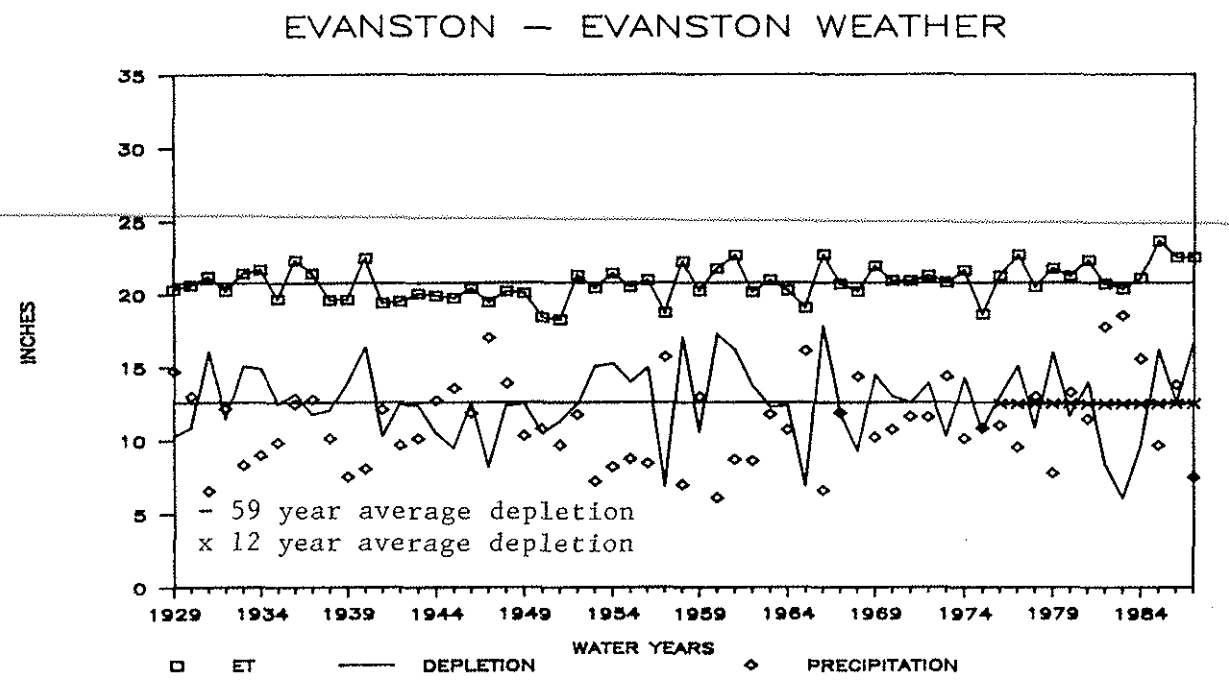


Figure 15. Long-term depletion using calibrated SCS Blaney-Criddle for Evanston subbasin (Evanston NWS data).

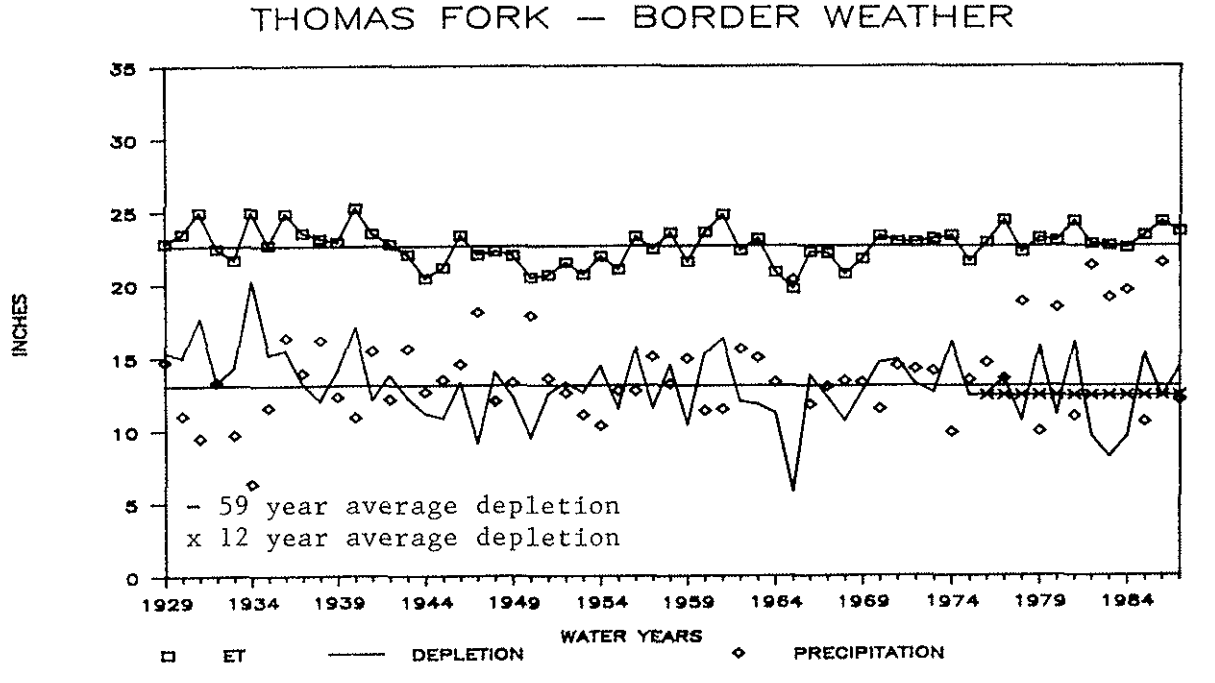


Figure 16. Long-term depletion using calibrated SCS Blaney-Criddle for Thomas Fork subbasin (Border NWS data).

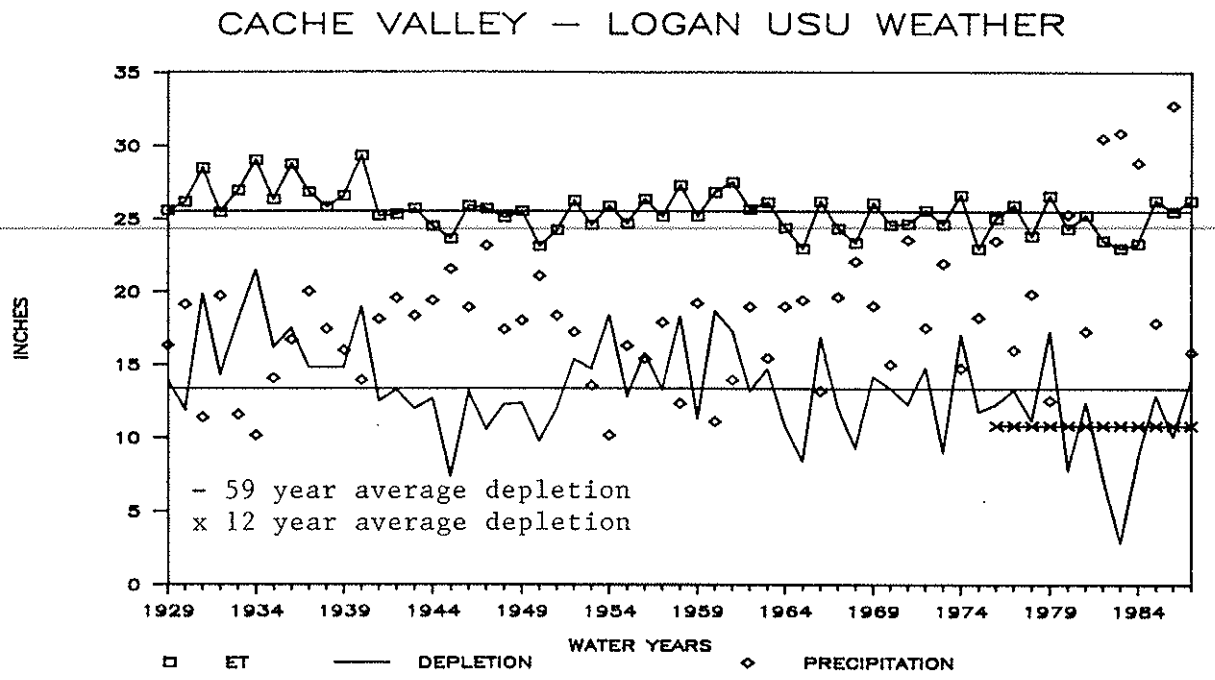


Figure 17. Long-term depletion using calibrated SCS Blaney-Criddle for Cache Valley subbasin (Logan-USU NWS data).

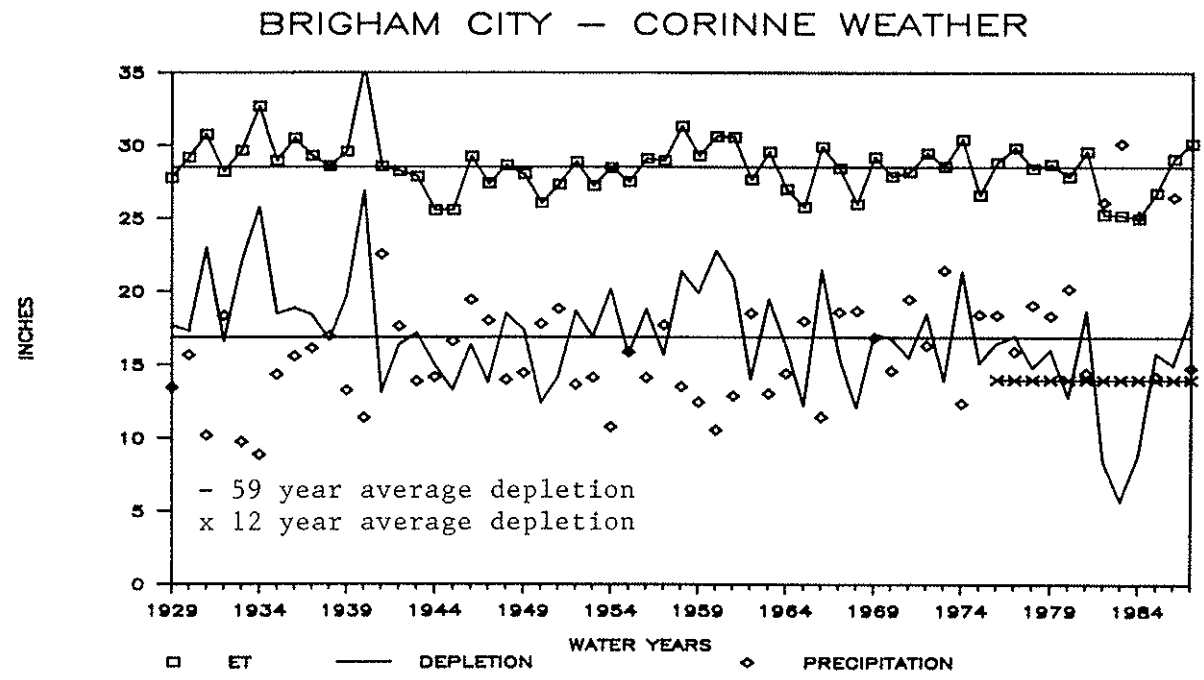


Figure 18. Long-term depletion using calibrated SCS Blaney-Criddle for Brigham City subbasin (Corinne NWS data).

SUMMARY AND CONCLUSIONS

A methodology was developed to estimate historical water depletions in the Bear River Basin. Empirical evapotranspiration (E_t) equations and historical weather data were used to estimate streamflow depletions resulting from irrigated crops in the 10 subbasins of the Bear River. The empirical E_t equations were calibrated with field data.

Water use by irrigated meadows was measured at three sites in the Upper Bear River Basin during the 1983-1987 growing seasons. Non-weighing lysimeters and electronic weather stations at each site were visited at weekly intervals from April or May through late September or October. Electronic weather stations at each site sampled air temperature, relative humidity, solar radiation, wind travel, soil temperature and precipitation. Three lysimeters were installed at Montpelier, Idaho, (Wallentine Ranch, elev. 5928) and two lysimeters were installed at Randolph, Utah (J.F. Ranch, elev. 6280) and Hilliard Flats, Wyoming (Barker Ranch, elev 7550). Two additional lysimeters were installed in an adjacent meadow at the Montpelier site in June 1986. Measurements for each lysimeter include depth to the water table, previous week's rainfall, irrigation or drainage (water pumped out), vegetation height and moisture content in the top 30 inches of soil (determined with a neutron probe). Saturated soil specific yield (water) values, which varied with depth, were determined at the end of the 1987 season for each lysimeter.

Water use ranged from 15.8 to 32.5 inches on all sites for 1984 through 1987. Water use was highest during 1986 and 1987, possibly due to the longer than usual growing season and the fact that lysimeters were irrigated through September.

The irrigation season in the Upper Bear River generally ends by mid-July so meadows can be harvested by mid-August. However, the lysimeters were irrigated (particularly in 1986 and 1987) into late August and September to facitate root development. The lysimeter water use was then adjusted to approximate the levels in adjacent fields.

Mean temperatures during the 6 years of the study were warmer (except at Lifton) than the normals and precipitation during the study period was higher than normal. Data from the electronic weather stations and the NWS stations indicated that monthly and seasonal variations and trends were similar, thus confirming the validity of using parameters from NWS stations to estimate E_t.

Crop water use based on data from the lysimeters was used to calibrate empirical evapotranspiration (E_t) equations. A modified Penman equation best matched measured E_t values at the three sites, using the crop coefficients for those sites. There was more variability in the other empirical methods, such as the SCS Blaney-Criddle equation, used to estimate crop water use at individual sites and during different years. Because the electronic weather stations provided data to use the Penman equation for only the 1982-1987 period, historical subbasin depletion was calculated by using equations that required only air temperature. The modified Penman

equation (Kimberly, Idaho, calibration) was used to calibrate monthly E_t for time periods when adequate data were available and was the basis for calibrating the simpler empirical methods.

Depletion was calculated by subtracting carry-over soil moisture and effective summer precipitation from water year E_t. Carry-over soil moisture was estimated to be 67% of non-growing season precipitation (less any E_t) or 75% of the available soil water capacity in the root zone, whichever was smaller. In this study, effective summer precipitation was assumed to be 80% of any precipitation falling during months in which evapotranspiration occurred. Calibrated crop coefficients and monthly temperature and precipitation data available from the NWS weather stations were used in four equations to estimate historical E_t and depletions for each of the 10 subbasins.

Depletions for 59 water years (1929-1987) were calculated using the SCS Blaney-Criddle equation and compared with the 12-year average depletion at four NWS stations. The 12-year average depletions were 0.1, 0.7, 2.5 and 2.9 inches lower than the respective 59-year averages of 12.8, 13.1, 13.4 and 16.9 inches at Evanston, Border, Logan USU and Corinne.

Conclusions

1. Automated weather stations provided adequate data about local weather parameters to calibrate E_t equations.

2. Comparisons of the monthly values of weather parameters for the NWS stations and the automated weather stations indicated that monthly and seasonal variations and trends were similar; thus data from NWS stations were accurate enough to be used to estimate evapotranspiration.

3. There have been some problems associated with non-weighing lysimeters, but they have provided reliable monthly and seasonal estimates of water consumption in wet meadows. The lysimeters and procedures developed for this project substantiate that data from lysimeters can be used to calibrate evapotranspiration methods.

4. The preferred method for estimating reference E_{tr} is the Penman procedure. However, except at locations with automated weather stations, adequate data are generally not available in the basin to apply this procedure.

5. Any of the recognized empirical methods for estimating E_t are applicable, provided that each method is calibrated to local conditions. Those are the Modified SCS Blaney-Criddle (SCS-TR 21), FAO-24 Blaney-Criddle, and Hargreaves Delta Temperature methods.

RECOMMENDATIONS

None of the four equations that were calibrated and used in the historical depletion calculations had any particular advantage; each required the same type of weather data. Because it has long served as a standard and is reasonably accurate when locally calibrated, we recommend the use of the SCS Blaney-Criddle equation.

A procedure for estimating streamflow depletion was presented. This procedure is theoretically sound but uses estimated coefficients for determining carry-over moisture and effective rainfall. The limited data available to evaluate these coefficients may mean that adjustments will be necessary later.

As the commission further studies historical depletions, depletions should be updated when improved estimates of irrigated area or crop distribution are available.

We recommend that any future field measurements of consumptive use should be conducted for at least 5 years duration to allow for annual variability in weather conditions.

The scope of this study did not permit a detailed study of precipitation in each subbasin. Rather, the depletion calculation for each subbasin was derived from the use of one NWS station (two NWS stations were used in the Cache Valley and Tremonton-Brigham City areas). Thus, the calculations demonstrated the methodology but may not represent appropriate depletions for the commission to use in allocating water. This is particularly germane in the Randolph subbasin where the Woodruff NWS temperature and precipitation values were used to calculate the 12-year historical depletion. Precipitation at Woodruff is apparently somewhat lower than precipitation at other points within that subbasin. Thus, the depletion calculated for Randolph is higher than would be expected if areal weighted precipitation had been used.

Future calculations of depletion for use by the commission or in hydrologic modeling in the Bear River Basin should include weather station data from a number of sites in each subbasin. This would increase the accuracy of precipitation used to calculate depletion in an area.

GLOSSARY

Adiabatic Process A reversible thermodynamic change of state of a system without the addition or removal of heat or mass.

Advection Horizontal transfer of heat energy by large-scale movement of the atmosphere.

Albedo The ratio of electromagnetic radiation reflected from a soil and crop surface to the amount incident upon it. The value commonly is about 0.23 for a green growing crop.

Available Soil Moisture See soil moisture (available).

Bulk Density The ratio of the mass of a given volume of dry soil, including air space, to the given volume. Expressed as grams per cubic centimeter.

Carry-over Soil Moisture Non-growing season precipitation stored in the soil that may be used in meeting the crop's evapotranspiration requirement in the subsequent growing season. Estimated herein as 2/3 of the winter (October-April) precipitation after subtracting ET but not to exceed 75% of the available soil moisture storage capacity for an average root zone.

Consumptive Use The amount of water used by plants in transpiration, retained in plant tissue, and the evaporation of water from plant and adjacent soil surfaces during a specified time period. Synonymous with evapotranspiration.

Crop Irrigation Requirement The quantity of water, exclusive of effective growing season precipitation, winter precipitation stored in the root zone, or (perhaps) upward water movement from a shallow water table, that is required as an irrigation application to meet the evapotranspiration needs of the crop. It also may include water requirements for germination, frost protection, prevention of wind erosion, leaching of salts and plant cooling.

Crop Coefficient Relates ET of a given crop at a specific time in its growth stage to a reference ET condition. Incorporates effects of crop growth state, plant density, and other cultural factors affecting ET, usually expressed or exhibited as a curve or polynomial. The reference condition has been termed "potential" or "reference crop" and relates to ET of alfalfa or grass, depending upon the research that resulted in the crop coefficient. The respective "k" or "k_c" factor as used in the original and SCS Blaney-Criddle methods are not based on a reference condition and should only be used with these methods.

Depletion The amount of water lost from a river basin or other hydrologic system resulting from irrigation withdrawals from surface or subsurface sources. It is calculated as consumptive use (ET) less the sum of effective precipitation and carryover soil moisture. It is intended to represent the net loss to the basin after return flows and/or excess irrigation water has returned to the stream or groundwater system.

Glossary (continued)

Depletion; Crop Acreage Weighted Depletion estimated as an average for several crops for a large area such as a subbasin of a river system. Calculated herein as the sum for all crops of the product of consumptive use for each crop times the crop's respective fraction of total area, less the sum of carry over soil moisture and effective precipitation.

Dew Point The temperature to which a given parcel of air must be cooled at constant pressure and at constant water vapor content until saturation occurs, or the temperature at which saturation vapor pressure of the parcel is equal to the actual vapor pressure of the contained water vapor.

Duty of Water The total volume of irrigation water required to mature a particular type of crop. It includes that portion of consumptive use not satisfied by precipitation, evaporation and seepage from ditches and canals and the water eventually returned to streams by percolation and surface runoff.

Effective Precipitation Precipitation occurring during the growing season that is available to meet the evapotranspiration requirements of crops. It does not include precipitation lost through deep percolation below the root zone or through surface runoff. Estimated in this report as 80% of May-April precipitation.

Empirical Equation An equation whose derivation and/or accuracy (calibration) is based upon observation.

Evaporation The physical process by which a liquid or solid is transformed to the gaseous state which in irrigation usually is restricted to the change of water from liquid to gas.

Evapotranspiration (ET) Synonymous with consumptive use.

Field Capacity The moisture content of a soil following an application of water and after the downward movement of excess water (from gravitational forces) has essentially ended. Usually it is assumed that this condition is reached about two days after a full irrigation or heavy rain.

Growing Season The period that is warm enough for plants to transpire and grow. In the case of annual plants, it approximates the time interval between planting and crop maturity; for perennial crops, it is the period between certain temperature conditions that establish growth and dormancy. This growing season is sometimes restricted to the period between killing frosts.

Glossary (continued)

Irrigation Efficiency The ratio of the volume of water required for a specific beneficial use as compared to the volume of water delivered for this purpose. It is commonly interpreted as the volume of water stored in the soil for evapotranspiration compared to the volume of water diverted for this purpose, but may be defined and used in different ways.

Langley A unit of energy per unit area commonly used in radiation measurements which is equal to one gram calorie per square centimeter.

Lysimeter A device such as a tank or large barrel that contains a mass of soil and vegetation similar to that in the immediate vicinity, which is isolated hydrologically from its surroundings. It is commonly used in research to determine the water use of various crops in field conditions.

Net Irrigation Requirement Similar to crop irrigation requirement, however, may be used as equivalent to depletion.

Pan Evaporation Evaporation from a class A or similar pan. The U.S. Weather Bureau class A pan is a cylindrical container fabricated of galvanized iron or monel metal with a depth of 10 inches and a diameter of 48 inches. The pan is accurately leveled at a site which is nearly flat, well sodded, and free from obstructions. The pan is filled with water to a depth of eight inches, and periodic measurements are made of the changes of the water level with the aid of a hook gage set in the stilling well. When the water level drops to seven inches, the pan is refilled.

Peak Irrigation Period The period of highest consumptive use that is used in irrigation design to size on-farm or project facilities such as pumping plants, pipelines, canals, distribution systems, etc. Peak period consumptive use is the average daily ET rate of a crop at its maximum during the period between normal irrigations.

Potential Evapotranspiration The rate at which water, if available, would be removed from the soil and plant surfaces. Expressed as the rate of latent heat transfer per square centimeter or depth of water. In this report potential evapotranspiration is the same as "reference crop ET" and refers to ET of a well-watered crop like alfalfa with 30 to 50 cm of top growth and about 100 m of fetch under given climatic conditions.

Pyranometer (solar remitter) A general name for instruments which measure the combined intensity of incoming direct solar radiation and diffuse sky radiation. The sum which is global solar radiation.

Glossary (continued)

Radiation Process by which electromagnetic radiation is propagated through space. Classified for agricultural purposes as:

- Extraterrestrial radiation Incoming solar radiation above Earth's atmosphere (R_A).
- Global Radiation Total of direct solar radiation and diffuse sky radiation received at Earth's surface by a unit horizontal surface (R_s).
- Clear day radiation Theoretical incoming radiation at Earth's surface assuming complete absence of clouds (R_{so}).
- Net back radiation The thermal or long wave radiation that is outgoing from Earth's surface (R_b).
- Net clear day outgoing long wave radiation Theoretical outgoing long wave radiation at Earth's surface assuming complete absence of clouds (R_{bo}).

Reference Crop ET See potential evapotranspiration.

Relative Humidity The dimensionless ratio of actual vapor pressure of the air to saturation vapor pressure, commonly expressed in percent.

Root Zone The depth to which plant roots invade the soil and where water extraction occurs.

Saturation Deficit (also called vapor pressure deficit) The difference between the actual vapor pressure and the saturation vapor pressure at the existing temperature.

Soil Moisture (available) Water in the root zone that can be extracted by plants. The available soil moisture is the difference between field capacity and wilting point.

Soil Moisture (unavailable) Water in the root zone that is held so firmly by various forces that it usually cannot be absorbed by plants.

Soil Water Water present in the soil pores (also called soil moisture which includes water vapor).

Solar Radiation Synonymous with global radiation in this report.

Specific Yield The ratio of the volume of water which will drain freely from a saturated soil, under a water table condition, to the total volume of soil dewatered with a given drop in the water table surface.

Transpiration The process by which water in plants is transferred as water vapor to the atmosphere.

Glossary (continued)

Wet Bulb Depression The difference in degrees between the dry bulb temperature and the wet bulb temperature.

Wet Bulb Temperature The temperature an air parcel would have if cooled adiabatically to saturation at constant pressure by evaporation of water in it with all latent heat being supplied by the parcel.

Wilting Point The soil moisture content at which a plant can no longer obtain sufficient moisture to satisfy its requirements and, therefore, will wilt permanently.

Wind Run Accumulated wind travel past a given point during a 24-hour period. For use in the Penman Equation, the wind run data is for 2 meters above the ground.

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APPENDIX A

Description of Modified Penman Combination equation as used in this study, and coefficients for polynomial equations describing "mean" crop coefficients (K_{cm}).

Appendix A. Description of Modified Penman Combination equation as used in this study, and coefficients for polynomial equations describing the mean crop coefficients.

The term "combination method" is derived from combining net radiation and advective energy transfer effects on crop water use into one equation. The most familiar of these is the "Penman Combination Equation" used in this report in a modified form adapted from the work at Kimberly, Idaho. Numbers in brackets [] are references.

Modified Penman equation [8, 9, 10, 11, 13, 14 and 20]

$$E_{tr} = \frac{\Delta}{\Delta + \gamma} (R_n + G) + \frac{\gamma}{\Delta + \gamma} (15.36) (W_1 + W_2 U_2) (\bar{e}_s - e_a) \quad (A.1)$$

where

E_{tr} = reference Et, alfalfa with 30 to 50 cm of top growth, $(cal/cm^2)/d$ (langleys per day). The conversion factor $0.3937/\lambda$ is used to convert to inches per day. This equals 0.00673, if a λ value of 585 is used to represent typical conditions; λ is the latent heat of water in cal/cm^3.

$$\lambda = 595.9 - 0.305 (T-32), \text{ T in } °F. \quad (A.2)$$

Δ = slope of saturation vapor pressure-temperature curve (de/dT) at the air temperature, mb/°C.

γ = psychrometer constant, mb/°C.

R_n = net radiation, $(cal/cm^2)/d$.

G = soil heat flux, $(cal/cm^2)/d$.

W_1, W_2 = wind term parameters. Empirically determined values for W_1 and W_2 at Kimberly, Id are 0.75 and 0.0185, respectively.

U_2 = wind movement, mi/d at 2-meter height.

$\bar{e}_s$ = saturation vapor pressure, as defined in equation (A.3), is the mean of values obtained at daily maximum and daily minimum temperatures, mb (this is a modification of the original Penman equation).

$$e_s = 1.23329 \exp [21.07-5336.0/(T_c + 273.1)] \quad (A.3)$$

where e_s is saturation vapor pressure over water, mb, at temperature T_c, and T_c is temperature, °C.

T_a = daily maximum temperature, °K; and

T_b = daily minimum temperature, °K.

R_{so} is obtained from curve fitting to the highest values of observed daily R_s data for a given site or from theoretical consideration [9]. Polynomial equations for estimating R_{so} at various sites are included in appendix B of [8].

An empirical equation for estimating the soil heat flux is:

$$G = (\bar{T}_{pr} - \bar{T})\ 5 \qquad (A.10)$$

where

$\bar{T}_{pr}$ = mean air temperature for a previous time period, usually the previous 3 days when daily estimates of E_{tr} are required, °F; and

$\bar{T}$ = mean air temperature for the current time period, i.e., mean air temperature of the particular day for which E_{tr} is required, °F.

The magnitude of G usually is small relative to other terms in equation (A.1) and is sometimes ignored in calculations; however, it was used in this study.

In some locations, wind movement may be available from an instrument at a height different than 2 meters. The following relationship [10] provides a reasonable estimate of the wind movement at 2 meters when the anemometer is at height z:

$$U_2 = U_z\ (2/z)^{0.2} \qquad (A.11)$$

where U_2 is wind movement at 2 meters, U_z is wind movement at height z, and z is height of anemometer above ground in meters.

(Table A1. footnotes continued)

[b]Before effective cover: $K_{cm} = a_0 + a_1 r + a_2 r^2 + a_3 r^3$, r in percent/100.

[c]Some crop equations are not included in present microcomputer version.

[d]Wright suggested that the minimum K_{cm} value of 0.2 is "appropriate for relatively dry surface soil conditions from planting until significant crop development. For moderately wet surface soil, as with preemergence irrigation(s) or some precipitation, use 0.35 and for very wet conditions, 0.50."

[e]Begin growth April 1; estimated effective cover July 15.

[f]Garden represents a composite of several crops. Assumed planting date May 1, effective cover 90 days later.

[g]After effective cover: $K_{cm} = b_0 + b_1 d + b_2 d^2 + b_3 d^3$, d in days.

[h]Same maximum as before cover. Minimum value is imposed following the indicated days after effective cover.

[i]Time base is days since previous cutting, same maximum and minimum K_{cm} values as before effective cover.

APPENDIX B

Summarized field data and analysis for non-weighing lysimeters near Montpelier, Idaho, Randolph, Utah and Hilliard Flat, Wyoming, 1983-1987.

Legend for Appendix B

SM Total soil moisture as determined form neutron probe readings.
DELSM Weekly change in soil moisture determined from neutron probe readings.
ETSM ET calculated from neutron probe readings.
WL Depth to water level.
SMWL Total soil moisture determined from water level readings.
DELWL ET calculated from water level readings.
ETCMBN ET calculated from combining both neutron probe and water level readings.
ETADJ ET adjusted for no irrigations after July 15.

Supplementary data for lysimeters in the Upper Bear River Basin.

LYSIMETER IDMO1
DEPTH TO THE SURFACE IS 6.5
MAX VALID NP READING IS 12
FROM 0 IN. TO 5 IN. THE SY IS .98 %
FROM 5 IN. TO 8 IN. THE SY IS LINEAR FROM 98% TO 4.7 %
FROM 8 IN. TO 48 IN. THE SY IS 4.7 %

LYSIMETER IDMO2
DEPTH TO THE SURFACE IS 2.95
MAX VALID NP READING IS 13
FROM 0 IN. TO 1.45 IN. THE SY IS .98 %
FROM 1.45 IN. TO 4.45 IN. THE SY IS LINEAR FROM 98% TO 4.7 %
FROM 4.45 IN. TO 48 IN. THE SY IS 4.7 %

LYSIMETER IDMO3
DEPTH TO THE SURFACE IS 4.6
MAX VALID NP READING IS 13.5
FROM 0 IN. TO 3.1 IN. THE SY IS .98 %
FROM 3.1 IN. TO 6.1 IN. THE SY IS LINEAR FROM 98% TO 4.7 %
FROM 6.1 IN. TO 48 IN. THE SY IS 4.7 %

LYSIMETER IDMO4
DEPTH TO THE SURFACE IS 3.97
MAX VALID NP READING IS 12.8
FROM 0 IN. TO 2.47 IN. THE SY IS .98 %
FROM 2.47 IN. TO 5.47 IN. THE SY IS LINEAR FROM 98% TO 8.4 %
FROM 5.47 IN. TO 18.25 IN. THE SY IS 8.4 %
FROM 18.25 IN. TO 23.75 IN. THE SY IS 6.3 %
FROM 23.75 IN. TO 29.5 IN. THE SY IS 5 %
FROM 29.5 IN. TO 30.5 IN. THE SY IS 11.5 %
FROM 30.5 IN. TO 35.25 IN. THE SY IS 3.5 %
FROM 35.25 IN. TO 48 IN. THE SY IS 4.4 %

LYSIMETER IDMO5
DEPTH TO THE SURFACE IS 4.05
MAX VALID NP READING IS 12
FROM 0 IN. TO 2.55 IN. THE SY IS .98 %
FROM 2.55 IN. TO 5.55 IN. THE SY IS LINEAR FROM 98% TO 9.3 %
FROM 5.55 IN. TO 19.75 IN. THE SY IS 9.3 %
FROM 19.75 IN. TO 29.56 IN. THE SY IS 4.3 %
FROM 29.56 IN. TO 37 IN. THE SY IS 10.4 %
FROM 37 IN. TO 48 IN. THE SY IS 5.6 %

LYSIMETER UIJFE
DEPTH TO THE SURFACE IS 8.75
MAX VALID NP READING IS 13.7
FROM 0 IN. TO 7.25 IN. THE SY IS .98 %
FROM 7.25 IN. TO 10.25 IN. THE SY IS LINEAR FROM 98% TO 7.8 %
FROM 10.25 IN. TO 25 IN. THE SY IS 7.8 %
FROM 25 IN. TO 34 IN. THE SY IS 2.7 %
FROM 34 IN. TO 48 IN. THE SY IS 3.2 %

LYSIMETER UIJFW
DEPTH TO THE SURFACE IS 10.75
MAX VALID NP READING IS 15
FROM 0 IN. TO 9.25 IN. THE SY IS .98 %
FROM 9.25 IN. TO 12.25 IN. THE SY IS LINEAR FROM 98% TO 10.5 %
FROM 12.25 IN. TO 22 IN. THE SY IS 10.5 %
FROM 22 IN. TO 32 IN. THE SY IS 2.8 %
FROM 32 IN. TO 36 IN. THE SY IS 6.8 %
FROM 36 IN. TO 48 IN. THE SY IS 2.6 %

LYSIMETER WYHLN
DEPTH TO THE SURFACE IS 9.25
MAX VALID NP READING IS 14.3
FROM 0 IN. TO 7.75 IN. THE SY IS .98 %
FROM 7.75 IN. TO 10.75 IN. THE SY IS LINEAR FROM 98% TO 6.9 %
FROM 10.75 IN. TO 21.5 IN. THE SY IS 6.9 %
FROM 21.5 IN. TO 28.125 IN. THE SY IS 3.9 %
FROM 28.125 IN. TO 33 IN. THE SY IS 2.3 %
FROM 33 IN. TO 48 IN. THE SY IS 2 %

LYSIMETER WYHLS
DEPTH TO THE SURFACE IS 3.75
MAX VALID NP READING IS 14.5
FROM 0 IN. TO 2.25 IN. THE SY IS .98 %
FROM 2.25 IN. TO 5.25 IN. THE SY IS LINEAR FROM 98% TO 14.3 %
FROM 5.25 IN. TO 10 IN. THE SY IS 14.3 %
FROM 10 IN. TO 23.5 IN. THE SY IS 3.7 %
FROM 23.5 IN. TO 31 IN. THE SY IS 4.2 %
FROM 31 IN. TO 48 IN. THE SY IS 2.4 %

Appendix B. Summarized field data and analysis for non-weighing lysimeters in the upper Bear River Basin, 1983-1987.

Information for lysimeter number 1 at Montpelier, Idaho for 1983.

IDMO183 01-25-1989
LYSIMETER ET DATA 15:52:00

DATE	IRRIG	RAIN	SM	DELSM	ETSM	WL	SMWL	DELWL	ETWL	ETCMBN
					INCHES					
JUN13	0.00	0.00				8.3	15.4	0.0	0.0	0.0
JUN20	0.51	0.00				12.3	15.2	0.2	0.2	0.2
JUN27	0.00	0.03				8.6	15.4	-0.2	0.4	0.4
JUL05	1.03	0.72				11.1	15.3	0.1	0.8	0.8
JUL11	0.74	0.67				11.3	15.2	0.0	1.7	1.7
JUL18	0.00	0.09				11.8	15.2	0.0	0.9	0.9
JUL25	0.00	0.05				14.4	15.1	0.1	0.2	0.2
AUG01	0.00	0.68				16.1	15.0	0.1	0.8	0.8
AUG08	0.00	0.02	14.0	0.0	0.0	20.1	14.8	0.2	0.2	0.2
AUG15	0.00	1.36	14.4	-0.4	0.9	21.3	14.8	0.1	1.4	1.4
AUG22	0.00	1.71	15.5	-1.1	0.6	22.7	14.7	0.1	1.8	1.8
AUG29	0.00	0.00	15.3	0.2	0.2	23.6	14.7	0.0	0.0	0.0
SEP05	0.00	1.29	15.2	0.1	1.4	22.6	14.7	-0.0	1.2	1.2
SEP12	0.00	0.28	15.0	0.2	0.5	26.1	14.5	0.2	0.4	0.4
SEP19	-0.18	0.00	14.6	0.4	0.4	27.5	14.5	0.1	0.1	0.1
SEP26	0.00	0.13	14.4	0.2	0.2	36.9	14.0	0.4	0.4	0.4
OCT03	0.00	1.80	14.6	-0.2	1.6	37.0	14.0	0.0	1.8	1.8
OCT10	0.00	0.54	13.9	0.7	1.3	37.6	14.0	0.0	0.6	0.6
	2.10	9.38		0.1	7.0			1.4	12.9	12.9

ET SUMMARY INFORMATION

PERIOD	ETSM	ETWL	ETCMBN	ETADJ
	INCHES			
JUN	0.00	0.87	0.87	0.87**
JUL	0.00	3.91	3.91	3.91
AUG	2.16	3.90	3.90	3.90
SEP	2.95	2.83	2.83	2.83
OCT	1.95	1.34	1.34	1.34**
JUN - SEP	5.10	11.52	11.52	11.52**
SEASONAL	7.05	12.86	12.86	12.86

NOTE: See definitions of table headings at beginning of appendix.
** Indicates partial month of data.

Information for lysimeter number 1 at Montpelier, Idaho for 1984.

IDMO184 01-25-1989
LYSIMETER ET DATA 15:52:05

DATE	IRRIG	RAIN	SM	DELSM	ETSM	WL	SMWL	DELWL	ETWL	ETCMBN
					INCHES					
MAY12	0.00	0.00	15.1	0.0	0.0	18.8	14.9	0.0	0.0	0.0
MAY18	0.00	0.12	15.0	0.1	0.2	18.8	14.9	0.0	0.1	0.1
MAY25	2.94	0.01	14.8	0.3	0.3	19.1	14.9	0.0	0.0	0.0
JUN04	0.00	0.25	14.9	-0.2	3.0	15.8	15.0	-0.2	3.0	3.0
JUN11	0.00	1.42	14.9	-0.0	1.4	14.3	15.1	-0.1	1.3	1.3
JUN18	0.00	0.17	15.0	-0.0	0.1	13.8	15.1	-0.0	0.1	0.1
JUN25	0.74	0.01	14.7	0.3	0.3	14.8	15.1	0.0	0.1	0.1
JUL02	1.47	0.01	14.2	0.5	1.2	15.6	15.0	0.0	0.8	0.8
JUL09	1.47	0.03	13.7	0.5	2.1	16.8	15.0	0.1	1.6	1.6
JUL16	1.47	0.00	13.7	0.0	1.5	17.8	14.9	0.0	1.5	1.5
JUL23	2.21	0.15	14.1	-0.5	1.2	18.6	14.9	0.0	1.7	1.7
JUL30	0.00	1.18	15.7	-1.5	1.9	5.6	15.5	-0.6	2.7	2.7
AUG06	-0.59	0.10	14.8	0.9	1.0	8.3	15.4	0.2	0.3	0.3
AUG13	1.54	0.00	13.4	1.4	0.8	37.6	14.0	1.4	0.8	0.8
AUG20	0.00	0.30	14.2	-0.8	1.0	11.6	15.2	-1.2	0.6	0.6
AUG27	0.00	0.62	14.9	-0.7	-0.1	15.1	15.1	0.2	0.8	0.8
SEP03	0.00	0.00	14.6	0.4	0.4	18.4	14.9	0.2	0.2	0.2
SEP10	0.00	0.13	14.2	0.3	0.5	21.1	14.8	0.1	0.3	0.3
SEP17	0.15	0.35	14.3	-0.1	0.3	24.1	14.6	0.1	0.5	0.5
SEP24	-0.44	0.49	14.9	-0.6	0.0	19.4	14.9	-0.2	0.4	0.4
OCT05	0.00	1.12	15.1	-0.2	0.5	40.6	13.9	1.0	1.7	1.7
OCT13	0.00	0.00	14.6	0.5	0.5	40.1	13.9	-0.0	-0.0	0.0
	10.96	6.47		0.5	18.0			1.0	18.4	18.4

ET SUMMARY INFORMATION

PERIOD	ETSM	ETWL	ETCMBN	ETADJ
	INCHES			
MAY	2.31	1.97	1.97	1.97**
JUN	3.92	3.33	3.33	3.33
JUL	7.04	7.74	7.74	7.74
AUG	2.78	2.51	2.51	2.47
SEP	1.18	2.14	2.14	1.88
OCT	0.76	0.74	0.74	0.65**
JUN - SEP	14.91	15.72	15.72	15.42
SEASONAL	17.98	18.43	18.43	18.04

NOTE: See definitions of table headings at beginning of appendix.
** Indicates partial month of data.

Information for lysimeter number 1 at Montpelier, Idaho for 1985.

IDMO185 01-25-1989
LYSIMETER ET DATA 15:52:11

DATE	IRRIG	RAIN	SM	DELSM	ETSM	WL	SMWL	DELWL	ETWL	ETCMBN
	INCHES									
MAY17	0.00	0.00	15.7	0.0	0.0	19.3	14.9	0.0	0.0	0.0
MAY24	0.00	1.44	14.8	0.9	2.3	19.9	14.8	0.0	1.5	1.5
MAY31	0.00	0.17	15.1	-0.3	-0.2	20.8	14.8	0.0	0.2	0.2
JUN10	0.29	0.09	13.5	1.6	1.7	22.3	14.7	0.1	0.2	0.2
JUN17	-0.15	0.00	12.9	0.6	0.9	14.0	15.1	-0.4	-0.1	0.4
JUN24	0.29	0.01	12.4	0.5	0.4	22.5	14.7	0.4	0.3	0.8
JUL01	0.00	0.20	12.5	-0.1	0.4	13.5	15.1	-0.4	0.1	-0.0
JUL08	1.47	0.02	11.3	1.2	1.2	20.0	14.8	0.3	0.3	1.5
JUL15	1.47	0.95	12.3	-1.0	1.4	8.0	15.4	-0.6	1.9	0.9
JUL22	1.32	0.04	13.4	-1.1	0.4	7.0	15.4	-0.0	1.5	0.3
JUL29	2.21	0.15	12.6	0.8	2.3	11.5	15.2	0.2	1.7	2.5
AUG05	0.00	0.26	13.4	-0.8	1.6	6.0	15.5	-0.2	2.3	1.4
AUG12	2.21	0.00	12.6	0.7	0.7	11.5	15.2	0.2	0.2	1.0
AUG19	2.06	0.00	13.5	-0.8	1.4	8.0	15.4	-0.2	2.0	1.3
AUG26	0.59	0.00	13.9	-0.4	1.7	6.8	15.4	-0.0	2.1	2.1
SEP02	0.00	0.45	14.0	-0.1	1.0	9.5	15.3	0.1	1.1	1.1
SEP09	0.00	0.14	13.7	0.3	0.4	13.5	15.1	0.2	0.3	0.3
SEP16	0.00	0.42	13.5	0.2	0.6	17.0	15.0	0.2	0.6	0.6
SEP23	0.66	0.29	13.5	0.0	0.3	19.5	14.9	0.1	0.4	0.4
SEP30	0.00	0.00	13.7	-0.2	0.5	20.0	14.8	0.0	0.7	0.7
OCT07	0.00	0.32	13.6	0.1	0.4	22.0	14.7	0.1	0.4	0.4
	12.43	4.95		2.0	19.4			0.1	17.5	17.5

ET SUMMARY INFORMATION

PERIOD	ETSM	ETWL	ETCMBN	ETADJ
	INCHES			
MAY	2.13	1.68	1.68	1.68**
JUN	3.34	0.39	1.31	1.31
JUL	5.88	5.99	5.67	5.67
AUG	5.64	6.72	6.12	3.56
SEP	2.05	2.32	2.32	0.70
OCT	0.39	0.41	0.41	0.13**
JUN - SEP	16.90	15.42	15.42	11.24
SEASONAL	19.42	17.51	17.51	13.05

NOTE: See definitions of table headings at beginning of appendix.
** Indicates partial month of data.

Information for lysimeter number 1 at Montpelier, Idaho for 1986.

IDMO186 01-25-1989
LYSIMETER ET DATA 15:52:17

DATE	IRRIG	RAIN	SM	DELSM	ETSM	WL	SMWL	DELWL	ETWL	ETCMBN
	INCHES									
MAY02	0.00	0.00	14.5	0.0	0.0	4.6	17.2	0.0	0.0	0.0
MAY09	0.00	0.59	14.5	-0.0	0.6	4.6	17.2	0.0	0.6	0.6
MAY16	0.00	0.11	14.1	0.4	0.5	15.5	15.0	2.1	2.3	2.3
MAY23	0.00	0.00	14.8	-0.7	-0.7	15.5	15.0	0.0	0.0	0.0
JUN02	1.54	0.00	14.6	0.2	0.2	17.0	15.0	0.1	0.1	0.1
JUN09	1.10	0.09	14.9	-0.3	1.3	4.3	17.5	-2.5	-0.9	-0.9
JUN16	1.29	0.00	14.4	0.5	1.6	4.0	17.8	-0.3	0.8	0.8
JUN23	2.43	0.00	14.6	-0.2	1.1	5.5	15.6	2.2	3.5	3.5
JUN30	0.00	0.00	15.9	-1.2	1.2	5.3	15.7	-0.1	2.4	2.4
JUL07	0.74	0.00	14.8	1.1	1.1	6.0	15.5	0.2	0.2	0.2
JUL14	1.18	0.00	14.8	-0.0	0.7	7.3	15.5	-0.0	0.7	0.7
JUL21	0.74	0.11	14.9	-0.1	1.2	7.4	15.5	-0.0	1.3	1.3
JUL28	0.59	0.99	14.6	0.3	2.0	7.0	15.4	0.1	1.8	1.8
AUG11	0.74	0.00	14.0	0.6	1.2	9.0	15.4	0.1	0.7	0.7
AUG18	1.32	0.00	14.2	-0.1	0.6	10.8	15.3	0.1	0.8	0.8
AUG25	0.00	0.59	14.5	-0.3	1.6	10.5	15.3	-0.0	1.9	1.9
SEP01	0.74	0.00	14.2	0.3	0.3	11.3	15.2	0.0	0.0	0.0
SEP08	0.00	0.00	14.1	0.1	0.9	12.0	15.2	0.0	0.8	0.8
SEP15	0.00	0.36	13.5	0.6	0.9	12.0	15.2	0.0	0.4	0.4
SEP22	0.00	0.11	13.2	0.3	0.4	13.5	15.1	0.1	0.2	0.4
OCT03	-1.77	2.66	14.6	-1.4	1.2	10.3	15.3	-0.2	2.5	2.3
OCT17	0.00	0.00	13.1	1.5	-0.2	23.0	14.7	0.6	-1.2	-0.9
	10.64	5.61		1.4	17.6			2.5	18.7	19.0

ET SUMMARY INFORMATION

PERIOD	ETSM	ETWL	ETCMBN	ETADJ
	INCHES			
MAY	0.53	2.90	2.90	2.90**
JUN	5.26	5.80	5.80	5.80
JUL	5.26	4.12	4.12	4.12
AUG	3.36	3.27	3.27	3.27
SEP	3.12	3.14	3.19	2.09
OCT	0.10	-0.48	-0.24	-0.41**
JUN - SEP	17.00	16.33	16.38	15.28
SEASONAL	17.63	18.75	19.05	17.76

NOTE: See definitions of table headings at beginning of appendix.
** Indicates partial month of data.

Appendix B continued. Summarized field data and analysis for non-weighing lysimeters in the upper Bear River Basin, 1983-1987.

Information for lysimeter number 2 at Montpelier, Idaho for 1983.

IDMO283 01-25-1989
LYSIMETER ET DATA 15:52:22

DATE	IRRIG	RAIN	SM	DELSM	ETSM	WL	SMWL	DELWL	ETWL	ETCMBN
					INCHES					
JUN13	0.00	0.00				37.8	14.8	0.0	0.0	0.0
JUN20	2.21	0.00				29.8	15.2	-0.4	-0.4	-0.4
JUN27	1.91	0.03				19.2	15.7	-0.5	1.7	1.7
JUL05	0.00	0.72				14.1	15.9	-0.2	2.4	2.4
JUL11	0.00	0.67				11.8	16.1	-0.1	0.6	0.6
JUL18	0.00	0.09				10.8	16.1	-0.0	0.0	0.0
JUL25	0.00	0.05				11.5	16.1	0.0	0.1	0.1
AUG01	0.00	0.68				12.8	16.0	0.1	0.7	0.7
AUG08	0.00	0.02				14.2	15.9	0.1	0.1	0.1
AUG15	0.00	1.36	16.4	0.0	0.0	15.6	15.9	0.1	1.4	1.4
AUG22	0.00	1.71	16.3	0.0	1.8	17.3	15.8	0.1	1.8	1.8
AUG29	0.00	0.00	16.4	-0.1	-0.1	19.6	15.7	0.1	0.1	0.1
SEP05	0.00	1.29	15.7	0.7	2.0	20.5	15.6	0.0	1.3	1.3
SEP12	0.00	0.28	15.6	0.1	0.4	23.1	15.5	0.1	0.4	0.4
SEP19	-0.28	0.00	15.1	0.5	0.5	24.5	15.5	0.1	0.1	0.1
SEP26	0.00	0.13	14.6	0.5	0.4	37.3	14.9	0.6	0.5	0.5
OCT03	0.00	1.80	15.1	-0.5	1.3	36.9	14.9	-0.0	1.8	1.8
OCT10	0.00	0.54	14.2	0.8	1.4	37.4	14.9	0.0	0.6	0.7
	3.84	9.38		2.1	7.6			-0.0	13.2	13.4

ET SUMMARY INFORMATION

PERIOD	ETSM	ETWL	ETCMBN	ETADJ
	INCHES			
JUN	0.00	2.26	2.26	2.26**
JUL	0.00	2.83	2.83	2.83
AUG	2.23	3.89	3.89	3.89
SEP	3.45	2.89	2.89	2.89
OCT	1.93	1.33	1.50	1.50**
JUN - SEP	5.68	11.88	11.88	11.88**
SEASONAL	7.62	13.20	13.37	13.37

NOTE: See definitions of table headings at beginning of appendix.
** Indicates partial month of data.

Information for lysimeter number 2 at Montpelier, Idaho for 1984.

IDMO284 01-25-1989
LYSIMETER ET DATA 15:52:28

DATE	IRRIG	RAIN	SM	DELSM	ETSM	WL	SMWL	DELWL	ETWL	ETCMBN
					INCHES					
MAY12	0.00	0.00	14.4	0.0	0.0	16.6	15.8	0.0	0.0	0.0
MAY18	0.00	0.12	13.9	0.5	0.6	16.4	15.8	-0.0	0.1	0.6
MAY25	2.94	0.01	13.8	0.1	0.1	17.3	15.8	0.0	0.1	0.2
JUN04	0.00	0.25	14.0	-0.2	3.0	9.1	16.2	-0.4	2.8	2.6
JUN11	-0.74	1.42	13.8	0.2	1.6	5.3	16.4	-0.2	1.2	1.4
JUN18	0.00	0.17	14.3	-0.4	-1.0	14.1	15.9	0.4	-0.1	-0.6
JUN25	1.47	0.01	13.1	1.2	1.2	14.8	15.9	0.0	0.0	1.2
JUL02	1.47	0.01	14.0	-0.9	0.6	14.8	15.9	0.0	1.5	0.6
JUL09	1.47	0.03	13.9	0.1	1.6	15.1	15.9	0.0	1.5	1.6
JUL16	1.47	0.00	14.0	-0.1	1.3	15.1	15.9	0.0	1.5	1.3
JUL23	2.21	0.15	15.3	-1.3	0.4	16.1	15.9	0.0	1.7	1.3
JUL30	0.00	1.18	16.4	-1.1	2.3	4.8	16.4	-0.5	2.9	2.9
AUG06	0.00	0.10	16.4	0.0	0.1	13.2	16.0	0.4	0.5	0.5
AUG13	0.74	0.00	15.5	0.9	0.9	18.2	15.8	0.2	0.2	0.2
AUG20	0.00	0.30	15.4	0.1	1.1	17.1	15.8	-0.1	1.0	1.0
AUG27	0.00	0.62	16.0	-0.6	-0.0	18.2	15.8	0.1	0.7	0.7
SEP03	0.44	0.00	16.2	-0.1	-0.1	21.4	15.6	0.2	0.2	0.2
SEP10	0.00	0.13	15.5	0.6	1.2	18.1	15.8	-0.2	0.4	0.4
SEP17	-0.15	0.35	16.3	-0.7	-0.4	20.6	15.6	0.1	0.5	0.5
SEP24	-0.29	0.49	16.3	0.0	0.4	20.6	15.6	0.0	0.3	0.3
OCT05	-0.51	1.12	16.2	0.1	0.9	18.1	15.8	-0.1	0.7	0.7
OCT13	0.00	0.00	12.5	3.7	3.2	34.6	15.0	0.8	0.3	2.2
	10.52	6.47		2.0	19.0			0.8	17.8	19.8

ET SUMMARY INFORMATION

PERIOD	ETSM	ETWL	ETCMBN	ETADJ
	INCHES			
MAY	2.54	1.85	2.32	2.32**
JUN	3.40	3.31	3.51	3.51
JUL	5.74	8.01	7.34	7.34
AUG	2.05	2.40	2.40	2.38
SEP	1.61	1.68	1.68	1.50
OCT	3.62	0.58	2.53	2.50**
JUN - SEP	12.79	15.40	14.93	14.74
SEASONAL	18.96	17.83	19.78	19.56

NOTE: See definitions of table headings at beginning of appendix.
** Indicates partial month of data.

Information for lysimeter number 2 at Montpelier, Idaho for 1985.

IDMO285 LYSIMETER ET DATA — 01-25-1989 15:52:33

DATE	IRRIG	RAIN	SM	DELSM	ETSM	WL	SMWL	DELWL	ETWL	ETCMBN
	INCHES									
MAY17	0.00	0.00	16.4	0.0	0.0	16.8	15.8	0.0	0.0	0.0
MAY24	0.00	1.44	16.0	0.4	1.8	19.4	15.7	0.1	1.6	1.6
MAY31	0.00	0.17	15.3	0.7	0.8	21.0	15.6	0.1	0.2	0.2
JUN10	0.37	0.09	13.5	1.8	1.9	24.8	15.4	0.2	0.3	1.2
JUN17	0.00	0.00	13.7	-0.2	0.1	20.5	15.6	-0.2	0.2	-0.1
JUN24	0.74	0.01	13.5	0.2	0.2	24.0	15.5	0.2	0.2	0.4
JUL01	0.44	0.20	13.5	-0.0	0.9	23.0	15.5	-0.0	0.9	0.9
JUL08	1.47	0.02	13.5	0.0	0.5	24.0	15.5	0.0	0.5	0.5
JUL15	3.24	0.95	15.0	-1.5	1.0	21.0	15.6	-0.1	2.3	1.4
JUL22	2.21	0.04	16.4	-1.4	1.8	17.0	15.8	-0.2	3.1	3.1
JUL29	0.00	0.15	15.7	0.7	3.0	7.5	16.3	-0.4	1.9	1.9
AUG05	1.32	0.26	15.3	0.5	0.7	15.5	15.9	0.4	0.6	0.6
AUG12	0.74	0.00	15.2	0.1	1.4	16.5	15.8	0.0	1.4	1.4
AUG19	2.21	0.00	15.0	0.2	0.9	18.0	15.8	0.1	0.8	0.8
AUG26	1.18	0.00	15.7	-0.7	1.5	11.5	16.1	-0.3	1.9	1.9
SEP02	0.00	0.45	16.4	-0.7	0.9	8.0	16.2	-0.2	1.5	1.5
SEP09	0.00	0.14	15.8	0.6	0.7	14.5	15.9	0.3	0.4	0.4
SEP16	0.00	0.42	15.3	0.5	1.0	16.0	15.9	0.1	0.5	0.5
SEP23	0.00	0.29	13.4	1.8	2.1	19.0	15.7	0.1	0.4	1.4
	13.90	4.64		3.0	21.5			0.1	18.6	19.6

ET SUMMARY INFORMATION

PERIOD	ETSM	ETWL	ETCMBN	ETADJ
	INCHES			
MAY	2.68	1.81	1.81	1.81**
JUN	3.09	1.38	2.27	2.27
JUL	6.63	8.10	7.21	7.21
AUG	5.02	5.58	5.58	4.25
SEP	4.07	1.78	2.74	1.07**
JUN - SEP	18.81	16.83	17.79	14.79**
SEASONAL	21.49	18.64	19.60	16.60

NOTE: See definitions of table headings at beginning of appendix.
** Indicates partial month of data.

Information for lysimeter number 2 at Montpelier, Idaho for 1986.

IDMO286 LYSIMETER ET DATA — 01-25-1989 15:52:39

DATE	IRRIG	RAIN	SM	DELSM	ETSM	WL	SMWL	DELWL	ETWL	ETCMBN
	INCHES									
MAY02	0.00	0.00	14.5	0.0	0.0	8.3	16.2	0.0	0.0	0.0
MAY09	0.00	0.59	14.5	-0.0	0.5	7.8	16.2	-0.0	0.6	0.6
MAY16	0.00	0.11	16.0	-1.5	-1.4	8.3	16.2	0.0	0.1	0.1
MAY23	0.00	0.14	15.9	0.1	0.2	8.3	16.2	0.0	0.1	0.1
JUN02	0.00	0.00	16.5	-0.6	-0.6	2.8	16.4	-0.2	-0.2	-0.2
JUN09	1.47	0.09	16.3	0.2	0.3	8.5	16.2	0.2	0.3	0.3
JUN16	1.88	0.00	15.9	0.4	1.8	7.8	16.2	-0.0	1.4	1.4
JUN23	1.47	0.00	15.9	0.0	1.9	6.5	16.3	-0.1	1.8	1.8
JUN30	0.74	0.00	15.7	0.2	1.7	5.9	16.3	-0.0	1.4	1.4
JUL07	1.25	0.00	16.0	-0.3	0.4	9.3	16.2	0.2	0.9	0.9
JUL14	1.32	0.00	16.1	-0.1	1.2	9.0	16.2	-0.0	1.2	1.2
JUL21	1.32	0.11	16.2	-0.1	1.3	8.8	16.2	-0.0	1.4	1.4
JUL28	-0.29	0.99	15.2	1.0	3.3	4.5	16.4	-0.2	2.1	2.1
AUG04	0.74	0.00	14.8	0.4	0.1	9.3	16.2	0.2	-0.1	-0.1
AUG11	1.18	0.00	15.3	-0.5	0.2	11.0	16.1	0.1	0.8	0.8
AUG18	1.47	0.00	15.5	-0.2	1.0	12.0	16.0	0.0	1.2	1.2
AUG25	0.00	0.59	15.3	0.2	2.3	7.8	16.2	-0.2	1.9	1.9
SEP01	1.18	0.00	14.5	0.8	0.8	11.5	16.1	0.2	0.2	0.2
SEP08	1.18	0.00	15.0	-0.5	0.6	12.5	16.0	0.0	1.2	1.2
SEP15	0.00	0.37	14.7	0.3	1.8	9.0	16.2	-0.2	1.4	1.4
SEP22	0.00	0.11	13.0	1.7	1.8	14.3	15.9	0.2	0.4	1.7
OCT03	-0.74	2.66	13.7	-0.7	1.9	7.0	16.3	-0.3	2.3	1.6
OCT17	0.00	0.00	13.1	0.6	-0.1	15.8	15.9	0.4	-0.3	0.3
	14.17	5.77		1.3	21.3			0.4	20.3	21.6

ET SUMMARY INFORMATION

PERIOD	ETSM	ETWL	ETCMBN	ETADJ
	INCHES			
MAY	-1.08	0.70	0.70	0.70**
JUN	5.61	4.95	4.95	4.95
JUL	6.28	5.64	5.64	5.64
AUG	4.26	4.01	4.01	3.87
SEP	5.78	4.67	5.52	2.46
OCT	0.43	0.31	0.75	0.36**
JUN - SEP	21.93	19.28	20.13	16.93
SEASONAL	21.27	20.28	21.57	17.98

NOTE: See definitions of table headings at beginning of appendix.
** Indicates partial month of data.

Appendix B continued. Summarized field data and analysis for non-weighing lysimeters in the upper Bear River Basin, 1983-1987.

Information for lysimeter number 2 at Montpelier, Idaho for 1987.

IDMO287 01-25-1989
LYSIMETER ET DATA 15:52:46

DATE	IRRIG	RAIN	SM	DELSM	ETSM	WL	SMWL	DELWL	ETWL	ETCMBN
					INCHES					
APR24	2.21	0.00	10.8	0.0	0.0	31.0	15.2	0.0	0.0	0.0
MAY01	0.00	0.09	15.2	-4.5	-2.2	16.0	15.9	-0.7	1.6	-2.0
MAY08	2.21	0.14	14.2	1.1	1.2	22.0	15.6	0.3	0.4	0.6
MAY15	0.00	0.48	15.6	-1.4	1.3	11.0	16.1	-0.5	2.2	1.9
MAY22	0.00	1.54	16.5	-0.9	0.7	4.0	16.5	-0.5	1.1	1.1
MAY31	0.00	0.59	16.2	0.3	0.9	4.5	16.4	0.1	0.7	0.7
JUN08	1.47	0.18	15.0	1.1	1.3	18.8	15.7	0.7	0.9	0.9
JUN15	1.47	0.45	15.4	-0.3	1.6	13.0	16.0	-0.3	1.6	1.6
JUN22	2.21	0.07	15.3	0.1	1.6	17.0	15.8	0.2	1.7	1.7
JUN28	1.47	0.62	15.4	-0.1	2.7	12.5	16.0	-0.2	2.6	2.6
JUL06	1.47	0.01	15.6	-0.2	1.3	15.0	15.9	0.1	1.6	1.6
JUL13	0.74	0.78	16.0	-0.4	1.9	9.5	16.2	-0.3	2.0	2.0
JUL21	0.74	0.39	16.3	-0.4	0.8	16.0	15.9	0.3	1.4	1.4
JUL28	1.47	0.36	14.8	1.6	2.7	20.0	15.7	0.2	1.3	1.3
AUG01	0.74	0.29	15.5	-0.7	1.0	12.5	16.0	-0.4	1.4	1.4
AUG10	0.00	0.00	12.3	3.2	3.9	24.0	15.5	0.5	1.3	3.4
AUG17	3.68	1.20	11.8	0.5	1.7	27.3	15.3	0.2	1.4	1.8
AUG24	0.00	0.18	16.1	-4.3	-0.4	5.0	16.4	-1.0	2.8	0.3
AUG31	0.00	1.12	15.1	1.0	2.2	8.5	16.2	0.2	1.3	1.3
SEP08	2.94	0.23	14.1	1.0	1.2	17.0	15.8	0.4	0.6	1.0
SEP14	0.00	0.05	16.2	-2.1	0.9	1.8	16.6	-0.8	2.2	1.8
SEP21	0.00	0.51	14.0	2.2	2.7	3.0	16.4	0.2	0.7	1.1
SEP25	0.00	0.05	13.5	0.5	0.5	5.8	16.3	0.1	0.1	0.6
OCT02	0.00	0.00	13.2	0.3	0.3	12.8	16.0	0.3	0.3	0.6
OCT08	0.00	0.04	12.9	0.4	0.4	20.0	15.7	0.3	0.4	0.7
OCT15	0.00	1.02	13.3	-0.4	0.6	14.8	15.9	-0.2	0.8	0.4
	22.80	10.40		-2.5	30.7			-0.8	32.4	30.0

ET SUMMARY INFORMATION

PERIOD	ETSM	ETWL	ETCMBN	ETADJ
	INCHES			
APR	-1.85	1.37	-1.74	-1.74**
MAY	3.71	4.64	4.13	4.13
JUN	7.55	7.25	7.25	7.25
JUL	7.06	6.96	6.96	6.96
AUG	7.60	7.08	7.08	5.29
SEP	5.56	3.90	5.00	2.34
OCT	1.09	1.25	1.28	0.34**
JUN - SEP	27.77	25.18	26.29	21.84
SEASONAL	30.71	32.44	29.95	24.56

NOTE: See definitions of table headings at beginning of appendix.
** Indicates partial month of data.

Information for lysimeter number 3 at Montpelier, Idaho for 1983.

IDMO383 01-25-1989
LYSIMETER ET DATA 15:52:51

DATE	IRRIG	RAIN	SM	DELSM	ETSM	WL	SMWL	DELWL	ETWL	ETCMBN
					INCHES					
JUN13	1.47	0.00				43.5	14.3	0.0	0.0	0.0
JUN20	2.21	0.00				27.5	15.1	-0.8	0.7	0.7
JUN27	1.91	0.03				22.5	15.3	-0.2	2.0	2.0
JUL05	0.74	0.72				13.5	15.8	-0.4	2.2	2.2
JUL11	0.37	0.67				11.5	15.8	-0.1	1.3	1.3
JUL18	0.00	0.09				13.9	15.7	0.1	0.6	0.6
JUL25	0.00	0.05				16.5	15.6	0.1	0.2	0.2
AUG01	0.00	0.68				18.8	15.5	0.1	0.8	0.8
AUG08	0.00	0.02				20.8	15.4	0.1	0.1	0.1
AUG15	0.00	1.36	15.7	0.0	0.0	21.7	15.4	0.0	1.4	1.4
AUG22	0.00	1.71	16.3	-0.6	1.1	21.4	15.4	-0.0	1.7	1.7
AUG29	0.00	0.00	15.9	0.5	0.5	22.1	15.3	0.0	0.0	0.0
SEP05	0.00	1.29	15.6	0.3	1.5	22.4	15.3	0.0	1.3	1.3
SEP12	0.00	0.28	15.5	0.1	0.4	23.4	15.3	0.0	0.3	0.3
SEP19	0.00	0.00	15.4	0.2	0.2	24.6	15.2	0.1	0.1	0.1
SEP26	0.00	0.13	14.9	0.5	0.6	26.2	15.2	0.1	0.2	0.2
OCT03	-0.28	1.80	15.4	-0.5	1.3	26.6	15.1	0.0	1.8	1.8
OCT10	0.00	0.54	15.3	0.1	0.4	31.6	14.9	0.2	0.5	0.5
	6.41	9.38		0.4	5.9			-0.6	15.2	15.2

ET SUMMARY INFORMATION

PERIOD	ETSM	ETWL	ETCMBN	ETADJ
	INCHES			
JUN	0.00	3.55	3.55	3.55**
JUL	0.00	4.12	4.12	4.12
AUG	1.97	3.73	3.73	3.73
SEP	2.99	2.56	2.56	2.56
OCT	0.94	1.28	1.28	1.28**
JUN - SEP	4.96	13.96	13.96	13.96**
SEASONAL	5.90	15.24	15.24	15.24

NOTE: See definitions of table headings at beginning of appendix.
** Indicates partial month of data.

Appendix B continued. Summarized field data and analysis for non-weighing lysimeters in the upper Bear River Basin, 1983-1987.

Information for lysimeter number 3 at Montpelier, Idaho for 1984.

IDMO384 01-25-1989
LYSIMETER ET DATA 15:52:57

DATE	IRRIG	RAIN	SM	DELSM	ETSM	WL	SMWL	DELWL	ETWL	ETCMBN
	INCHES									
MAY12	0.00	0.00	15.8	0.0	0.0	25.3	15.2	0.0	0.0	0.0
MAY18	0.00	0.12	15.5	0.3	0.4	25.0	15.2	-0.0	0.1	0.1
MAY25	1.77	0.01	14.5	1.0	1.0	24.1	15.3	-0.0	-0.0	-0.0
JUN04	1.18	0.25	14.7	-0.2	1.8	20.4	15.4	-0.2	1.8	1.8
JUN11	0.00	1.42	15.2	-0.5	2.1	15.4	15.7	-0.2	2.4	2.4
JUN18	0.74	0.17	15.1	0.1	0.3	20.0	15.4	0.2	0.4	0.4
JUN25	2.21	0.01	14.6	0.5	1.2	22.5	15.3	0.1	0.9	0.9
JUL02	2.21	0.01	14.7	-0.1	2.1	23.0	15.3	0.0	2.2	2.2
JUL09	2.21	0.03	15.0	-0.4	1.9	24.0	15.3	0.0	2.3	2.3
JUL16	2.21	0.00	15.0	0.1	2.3	24.3	15.2	0.0	2.2	2.2
JUL23	2.21	0.15	15.6	-0.6	1.7	22.0	15.4	-0.1	2.3	2.3
JUL30	0.00	1.18	16.2	-0.6	2.8	12.5	15.8	-0.4	2.9	2.9
AUG06	0.00	0.10	16.0	0.1	0.2	22.5	15.3	0.5	0.6	0.6
AUG13	0.00	0.00	14.4	1.6	1.6	27.5	15.1	0.2	0.2	0.2
AUG20	0.00	0.30	13.7	0.7	1.0	31.3	14.9	0.2	0.5	0.9
AUG27	-0.18	0.62	13.7	-0.0	0.6	33.0	14.8	0.1	0.7	0.7
SEP03	0.00	0.00	13.9	-0.2	-0.4	40.5	14.5	0.4	0.2	-0.0
SEP10	0.00	0.13	13.6	0.4	0.5	40.3	14.5	-0.0	0.1	0.5
SEP17	0.00	0.35	13.7	-0.1	0.2	41.0	14.5	0.0	0.4	0.3
SEP24	0.00	0.49	14.5	-0.8	-0.3	41.0	14.5	0.0	0.5	0.1
OCT05	0.00	1.12	14.6	-0.1	1.0	42.0	14.4	0.0	1.2	1.2
OCT13	0.00	0.00	14.0	0.6	0.6	42.0	14.4	0.0	0.0	0.1
	14.53	6.47		1.8	22.8			0.8	21.8	21.9

ET SUMMARY INFORMATION

PERIOD	ETSM	ETWL	ETCMBN	ETADJ
	INCHES			
MAY	2.46	1.18	1.18	1.18**
JUN	5.92	5.95	5.95	5.95
JUL	9.32	10.42	10.42	10.42
AUG	3.20	2.00	2.25	2.22
SEP	0.82	1.70	1.45	1.39
OCT	1.06	0.53	0.66	0.65**
JUN - SEP	19.27	20.07	20.07	19.98
SEASONAL	22.79	21.79	21.91	21.81

NOTE: See definitions of table headings at beginning of appendix.
** Indicates partial month of data.

Information for lysimeter number 3 at Montpelier, Idaho for 1985.

IDMO385 01-25-1989
LYSIMETER ET DATA 15:53:03

DATE	IRRIG	RAIN	SM	DELSM	ETSM	WL	SMWL	DELWL	ETWL	ETCMBN
	INCHES									
MAY17	0.00	0.00	15.9	0.0	0.0	19.1	15.5	0.0	0.0	0.0
MAY24	0.00	1.44	15.8	0.1	1.6	21.9	15.4	0.1	1.6	1.6
MAY31	0.00	0.17	15.8	-0.1	0.1	23.0	15.3	0.1	0.2	0.2
JUN10	0.29	0.09	15.6	0.3	0.3	24.0	15.3	0.0	0.1	0.1
JUN17	0.00	0.00	15.5	0.1	0.4	23.0	15.3	-0.0	0.2	0.2
JUN24	0.29	0.01	14.7	0.8	0.8	24.0	15.3	0.0	0.1	0.1
JUL01	0.74	0.20	14.1	0.5	1.0	24.5	15.2	0.0	0.5	0.5
JUL08	1.47	0.02	13.8	0.3	1.1	24.5	15.2	0.0	0.8	1.0
JUL15	2.50	0.95	15.0	-1.1	1.3	23.3	15.3	-0.1	2.4	2.1
JUL22	0.74	0.04	16.3	-1.4	1.2	15.0	15.7	-0.4	2.2	2.2
JUL29	0.74	0.15	15.0	1.4	2.2	17.0	15.6	0.1	1.0	1.0
AUG05	0.74	0.26	15.1	-0.2	0.8	18.5	15.5	0.1	1.1	1.1
AUG12	0.74	0.00	14.8	0.4	1.1	21.0	15.4	0.1	0.9	0.9
AUG19	1.47	0.00	15.0	-0.2	0.5	21.5	15.4	0.0	0.8	0.8
AUG26	1.77	0.00	15.1	-0.2	1.3	18.0	15.5	-0.2	1.3	1.3
SEP02	0.00	0.45	15.4	-0.3	1.9	6.5	16.1	-0.5	1.7	1.7
SEP09	0.00	0.14	15.3	0.1	0.3	14.0	15.7	0.4	0.5	0.5
SEP16	0.00	0.42	15.2	0.1	0.5	16.0	15.6	0.1	0.5	0.5
SEP23	0.00	0.29	15.3	-0.1	0.2	19.0	15.5	0.1	0.4	0.4
SEP30	0.00	0.00	15.1	0.3	0.3	24.0	15.3	0.2	0.2	0.2
OCT07	0.00	0.32	14.9	0.2	0.5	25.0	15.2	0.0	0.4	0.4
OCT14	0.00	0.15	14.8	0.1	0.2	25.0	15.2	0.0	0.2	0.2
	11.47	5.10		1.1	17.7			0.3	16.9	16.9

ET SUMMARY INFORMATION

PERIOD	ETSM	ETWL	ETCMBN	ETADJ
	INCHES			
MAY	1.68	1.79	1.79	1.79**
JUN	2.43	0.89	0.89	0.89
JUL	6.18	6.63	6.63	6.63
AUG	4.89	4.88	4.88	4.29
SEP	1.76	2.15	2.15	1.11
OCT	0.72	0.52	0.52	0.26**
JUN - SEP	15.26	14.55	14.55	12.92
SEASONAL	17.66	16.86	16.86	14.97

NOTE: See definitions of table headings at beginning of appendix.
** Indicates partial month of data.

Appendix B continued. Summarized field data and analysis for non-weighing lysimeters in the upper Bear River Basin, 1983-1987.

Information for lysimeter number 3 at Montpelier, Idaho for 1986.

IDMO386 01-25-1989
LYSIMETER ET DATA 15:53:09

DATE	IRRIG	RAIN	SM	DELSM	ETSM	WL	SMWL	DELWL	ETWL	ETCMBN
	INCHES									
MAY02	0.00	0.00	15.6	0.0	0.0	5.5	16.2	0.0	0.0	0.0
MAY09	0.00	0.59	15.8	-0.2	0.4	6.0	16.4	-0.2	0.4	0.4
MAY16	0.00	0.11	15.8	0.0	0.1	14.5	15.7	0.7	0.8	0.8
MAY23	0.51	0.14	15.7	0.1	0.2	20.3	15.4	0.3	0.4	0.4
JUN02	2.21	0.00	15.6	0.2	0.7	22.0	15.4	0.1	0.6	0.6
JUN09	1.47	0.09	15.8	-0.3	2.0	21.1	15.4	-0.0	2.3	2.3
JUN16	2.57	0.00	15.5	0.4	1.9	21.0	15.4	-0.0	1.5	1.5
JUN23	2.47	0.00	15.5	-0.1	2.5	19.3	15.5	-0.1	2.5	2.5
JUN30	1.03	0.00	15.7	-0.2	2.3	14.5	15.7	-0.2	2.2	2.2
JUL07	2.50	0.00	15.3	0.4	1.4	21.3	15.4	0.3	1.3	1.3
JUL14	2.35	0.00	15.7	-0.4	2.1	16.5	15.6	-0.2	2.3	2.3
JUL21	1.91	0.11	15.7	0.0	2.5	12.5	15.8	-0.2	2.3	2.3
JUL28	0.00	0.99	16.0	-0.3	2.6	3.0	17.6	-1.8	1.1	1.1
AUG04	1.18	0.00	15.4	0.6	0.6	12.0	15.8	1.8	1.8	1.8
AUG11	1.47	0.00	15.8	-0.4	0.8	17.8	15.6	0.3	1.4	1.4
AUG18	1.32	0.00	16.1	-0.3	1.2	16.8	15.6	-0.0	1.4	1.4
AUG25	0.00	0.59	16.1	0.0	1.9	6.8	16.1	-0.5	1.4	1.4
SEP01	0.74	0.00	15.1	1.0	1.0	18.5	15.5	0.5	0.5	0.5
SEP08	1.18	0.00	15.8	-0.7	0.1	21.0	15.4	0.1	0.9	0.9
SEP15	0.00	0.36	16.0	-0.2	1.3	14.5	15.7	-0.3	1.2	1.2
SEP23	0.00	0.11	15.9	0.2	0.3	20.5	15.4	0.3	0.4	0.4
OCT03	-0.74	2.66	15.2	0.7	3.3	4.5	16.1	-0.7	2.0	2.0
OCT17	0.00	0.00	14.9	0.2	-0.5	18.5	15.5	0.6	-0.1	-0.1
	22.18	5.76		0.7	28.6			0.7	28.6	28.6

ET SUMMARY INFORMATION

PERIOD	ETSM	ETWL	ETCMBN	ETADJ
	INCHES			
MAY	1.28	2.09	2.09	2.09**
JUN	8.84	8.58	8.58	8.58
JUL	8.80	7.76	7.76	7.76
AUG	5.06	5.80	5.80	4.80
SEP	4.13	3.94	3.94	1.48
OCT	0.51	0.44	0.44	0.08**
JUN - SEP	26.83	26.09	26.09	22.62
SEASONAL	28.61	28.63	28.63	24.80

NOTE: See definitions of table headings at beginning of appendix.
** Indicates partial month of data.

Information for lysimeter number 3 at Montpelier, Idaho for 1987.

IDMO387 01-25-1989
LYSIMETER ET DATA 15:53:16

DATE	IRRIG	RAIN	SM	DELSM	ETSM	WL	SMWL	DELWL	ETWL	ETCMBN
	INCHES									
APR24	1.47	0.00	13.5	0.0	0.0	25.0	15.2	0.0	0.0	0.0
MAY01	0.00	0.09	14.5	-1.0	0.6	14.0	15.7	-0.5	1.0	0.5
MAY08	2.21	0.14	14.6	-0.1	0.0	21.5	15.4	0.4	0.5	0.5
MAY15	0.00	0.48	14.9	-0.3	2.4	5.0	16.1	-0.7	1.9	1.9
MAY22	0.00	1.54	15.8	-0.9	0.6	3.5	16.3	-0.2	1.3	1.3
MAY31	0.00	0.59	15.6	0.1	0.7	4.0	16.2	0.1	0.7	0.7
JUN08	0.00	0.18	15.5	0.1	0.3	5.8	16.3	-0.1	0.1	0.1
JUN15	1.47	0.45	15.5	0.0	0.4	17.0	15.6	0.7	1.2	1.2
JUN22	2.21	0.07	15.4	0.1	1.7	18.5	15.5	0.1	1.6	1.6
JUN29	1.47	0.62	15.6	-0.2	2.7	10.5	15.9	-0.4	2.5	2.5
JUL06	1.47	0.01	15.5	0.1	1.5	12.5	15.8	0.1	1.6	1.6
JUL13	0.74	0.78	15.7	-0.2	2.1	5.0	16.1	-0.3	1.9	1.9
JUL21	0.00	0.39	16.3	-0.6	0.5	8.0	16.0	0.1	1.2	1.2
JUL28	0.00	0.36	15.9	0.5	0.8	8.5	16.0	0.0	0.4	0.4
AUG01	1.47	0.29	15.7	0.1	0.4	19.0	15.5	0.5	0.8	0.8
AUG10	0.00	0.00	13.5	2.2	3.7	24.5	15.2	0.3	1.7	2.4
AUG17	2.21	1.20	13.8	-0.4	0.8	15.5	15.7	-0.4	0.8	0.4
AUG24	0.00	0.18	15.5	-1.7	0.7	4.5	16.1	-0.4	1.9	1.7
AUG31	0.00	1.12	14.1	1.5	2.6	4.5	16.1	0.0	1.1	1.2
SEP08	0.00	0.23	13.4	0.6	0.8	10.5	15.9	0.2	0.4	1.1
SEP14	0.00	0.05	13.4	0.1	0.1	19.5	15.5	0.4	0.5	0.5
SEP21	0.00	0.51	13.3	0.1	0.6	22.0	15.4	0.1	0.6	0.7
SEP28	0.00	0.05	13.1	0.2	0.2	24.0	15.3	0.1	0.1	0.3
OCT02	0.00	0.00	12.9	0.2	0.2	28.5	15.0	0.2	0.2	0.4
OCT08	0.00	0.04	11.5	1.4	1.4	30.0	15.0	0.1	0.1	1.5
OCT15	0.00	1.02	13.1	-1.5	-0.5	28.0	15.1	-0.1	0.9	-0.6
	14.71	10.40		0.5	25.6			0.1	25.3	25.7

ET SUMMARY INFORMATION

PERIOD	ETSM	ETWL	ETCMBN	ETADJ
	INCHES			
APR	0.48	0.90	0.41	0.41**
MAY	3.93	4.67	4.58	4.58
JUN	5.28	5.50	5.50	5.50
JUL	5.05	5.48	5.48	5.48
AUG	7.95	5.77	5.82	5.60
SEP	1.89	1.80	2.84	2.06
OCT	0.99	1.14	1.07	0.71**
JUN - SEP	20.16	18.55	19.64	18.64
SEASONAL	25.56	25.25	25.70	24.34

NOTE: See definitions of table headings at beginning of appendix.
** Indicates partial month of data.

Appendix B continued. Summarized field data and analysis for non-weighing lysimeters in the upper Bear River Basin, 1983-1987.

Information for lysimeter number 4 at Montpelier, Idaho for 1986.

IDMO486 01-25-1989
LYSIMETER ET DATA 15:53:21

DATE	IRRIG	RAIN	SM	DELSM	ETSM	WL	SMWL	DELWL	ETWL	ETCMBN
					INCHES					
JUL07	1.62	0.00	16.7	0.0	0.0	12.8	16.3	0.0	0.0	0.0
JUL14	1.47	0.00	16.6	0.1	1.7	10.3	16.5	-0.1	1.5	1.5
JUL21	1.47	0.11	16.5	0.1	1.6	10.0	16.5	-0.0	1.6	1.6
JUL28	0.00	0.99	16.1	0.5	2.9	2.8	16.9	-0.5	2.0	2.0
AUG04	1.32	0.00	16.0	0.1	0.1	11.0	16.4	0.5	0.5	0.5
AUG11	1.47	0.00	15.3	0.6	2.0	15.5	16.1	0.3	1.7	1.7
AUG18	1.47	0.00	15.8	-0.4	1.0	13.3	16.3	-0.2	1.3	1.3
AUG25	0.74	0.59	15.9	-0.2	1.9	8.0	16.6	-0.3	1.8	1.8
SEP01	0.74	0.00	15.3	0.6	1.4	11.0	16.4	0.1	0.9	0.9
SEP08	1.03	0.00	15.6	-0.3	0.5	14.5	16.2	0.2	1.0	1.0
SEP15	0.00	0.36	16.3	-0.7	0.6	11.0	16.4	-0.2	1.1	1.1
SEP23	0.00	0.11	15.9	0.5	0.6	17.5	15.9	0.5	0.6	0.6
OCT03	-0.74	2.66	16.7	-0.9	1.8	4.0	16.7	-0.8	1.9	1.9
OCT17	0.00	0.00	16.3	0.4	-0.3	16.0	16.0	0.7	-0.1	-0.1
	10.59	4.82		0.4	15.8			0.3	15.7	15.7

ET SUMMARY INFORMATION

PERIOD	ETSM	ETWL	ETCMBN	ETADJ
	INCHES			
JUL	6.33	5.26	5.26	5.26**
AUG	6.09	5.76	5.76	4.76
SEP	3.15	4.18	4.18	1.47
OCT	0.20	0.48	0.48	0.11**
JUN - SEP	15.58	15.20	15.20	11.49**
SEASONAL	15.78	15.68	15.68	11.60

NOTE: See definitions of table headings at beginning of appendix.
** Indicates partial month of data.

Information for lysimeter number 4 at Montpelier, Idaho for 1987.

IDMO487 01-25-1989
LYSIMETER ET DATA 15:53:27

DATE	IRRIG	RAIN	SM	DELSM	ETSM	WL	SMWL	DELWL	ETWL	ETCMBN
					INCHES					
APR24	0.00	0.00	13.8	0.0	0.0	29.5	15.2	0.0	0.0	0.0
MAY01	0.00	0.09	14.6	-0.9	-0.8	33.8	15.0	0.2	0.3	-0.6
MAY08	2.94	0.14	13.7	1.0	1.1	38.0	14.8	0.2	0.3	1.3
MAY15	0.00	0.48	14.6	-0.9	2.5	22.0	15.6	-0.8	2.6	1.7
MAY22	0.00	1.54	16.0	-1.4	0.1	12.5	16.3	-0.7	0.8	0.7
MAY31	0.00	0.59	15.7	0.3	0.9	16.5	16.0	0.3	0.9	0.9
JUN08	1.47	0.18	14.2	1.5	1.7	27.5	15.3	0.7	0.9	1.4
JUN15	1.47	0.45	14.3	-0.1	1.8	24.5	15.5	-0.1	1.8	1.6
JUN22	2.21	0.07	14.2	0.1	1.7	26.3	15.4	0.1	1.6	1.8
JUN29	1.47	0.62	14.5	-0.3	2.6	25.0	15.4	-0.1	2.8	2.5
JUL06	2.21	0.01	14.4	0.1	1.6	26.3	15.4	0.1	1.5	1.6
JUL13	1.47	0.78	16.0	-1.6	1.4	15.0	16.1	-0.7	2.2	1.9
JUL21	0.00	0.39	15.9	0.1	2.0	16.0	16.0	0.1	1.9	1.9
JUL28	2.21	0.36	16.5	-0.6	-0.2	16.8	16.0	0.1	0.4	0.4
AUG01	0.00	0.29	16.9	-0.4	2.1	4.8	16.8	-0.8	1.7	1.7
AUG10	0.00	0.00	13.6	3.3	3.3	28.0	15.3	1.5	1.5	2.6
AUG17	2.21	1.20	13.7	-0.1	1.1	30.5	15.2	0.1	1.3	1.3
AUG24	0.74	0.18	15.9	-2.3	0.1	15.0	16.1	-1.0	1.4	0.4
AUG31	0.74	1.12	14.5	1.4	3.3	17.5	15.9	0.2	2.1	2.2
SEP08	0.00	0.23	13.4	1.1	2.1	25.0	15.4	0.5	1.4	2.6
SEP14	0.00	0.05	13.0	0.4	0.5	31.0	15.1	0.3	0.4	0.8
SEP21	0.00	0.51	12.7	0.3	0.8	36.0	14.9	0.2	0.8	1.1
SEP28	0.00	0.05	12.6	0.1	0.1	38.8	14.8	0.1	0.2	0.3
OCT02	0.00	0.00	11.8	0.7	0.7	42.0	14.6	0.1	0.1	0.9
OCT08	0.00	0.04	11.3	0.5	0.6	44.0	14.6	0.1	0.1	0.7
OCT15	0.00	1.02	11.1	0.2	1.2	43.0	14.6	-0.0	1.0	1.2
	19.12	10.40		2.7	32.2			0.6	30.2	32.8

ET SUMMARY INFORMATION

PERIOD	ETSM	ETWL	ETCMBN	ETADJ
	INCHES			
APR	-0.66	0.26	-0.47	-0.47**
MAY	4.50	4.74	4.53	4.53
JUN	7.93	7.25	7.51	7.51
JUL	5.98	7.20	6.94	6.94
AUG	8.35	6.73	6.91	6.01
SEP	3.91	2.79	5.12	2.40
OCT	2.16	1.17	2.28	0.57**
JUN - SEP	26.18	23.98	26.48	22.85
SEASONAL	32.18	30.15	32.81	27.48

NOTE: See definitions of table headings at beginning of appendix.
** Indicates partial month of data.

Appendix B continued. Summarized field data and analysis for non-weighing lysimeters in the upper Bear River Basin, 1983-1987.

Information for lysimeter number 5 at Montpelier, Idaho for 1986.

IDMO586 01-25-1989
LYSIMETER ET DATA 15:53:33

DATE	IRRIG	RAIN	SM	DELSM	ETSM	WL	SMWL	DELWL	ETWL	ETCMBN
	INCHES									
JUN30	0.74	0.00	16.0	0.0	0.0	5.3	16.1	0.0	0.0	0.0
JUL07	1.32	0.00	15.8	0.2	0.9	10.8	15.6	0.5	1.3	1.3
JUL14	1.32	0.00	15.7	0.1	1.4	10.5	15.6	-0.0	1.3	1.3
JUL21	1.32	0.11	15.6	0.2	1.6	10.3	15.6	-0.0	1.4	1.4
JUL28	0.00	0.99	15.4	0.1	2.4	2.3	17.5	-1.9	0.4	0.4
AUG04	1.18	0.00	14.0	1.4	1.4	9.8	15.6	1.9	1.9	1.9
AUG11	1.47	0.00	14.5	-0.5	0.7	14.5	15.3	0.3	1.5	1.5
AUG18	1.47	0.00	15.2	-0.7	0.8	12.5	15.5	-0.1	1.3	1.3
AUG25	0.59	0.59	15.3	-0.1	2.0	6.3	15.9	-0.4	1.7	1.7
SEP01	0.74	0.00	15.2	0.1	0.7	11.0	15.6	0.3	0.9	0.9
SEP08	1.03	0.00	15.0	0.1	0.9	14.5	15.3	0.2	1.0	1.0
SEP15	0.00	0.36	15.3	-0.2	1.2	9.8	15.6	-0.3	1.1	1.1
SEP22	0.00	0.11	14.9	0.3	0.4	15.5	15.2	0.4	0.5	0.5
OCT03	-0.74	2.66	15.8	-0.9	1.7	2.5	17.3	-2.1	0.6	0.6
OCT17	0.00	0.00	15.0	0.9	0.2	12.5	15.5	1.8	1.1	1.1
	10.44	4.82		1.0	16.3			0.6	15.9	15.9

ET SUMMARY INFORMATION

PERIOD	ETSM	ETWL	ETCMBN	ETADJ
	INCHES			
JUL	6.96	5.19	5.19	5.19
AUG	4.83	6.32	6.32	5.45
SEP	3.87	3.10	3.10	1.15
OCT	0.63	1.27	1.27	1.06**
JUN - SEP	15.65	14.61	14.61	11.79**
SEASONAL	16.28	15.88	15.88	12.85

NOTE: See definitions of table headings at beginning of appendix.
** Indicates partial month of data.

Information for lysimeter number 5 at Montpelier, Idaho for 1987.

IDMO587 01-25-1989
LYSIMETER ET DATA 15:53:39

DATE	IRRIG	RAIN	SM	DELSM	ETSM	WL	SMWL	DELWL	ETWL	ETCMBN
	INCHES									
APR24	0.00	0.00	15.5	0.0	0.0	25.5	14.6	0.0	0.0	0.0
MAY01	0.00	0.09	15.2	0.3	0.4	28.0	14.5	0.1	0.2	0.2
MAY08	2.94	0.14	13.2	2.0	2.1	32.5	14.1	0.4	0.5	1.2
MAY15	0.00	0.48	14.8	-1.6	1.8	19.8	14.8	-0.7	2.7	2.0
MAY22	0.00	1.54	15.9	-1.1	0.5	13.5	15.4	-0.6	1.0	1.0
MAY31	0.00	0.59	15.6	0.2	0.8	12.0	15.5	-0.1	0.5	0.5
JUN08	1.47	0.18	14.5	1.2	1.4	20.5	14.8	0.7	0.9	0.9
JUN15	1.47	0.45	14.8	-0.3	1.6	18.5	15.0	-0.1	1.8	1.8
JUN22	2.21	0.07	14.7	0.1	1.6	18.8	14.9	0.0	1.6	1.6
JUN29	1.47	0.62	14.4	0.3	3.1	20.0	14.8	0.1	2.9	2.9
JUL06	2.06	0.01	14.7	-0.3	1.2	20.0	14.8	0.0	1.5	1.5
JUL13	1.47	0.78	15.7	-1.0	1.8	9.5	15.7	-0.8	2.0	2.0
JUL21	0.00	0.39	15.9	-0.2	1.6	8.0	15.8	-0.1	1.8	1.8
JUL28	0.00	0.36	15.4	0.6	0.9	9.0	15.7	0.1	0.4	0.4
AUG01	0.00	0.29	15.3	0.1	0.4	9.0	15.7	0.0	0.3	0.3
AUG10	0.00	0.00	12.1	3.2	3.2	21.5	14.8	0.9	0.9	2.7
AUG17	2.21	1.20	12.2	-0.2	1.0	28.8	14.5	0.3	1.5	1.3
AUG24	1.47	0.18	14.6	-2.4	0.0	19.5	14.9	-0.4	2.0	0.3
AUG31	0.00	1.12	13.0	1.7	4.3	16.5	15.2	-0.3	2.3	3.3
SEP08	0.00	0.23	12.2	0.8	1.0	22.0	14.8	0.4	0.6	1.4
SEP14	0.00	0.05	11.8	0.4	0.4	26.8	14.5	0.2	0.3	0.6
SEP21	0.00	0.51	11.6	0.2	0.7	35.0	13.9	0.7	1.2	1.4
SEP25	0.00	0.05	11.3	0.3	0.4	36.3	13.7	0.1	0.2	0.5
OCT02	2.94	0.00	10.9	0.4	0.4	44.0	13.3	0.5	0.5	0.9
OCT08	0.00	0.04	12.0	-1.1	1.9	29.5	14.4	-1.2	1.8	0.7
OCT15	0.00	1.02	12.1	-0.1	0.9	30.5	14.3	0.1	1.1	1.0
	19.71	10.40		3.5	33.6			0.3	30.4	32.2

ET SUMMARY INFORMATION

PERIOD	ETSM	ETWL	ETCMBN	ETADJ
	INCHES			
APR	0.37	0.17	0.17	0.17**
MAY	5.33	4.70	4.70	4.70
JUN	7.85	7.36	7.36	7.36
JUL	5.69	5.69	5.69	5.69
AUG	8.61	6.80	7.74	7.50
SEP	2.79	2.60	4.55	1.71
OCT	2.95	3.07	2.02	0.48**
JUN - SEP	24.95	22.45	25.34	22.26
SEASONAL	33.60	30.39	32.23	27.61

NOTE: See definitions of table headings at beginning of appendix.
** Indicates partial month of data.

Appendix B continued. Summarized field data and analysis for non-weighing lysimeters in the upper Bear River Basin, 1983-1987.

Information for lysimeter number E at Randolph, Utah for 1983.

UTJFE83 01-25-1989
LYSIMETER ET DATA 15:53:45

DATE	IRRIG	RAIN	SM	DELSM	ETSM	WL	SMWL	DELWL	ETWL	ETCMBN
					INCHES					
JUN02	0.00	0.00				16.5	14.5	0.0	0.0	0.0
JUN07	0.00	1.08				22.5	14.2	0.3	1.4	1.4
JUN14	1.96	0.16				31.0	13.9	0.3	0.5	0.5
JUN21	1.96	0.00				24.5	14.1	-0.2	1.8	1.8
JUN28	2.66	0.04				20.0	14.3	-0.2	1.8	1.8
JUL06	0.00	0.40				8.5	14.8	-0.5	2.6	2.6
JUL12	1.38	0.04				15.3	14.6	0.3	0.3	0.3
JUL19	1.96	0.24				16.3	14.5	0.0	1.7	1.7
JUL26	0.00	0.89				8.0	14.9	-0.4	2.5	2.5
AUG02	0.00	0.04	15.0	0.0	0.0	15.0	14.6	0.3	0.4	0.4
AUG09	0.43	0.24	12.7	2.3	2.6	27.6	14.0	0.5	0.8	0.9
AUG16	0.00	1.09	13.4	-0.8	0.8	25.9	14.1	-0.1	1.5	1.4
AUG23	0.00	1.03	14.6	-1.1	-0.1	20.5	14.3	-0.2	0.8	0.8
AUG30	0.56	0.00	12.4	2.2	2.2	31.3	13.9	0.4	0.4	0.8
SEP06	0.00	1.57	13.9	-1.5	0.6	15.9	14.5	-0.6	1.5	1.1
SEP13	0.00	0.16	12.9	1.0	1.2	26.9	14.0	0.5	0.6	0.6
SEP20	0.00	0.01	11.8	1.2	1.2	37.6	13.7	0.3	0.3	1.4
SEP27	0.00	0.52	11.7	0.1	0.6	45.8	13.5	0.3	0.8	0.8
OCT04	0.00	0.66	12.0	-0.3	0.4	37.2	13.7	-0.3	0.4	0.1
OCT11	0.00	0.54	12.0	-0.0	0.5	30.3	13.9	-0.2	0.3	0.3
	10.91	8.71		3.0	9.8			0.6	20.2	21.0

ET SUMMARY INFORMATION

PERIOD	ETSM	ETWL	ETCMBN	ETADJ
	INCHES			
JUN	0.00	6.01	6.01	6.01**
JUL	0.00	6.62	6.62	6.62
AUG	5.50	3.78	4.12	4.03
SEP	3.59	3.23	3.86	3.05
OCT	0.73	0.55	0.36	0.25**
JUN - SEP	9.09	19.64	20.61	19.72**
SEASONAL	9.81	20.18	20.96	19.97

NOTE: See definitions of table headings at beginning of appendix.
** Indicates partial month of data.

Information for lysimeter number E at Randolph, Utah for 1984.

UTJFE84 01-25-1989
LYSIMETER ET DATA 15:53:51

DATE	IRRIG	RAIN	SM	DELSM	ETSM	WL	SMWL	DELWL	ETWL	ETCMBN
					INCHES					
MAY13	0.00	0.00	14.0	0.0	0.0	25.2	14.8	0.0	0.0	0.0
MAY19	0.00	0.00	13.5	0.5	0.5	28.0	14.7	0.1	0.1	0.1
MAY26	1.68	0.08	12.9	0.6	0.7	34.1	14.5	0.2	0.3	0.3
JUN05	4.20	0.53	12.9	-0.1	2.2	24.5	14.8	-0.3	1.9	1.9
JUN12	-2.10	0.37	14.1	-1.2	3.4	5.9	17.6	-2.8	1.8	1.8
JUN19	1.40	0.00	13.6	0.5	-1.6	19.0	14.8	2.8	0.7	0.7
JUN26	1.40	0.04	13.8	-0.2	1.3	19.8	14.8	0.0	1.4	1.4
JUL03	2.10	0.16	13.1	0.7	2.2	23.0	14.8	0.0	1.6	1.6
JUL10	2.10	0.00	13.4	-0.4	1.7	21.0	14.8	0.0	2.1	2.1
JUL17	1.68	0.00	13.0	0.4	2.5	26.5	14.8	0.0	2.1	2.1
JUL24	0.00	1.52	15.5	-2.5	0.7	7.9	14.9	-0.2	3.0	3.0
JUL31	0.98	0.04	13.3	2.2	2.3	24.0	14.8	0.1	0.2	0.2
AUG07	0.00	0.08	12.6	0.7	1.7	27.0	14.7	0.1	1.1	1.3
AUG14	0.00	0.00	11.4	1.2	1.2	45.5	14.2	0.6	0.6	1.8
AUG21	0.00	1.13	12.1	-0.7	0.4	47.0	14.1	0.0	1.2	0.5
AUG28	0.70	0.29	12.9	-0.8	-0.5	48.0	14.5	-0.4	-0.1	-0.8
SEP04	1.40	0.00	11.7	1.2	1.9	48.0	14.5	0.0	0.7	1.8
SEP11	0.00	0.56	11.4	0.3	2.3	44.8	14.2	0.3	2.3	2.6
SEP18	0.70	0.48	12.3	-0.9	-0.4	43.3	14.2	-0.0	0.4	-0.4
SEP25	0.00	0.45	13.1	-0.8	0.3	45.9	14.1	0.1	1.2	0.7
OCT06	0.00	0.40	12.8	0.3	0.7	48.0	14.5	-0.4	0.0	0.0
OCT13	0.00	0.16	13.2	-0.4	-0.2	48.0	14.5	0.0	0.2	0.2
	16.23	6.28		0.8	23.3			0.3	22.8	22.8

ET SUMMARY INFORMATION

PERIOD	ETSM	ETWL	ETCMBN	ETADJ
	INCHES			
MAY	2.27	1.32	1.32	1.32**
JUN	5.40	5.76	5.76	5.76
JUL	8.22	8.10	8.10	8.10
AUG	3.68	3.05	3.52	3.33
SEP	3.57	4.37	3.90	2.50
OCT	0.17	0.17	0.17	0.10**
JUN - SEP	20.87	21.28	21.28	19.69
SEASONAL	23.31	22.77	22.77	21.11

NOTE: See definitions of table headings at beginning of appendix.
** Indicates partial month of data.

Appendix B continued. Summarized field data and analysis for non-weighing lysimeters in the upper Bear River Basin, 1983-1987.

Information for lysimeter number E at Randolph, Utah for 1985.

UTJFE85 01-25-1989
LYSIMETER ET DATA 15:53:57

DATE	IRRIG	RAIN	SM	DELSM	ETSM	WL	SMWL	DELWL	ETWL	ETCMBN
	INCHES									
MAY18	0.70	0.00	10.7	0.0	0.0	48.0	13.8	0.0	0.0	0.0
MAY25	0.70	0.65	10.2	0.5	1.9	48.0	13.8	0.0	1.4	1.9
JUN01	1.33	0.41	9.9	0.3	1.4	48.0	13.8	0.0	1.1	1.4
JUN11	2.10	0.00	9.4	0.5	1.8	48.0	13.8	0.0	1.3	1.8
JUN18	2.10	0.00	9.3	0.1	2.2	48.0	13.8	0.0	2.1	2.2
JUN25	2.10	0.04	9.7	-0.4	1.7	40.0	13.6	0.2	2.3	1.9
JUL02	0.70	0.44	12.1	-2.4	0.2	31.0	13.9	-0.3	2.3	-0.1
JUL09	2.10	0.00	10.0	2.1	2.8	44.0	13.5	0.4	1.1	3.2
JUL16	1.40	0.15	10.1	-0.2	2.1	40.5	13.6	-0.1	2.1	2.0
JUL23	0.00	0.10	15.8	-5.6	-4.1	9.0	14.8	-1.2	0.3	-2.3
JUL30	0.63	0.63	13.8	2.0	2.6	13.0	14.7	0.1	0.8	0.8
AUG06	1.40	0.00	11.0	2.8	3.4	30.0	14.0	0.7	1.3	3.1
AUG13	2.10	0.00	10.3	0.8	2.2	36.0	13.8	0.2	1.6	2.3
AUG20	1.12	0.00	12.1	-1.8	0.3	23.5	14.2	-0.4	1.7	-0.1
AUG27	0.28	0.00	11.8	0.3	1.4	25.0	14.1	0.1	1.2	1.5
SEP03	1.12	0.56	11.1	0.7	1.5	32.0	13.9	0.2	1.0	1.7
SEP10	0.00	0.04	12.0	-0.9	0.3	25.0	14.1	-0.2	0.9	0.1
SEP17	0.00	0.30	11.1	0.9	1.2	29.0	14.0	0.1	0.4	1.3
SEP24	0.00	0.51	10.9	0.2	0.7	35.0	13.8	0.2	0.7	0.9
OCT01	0.00	0.00	10.4	0.5	0.5	44.0	13.5	0.3	0.3	0.8
OCT08	0.00	0.32	9.9	0.5	0.8	45.0	13.5	0.0	0.3	0.9
OCT15	0.00	0.04	9.7	0.2	0.2	46.0	13.5	0.0	0.1	0.3
	19.86	4.18		1.0	25.0			0.4	24.4	25.4

ET SUMMARY INFORMATION

PERIOD	ETSM	ETWL	ETCMBN	ETADJ
	INCHES			
MAY	3.10	2.30	3.10	3.10**
JUN	6.06	7.53	6.05	6.05
JUL	3.89	5.17	4.03	4.03
AUG	7.63	6.22	7.35	5.24
SEP	3.24	2.75	3.67	0.96
OCT	1.13	0.46	1.24	0.33**
JUN - SEP	20.82	21.67	21.10	16.28
SEASONAL	25.05	24.43	25.43	19.71

NOTE: See definitions of table headings at beginning of appendix.
** Indicates partial month of data.

Information for lysimeter number E at Randolph, Utah for 1986.

UTJFE86 01-25-1989
LYSIMETER ET DATA 15:54:04

DATE	IRRIG	RAIN	SM	DELSM	ETSM	WL	SMWL	DELWL	ETWL	ETCMBN
	INCHES									
APR21	0.00	0.00	13.2	0.0	0.0	31.0	13.9	0.0	0.0	0.0
MAY02	0.70	1.16	12.9	0.4	1.5	24.0	14.2	-0.2	0.9	0.9
MAY09	0.00	0.04	14.1	-1.3	-0.5	14.5	14.6	-0.4	0.3	0.3
MAY16	0.56	0.16	14.7	-0.6	-0.4	32.0	13.9	0.7	0.9	0.9
MAY23	0.84	0.12	14.3	0.4	1.0	37.0	13.7	0.2	0.8	0.8
JUN02	2.38	0.00	14.1	0.3	1.1	46.0	13.5	0.3	1.1	1.1
JUN09	1.40	0.20	13.0	1.1	3.7	21.3	14.3	-0.8	1.8	1.8
JUN16	1.82	0.32	14.8	-1.8	-0.0	13.0	14.7	-0.4	1.3	1.3
JUN24	2.80	0.00	14.2	0.6	2.4	29.8	14.0	0.7	2.5	2.5
JUN30	0.00	0.00	14.8	-0.7	2.1	7.5	15.1	-1.1	1.7	1.7
JUL07	2.10	0.08	14.0	0.9	1.0	33.5	13.9	1.2	1.3	1.3
JUL14	1.54	0.00	14.0	-0.0	2.1	21.5	14.3	-0.4	1.7	1.7
JUL21	1.40	0.08	14.3	-0.3	1.4	18.0	14.4	-0.2	1.5	1.5
JUL28	0.00	0.49	14.5	-0.2	1.6	8.0	14.9	-0.5	1.4	1.4
AUG04	1.82	0.00	13.3	1.2	1.2	37.3	13.7	1.2	1.2	1.2
AUG11	1.12	0.00	13.7	-0.4	1.4	22.3	14.2	-0.5	1.3	1.3
AUG18	1.40	0.00	13.5	0.2	1.3	25.0	14.1	0.1	1.2	1.2
AUG25	0.00	1.16	14.4	-0.9	1.7	11.5	14.7	-0.6	1.9	1.9
SEP01	1.40	0.08	13.5	0.9	1.0	30.0	14.0	0.8	0.9	0.9
SEP08	0.70	0.00	13.6	-0.2	1.2	20.8	14.3	-0.3	1.1	1.1
SEP15	0.70	0.24	12.1	1.5	2.5	31.5	13.9	0.4	1.3	2.0
SEP22	0.00	0.16	12.3	-0.2	0.6	28.0	14.0	-0.1	0.8	0.5
OCT04	-0.70	1.56	13.5	-1.1	0.4	8.0	14.9	-0.9	0.7	0.2
OCT17	0.00	0.04	12.6	0.8	0.2	31.0	13.9	1.0	0.3	0.5
	21.96	5.90		0.6	28.5			0.0	27.9	28.1

ET SUMMARY INFORMATION

PERIOD	ETSM	ETWL	ETCMBN	ETADJ
	INCHES			
APR	1.26	0.76	0.76	0.76**
MAY	1.26	3.07	3.07	3.07
JUN	8.37	7.52	7.52	7.52
JUL	6.55	6.36	6.36	6.36
AUG	5.95	5.90	5.90	4.38
SEP	4.77	3.71	3.87	1.37
OCT	0.33	0.54	0.58	0.33**
JUN - SEP	25.64	23.49	23.64	19.63
SEASONAL	28.50	27.87	28.05	23.80

NOTE: See definitions of table headings at beginning of appendix.
** Indicates partial month of data.

Appendix B continued. Summarized field data and analysis for non-weighing lysimeters in the upper Bear River Basin, 1983-1987.

Information for lysimeter number E at Randolph, Utah for 1987.

UTJFE87 01-25-1989
LYSIMETER ET DATA 15:54:10

DATE	IRRIG	RAIN	SM	DELSM	ETSM	WL	SMWL	DELWL	ETWL	ETCMBN
	INCHES									
APR24	0.00	0.00	13.8	0.0	0.0	28.0	14.0	0.0	0.0	0.0
MAY01	2.10	0.00	13.4	0.5	0.5	40.8	13.6	0.4	0.4	0.4
MAY08	2.10	0.21	13.5	-0.1	2.2	27.3	14.0	-0.4	1.9	1.9
MAY15	0.00	0.54	13.9	-0.4	2.2	25.0	14.1	-0.1	2.6	2.6
MAY22	0.00	1.84	14.7	-0.9	1.0	13.5	14.6	-0.5	1.3	1.3
MAY29	0.00	0.81	14.9	-0.2	0.6	8.0	14.9	-0.3	0.6	0.6
JUN08	1.40	0.57	13.6	1.2	1.8	35.8	13.8	1.1	1.7	1.7
JUN15	0.00	0.05	13.4	0.3	1.7	32.0	13.9	-0.1	1.3	1.3
JUN22	4.20	0.05	12.8	0.6	0.7	40.0	13.6	0.3	0.3	0.3
JUN29	0.00	0.00	14.6	-1.9	2.3	8.0	14.9	-1.3	2.9	2.9
JUL06	2.80	0.22	14.2	0.4	0.6	18.0	14.4	0.5	0.7	0.7
JUL13	0.00	0.13	14.6	-0.4	2.5	7.0	16.4	-2.0	0.9	0.9
JUL20	0.00	0.48	14.6	-0.0	0.5	9.0	14.8	1.6	2.1	2.1
JUL27	2.10	0.59	14.1	0.5	1.1	20.5	14.3	0.5	1.1	1.1
AUG01	0.00	0.10	14.5	-0.4	1.8	7.5	15.1	-0.8	1.4	1.4
AUG09	0.00	0.10	11.5	3.1	3.2	35.0	13.8	1.3	1.4	2.7
AUG17	2.80	0.78	11.0	0.5	1.2	41.5	13.6	0.2	1.0	1.4
AUG24	0.00	0.06	12.2	-1.2	1.6	8.3	14.8	-1.2	1.6	0.4
AUG31	1.40	0.37	11.5	0.7	1.0	26.0	14.1	0.8	1.1	1.8
SEP08	0.00	0.29	11.6	-0.1	1.6	15.0	14.6	-0.5	1.2	1.1
SEP14	0.00	0.00	11.0	0.6	0.6	31.0	13.9	0.7	0.7	1.3
SEP21	0.00	0.02	11.1	-0.2	-0.1	45.0	13.5	0.4	0.5	0.3
SEP25	0.00	0.00	10.6	0.6	0.6	45.0	13.5	0.0	0.0	0.6
OCT02	0.00	0.00	10.3	0.2	0.2	45.0	13.5	0.0	0.0	0.2
OCT09	0.00	0.00	10.3	0.1	0.1	45.0	13.5	0.0	0.0	0.1
OCT16	0.00	0.00	10.5	-0.2	-0.2	44.0	13.5	-0.0	-0.0	-0.2
	18.88	7.23		3.4	29.5			0.5	26.6	29.0

ET SUMMARY INFORMATION

PERIOD	ETSM	ETWL	ETCMBN	ETADJ
	INCHES			
APR	0.42	0.34	0.34	0.34**
MAY	6.50	6.72	6.72	6.72
JUN	6.26	6.03	6.03	6.03
JUL	6.05	5.87	5.87	5.87
AUG	7.48	5.40	6.66	4.82
SEP	2.84	2.30	3.43	1.02
OCT	-0.05	-0.03	-0.08	-0.01**
JUN - SEP	22.62	19.59	21.98	17.73
SEASONAL	29.50	26.61	28.96	24.78

NOTE: See definitions of table headings at beginning of appendix.
** Indicates partial month of data.

Information for lysimeter number W at Randolph, Utah for 1983.

UTJFW83 01-25-1989
LYSIMETER ET DATA 15:54:16

DATE	IRRIG	RAIN	SM	DELSM	ETSM	WL	SMWL	DELWL	ETWL	ETCMBN
	INCHES									
JUN28	1.47	0.00				21.8	16.2	0.0	0.0	0.0
JUL06	0.59	0.40				18.3	16.3	-0.2	1.7	1.7
JUL12	1.03	0.04				16.8	16.4	-0.1	0.6	0.6
JUL19	0.74	0.24				15.8	16.4	-0.0	1.2	1.2
JUL26	2.06	0.89				15.6	16.4	-0.0	1.6	1.6
AUG02	0.00	0.04				13.8	16.5	-0.1	2.0	2.0
AUG09	0.00	0.24				15.6	16.4	0.1	0.3	0.3
AUG16	0.00	1.09				17.4	16.4	0.1	1.2	1.2
AUG23	0.00	1.03				16.1	16.4	-0.1	1.0	1.0
AUG30	0.00	0.00	16.7	0.0	0.0	22.3	16.1	0.3	0.3	0.3
SEP06	0.00	1.57	16.5	0.1	1.7	21.4	16.2	-0.0	1.5	1.5
SEP13	0.00	0.16	15.5	1.0	1.2	25.4	16.0	0.1	0.3	0.3
SEP20	0.00	0.01	15.4	0.1	0.1	39.8	15.5	0.6	0.6	0.6
SEP27	0.00	0.52	15.2	0.2	0.8	48.0	15.6	-0.1	0.4	0.4
OCT04	0.00	0.66	15.0	0.2	0.8	43.4	15.4	0.2	0.9	0.9
OCT11	0.00	0.54	15.3	-0.4	0.2	38.2	15.5	-0.1	0.4	0.4
	5.88	7.44		1.3	4.8			0.6	14.0	14.0

ET SUMMARY INFORMATION

PERIOD	ETSM	ETWL	ETCMBN	ETADJ
	INCHES			
JUN	0.00	0.43	0.43	0.43**
JUL	0.00	6.12	6.12	6.12
AUG	0.24	3.55	3.55	3.54
SEP	3.90	2.97	2.97	2.77
OCT	0.66	0.89	0.89	0.77**
JUN - SEP	4.14	13.07	13.07	12.85**
SEASONAL	4.80	13.96	13.96	13.62

NOTE: See definitions of table headings at beginning of appendix.
** Indicates partial month of data.

Appendix B continued. Summarized field data and analysis for non-weighing lysimeters in the upper Bear River Basin, 1983-1987.

Information for lysimeter number W at Randolph, Utah for 1984.

UTJFW84 01-25-1989
LYSIMETER ET DATA 15:54:21

DATE	IRRIG	RAIN	SM	DELSM	ETSM	WL	SMWL	DELWL	ETWL	ETCMBN
	INCHES									
MAY13	0.00	0.00	16.3	0.0	0.0	25.2	16.0	0.0	0.0	0.0
MAY19	2.65	0.00	14.7	1.5	1.5	30.3	15.9	0.2	0.2	0.2
MAY26	0.00	0.08	15.4	-0.7	2.0	18.0	16.3	-0.4	2.3	2.3
JUN05	4.27	0.53	14.2	1.2	1.7	35.8	15.6	0.7	1.3	1.6
JUN12	-2.21	0.37	15.4	-1.2	3.4	8.8	18.4	-2.9	1.8	1.4
JUN19	1.47	0.00	15.5	-0.1	-2.3	19.3	16.3	2.2	-0.0	-0.0
JUN26	1.18	0.04	15.6	-0.1	1.4	20.8	16.2	0.1	1.6	1.6
JUL03	2.21	0.16	15.0	0.6	1.9	26.8	16.0	0.2	1.5	1.5
JUL10	0.74	0.00	15.7	-0.6	1.6	18.5	16.3	-0.3	1.9	1.9
JUL17	1.91	0.00	14.8	0.9	1.6	30.0	15.9	0.4	1.1	1.1
JUL24	0.00	1.52	16.9	-2.2	1.3	10.8	16.6	-0.7	2.7	2.7
JUL31	0.74	0.04	16.1	0.9	0.9	17.0	16.4	0.2	0.3	0.3
AUG07	0.00	0.08	15.4	0.7	1.5	18.3	16.3	0.1	0.9	0.9
AUG14	0.00	0.00	14.0	1.4	1.4	32.6	15.8	0.5	0.5	1.2
AUG21	0.74	1.13	14.3	-0.4	0.8	37.0	15.5	0.3	1.4	1.0
AUG28	0.00	0.29	15.2	-0.9	0.1	16.5	16.4	-0.9	0.2	-0.1
SEP04	1.03	0.00	13.6	1.6	1.6	45.8	15.3	1.1	1.1	2.1
SEP11	0.00	0.56	13.9	-0.3	1.3	34.0	15.7	-0.4	1.2	0.9
SEP18	0.59	0.48	14.8	-0.9	-0.4	45.0	15.3	0.4	0.8	0.1
SEP25	0.00	0.45	15.3	-0.5	0.5	34.5	15.7	-0.3	0.7	0.7
OCT06	0.00	0.40	15.3	0.0	0.4	42.0	15.4	0.3	0.7	0.7
OCT13	0.00	0.16	15.0	0.2	0.4	45.5	15.3	0.1	0.3	0.3
	15.30	6.29		1.2	22.8			0.7	22.3	22.3

ET SUMMARY INFORMATION

PERIOD	ETSM	ETWL	ETCMBN	ETADJ
	INCHES			
MAY	4.42	3.08	3.26	3.26**
JUN	4.54	4.84	4.66	4.66
JUL	6.19	6.69	6.69	6.69
AUG	4.51	3.41	3.84	3.74
SEP	2.53	3.67	3.24	2.43
OCT	0.62	0.61	0.61	0.40**
JUN - SEP	17.77	18.61	18.43	17.53
SEASONAL	22.81	22.31	22.31	21.19

NOTE: See definitions of table headings at beginning of appendix.
** Indicates partial month of data.

Information for lysimeter number W at Randolph, Utah for 1985.

UTJFW85 01-25-1989
LYSIMETER ET DATA 15:54:27

DATE	IRRIG	RAIN	SM	DELSM	ETSM	WL	SMWL	DELWL	ETWL	ETCMBN
	INCHES									
MAY18	0.74	0.00	12.8	0.0	0.0	46.1	15.3	0.0	0.0	0.0
MAY25	0.74	0.65	12.4	0.4	1.8	46.0	15.3	-0.0	1.4	1.8
JUN01	1.35	0.41	13.0	-0.6	0.5	48.0	15.6	-0.3	0.9	0.3
JUN11	2.21	0.00	11.5	1.5	2.9	48.0	15.6	0.0	1.4	2.9
JUN18	2.21	0.00	15.8	-4.3	-2.1	48.0	15.6	0.0	2.2	-0.9
JUN25	2.21	0.04	11.7	4.2	6.4	43.0	15.4	0.2	2.4	5.4
JUL02	0.44	0.44	14.4	-2.8	-0.1	26.5	16.0	-0.6	2.0	-0.7
JUL09	2.21	0.00	12.9	1.6	2.0	37.5	15.5	0.5	0.9	2.5
JUL16	1.47	0.15	14.4	-1.5	0.8	27.5	16.0	-0.4	1.9	0.4
JUL23	1.32	0.10	17.4	-3.0	-1.4	11.0	16.6	-0.6	0.9	0.7
JUL30	0.66	0.63	15.6	1.8	3.8	14.0	16.5	0.1	2.0	2.0
AUG06	1.47	0.00	13.7	1.9	2.5	26.0	16.0	0.5	1.2	2.1
AUG13	2.06	0.00	13.1	0.6	2.1	28.5	15.9	0.1	1.5	2.2
AUG20	1.18	0.00	14.2	-1.1	0.9	21.0	16.2	-0.2	1.8	0.7
AUG27	0.74	0.00	14.3	-0.1	1.1	21.0	16.2	0.0	1.2	1.1
SEP03	0.59	0.56	14.2	0.0	1.3	22.0	16.1	0.0	1.3	1.4
SEP10	0.00	0.04	13.9	0.3	0.9	25.0	16.1	0.1	0.7	1.0
SEP17	0.00	0.30	12.9	1.0	1.3	28.0	16.0	0.1	0.4	1.4
SEP24	0.00	0.51	12.8	0.1	0.7	32.0	16.1	-0.2	0.3	0.5
OCT01	0.00	0.00	11.6	1.2	1.2	37.0	15.5	0.6	0.6	1.8
OCT08	0.00	0.32	11.7	-0.1	0.2	43.0	15.4	0.2	0.5	0.4
OCT15	0.00	0.04	11.6	0.1	0.2	43.0	15.4	0.0	0.0	0.2
	21.58	4.19		1.2	26.9			-0.1	25.7	26.9

ET SUMMARY INFORMATION

PERIOD	ETSM	ETWL	ETCMBN	ETADJ
	INCHES			
MAY	2.23	2.14	2.00	2.00**
JUN	7.14	7.56	6.84	6.84
JUL	5.51	6.56	5.72	5.72
AUG	7.06	6.30	6.52	4.59
SEP	4.44	2.52	4.97	1.46
OCT	0.57	0.60	0.81	0.20**
JUN - SEP	24.15	22.95	24.06	18.61
SEASONAL	26.95	25.69	26.87	20.82

NOTE: See definitions of table headings at beginning of appendix.
** Indicates partial month of data.

Appendix B continued. Summarized field data and analysis for non-weighing lysimeters in the upper Bear River Basin, 1983-1987.

Information for lysimeter number W at Randolph, Utah for 1986.

UTJFW86 01-25-1989
LYSIMETER ET DATA 15:54:34

DATE	IRRIG	RAIN	SM	DELSM	ETSM	WL	SMWL	DELWL	ETWL	ETCMBN
					INCHES					
APR21	0.00	0.00	14.1	0.0	0.0	26.0	16.0	0.0	0.0	0.0
MAY02	0.44	1.16	14.5	-0.4	0.7	19.5	16.3	-0.2	0.9	0.5
MAY09	0.00	0.04	15.5	-1.0	-0.5	15.8	16.4	-0.2	0.3	0.3
MAY16	0.59	0.16	16.5	-1.0	-0.8	28.0	16.0	0.5	0.6	0.6
MAY23	0.74	0.12	16.3	0.1	0.8	28.8	15.9	0.0	0.7	0.7
JUN02	2.21	0.00	15.7	0.6	1.4	37.5	15.5	0.4	1.1	1.1
JUN09	1.47	0.20	16.7	-1.0	1.4	21.8	16.2	-0.6	1.8	1.8
JUN16	1.91	0.32	16.5	0.2	2.0	14.3	16.5	-0.4	1.4	1.4
JUN24	2.06	0.00	16.4	0.1	2.1	22.0	16.1	0.4	2.3	2.3
JUN30	0.00	0.00	16.5	-0.1	1.9	9.5	16.9	-0.7	1.3	1.3
JUL07	2.06	0.08	15.9	0.6	0.7	28.5	15.9	0.9	1.0	1.0
JUL14	1.47	0.00	16.3	-0.4	1.7	19.3	16.3	-0.3	1.7	1.7
JUL21	1.47	0.08	16.4	-0.1	1.4	18.0	16.3	-0.1	1.5	1.5
JUL28	0.00	0.49	15.9	0.6	2.5	9.8	16.8	-0.4	1.5	1.5
AUG04	1.47	0.00	14.3	1.5	1.5	28.8	15.9	0.8	0.8	1.1
AUG11	1.32	0.00	15.5	-1.2	0.3	25.0	16.1	-0.1	1.4	1.1
AUG18	1.47	0.00	14.9	0.6	1.9	39.3	15.5	0.6	1.9	1.9
AUG25	0.74	1.16	15.6	-0.7	2.0	21.5	16.2	-0.7	2.0	2.0
SEP01	1.18	0.08	15.6	0.0	0.8	21.0	16.2	-0.0	0.8	0.8
SEP08	0.00	0.00	15.5	0.1	1.2	15.0	16.5	-0.3	0.9	0.9
SEP15	0.74	0.24	15.0	0.5	0.7	22.5	16.1	0.3	0.6	0.6
SEP22	0.00	0.16	15.1	-0.1	0.8	18.8	16.3	-0.2	0.7	0.7
OCT04	-0.74	1.56	15.6	-0.4	1.1	10.0	16.7	-0.4	1.1	1.1
OCT17	0.00	0.04	15.3	0.2	-0.5	22.0	16.1	0.6	-0.1	-0.1
	20.59	5.91		-1.2	25.3			-0.1	26.4	25.9

ET SUMMARY INFORMATION

PERIOD	ETSM	ETWL	ETCMBN	ETADJ
	INCHES			
APR	0.60	0.76	0.41	0.41**
MAY	0.78	2.76	2.63	2.63
JUN	7.65	7.06	7.06	7.06
JUL	6.94	6.12	6.23	6.23
AUG	5.77	6.35	6.24	4.89
SEP	3.63	3.09	3.09	1.27
OCT	-0.09	0.25	0.25	0.05**
JUN - SEP	23.99	22.62	22.62	19.44
SEASONAL	25.29	26.38	25.91	22.53

NOTE: See definitions of table headings at beginning of appendix.
** Indicates partial month of data.

Information for lysimeter number W at Randolph, Utah for 1987.

UTJFW87 01-25-1989
LYSIMETER ET DATA 15:54:41

DATE	IRRIG	RAIN	SM	DELSM	ETSM	WL	SMWL	DELWL	ETWL	ETCMBN
					INCHES					
APR24	1.47	0.00	15.1	0.0	0.0	39.0	15.5	0.0	0.0	0.0
MAY01	0.00	0.00	15.8	-0.7	0.8	29.0	15.9	-0.4	1.0	1.0
MAY08	2.21	0.21	16.1	-0.3	-0.1	25.0	16.1	-0.1	0.1	0.1
MAY15	0.00	0.54	16.0	0.1	2.8	24.8	16.1	-0.0	2.7	2.7
MAY22	0.00	1.33	16.5	-0.5	0.9	11.0	16.6	-0.5	0.8	0.8
MAY29	0.00	0.82	16.7	-0.2	0.7	11.0	16.6	0.0	0.8	0.8
JUN08	1.47	0.57	15.5	1.2	1.8	36.5	15.6	1.0	1.6	1.6
JUN15	0.00	0.05	15.6	-0.1	1.4	31.0	15.9	-0.3	1.2	1.2
JUN22	4.41	0.05	14.2	1.4	1.5	44.0	15.4	0.5	0.6	1.0
JUN29	0.00	0.00	15.6	-1.4	3.0	11.0	16.6	-1.2	3.2	2.8
JUL06	2.94	0.22	15.9	-0.3	-0.1	27.0	16.0	0.6	0.8	0.8
JUL13	0.00	0.13	16.1	-0.2	2.9	9.5	16.9	-0.9	2.2	2.2
JUL20	0.00	0.48	16.2	-0.1	0.4	21.0	16.2	0.7	1.2	1.2
JUL27	3.68	0.59	15.7	0.5	1.1	30.6	15.9	0.3	0.9	0.9
AUG01	0.00	0.10	16.4	-0.7	3.0	8.5	18.7	-2.9	0.9	0.9
AUG09	0.00	0.10	14.3	2.1	2.2	19.0	16.3	2.5	2.6	2.8
AUG17	2.21	0.78	14.1	0.2	1.0	24.5	16.1	0.2	1.0	1.2
AUG24	0.00	0.06	14.3	-0.1	2.1	10.0	16.7	-0.6	1.6	1.5
AUG31	0.74	0.37	14.1	0.2	0.6	23.5	16.1	0.6	1.0	1.2
SEP08	0.00	0.29	13.4	0.6	1.7	24.0	16.1	0.0	1.0	1.7
SEP14	0.00	0.00	13.0	0.4	0.4	35.0	15.6	0.4	0.4	0.9
SEP21	0.00	0.02	12.6	0.4	0.4	47.0	15.3	0.4	0.4	0.8
SEP25	0.00	0.00	12.5	0.1	0.1	47.0	15.3	0.0	0.0	0.1
OCT02	0.00	0.00	12.1	0.4	0.4	47.0	15.3	0.0	0.0	0.4
OCT09	0.00	0.00	12.1	-0.0	-0.0	47.0	15.3	0.0	0.0	-0.0
OCT16	0.00	0.00	12.1	-0.0	-0.0	47.0	15.3	0.0	0.0	-0.0
	19.12	6.72		3.0	28.8			0.2	26.1	28.5

ET SUMMARY INFORMATION

PERIOD	ETSM	ETWL	ETCMBN	ETADJ
	INCHES			
APR	0.68	0.88	0.88	0.88**
MAY	4.69	4.91	4.91	4.91
JUN	7.27	6.35	6.35	6.35
JUL	6.75	5.71	5.71	5.71
AUG	6.45	6.34	6.87	5.67
SEP	2.88	1.85	3.69	1.37
OCT	0.09	0.00	0.09	0.02**
JUN - SEP	23.35	20.26	22.63	19.10
SEASONAL	28.82	26.06	28.51	24.91

NOTE: See definitions of table headings at beginning of appendix.
** Indicates partial month of data.

Appendix B continued. Summarized field data and analysis for non-weighing lysimeters in the upper Bear River Basin, 1983-1987.

Information for lysimeter number N at Hilliard, Wyoming for 1983.

WYHLN83 LYSIMETER ET DATA — 01-25-1989 15:54:46

DATE	IRRIG	RAIN	SM	DELSM	ETSM	WL	SMWL	DELWL	ETWL	ETCMBN
	INCHES									
JUN14	0.59	0.00				18.0	17.1	0.0	0.0	0.0
JUN21	1.03	0.00				19.0	17.0	0.1	0.7	0.7
JUN28	1.03	0.00				17.5	17.1	-0.1	0.9	0.9
JUL06	0.74	0.08				18.5	17.1	0.1	1.2	1.2
JUL12	0.59	0.40				18.3	17.1	-0.0	1.1	1.1
JUL19	1.37	0.16				23.6	16.8	0.3	1.1	1.1
JUL26	0.00	0.48				17.1	17.2	-0.4	1.5	1.5
AUG02	1.18	0.07				28.4	16.6	0.6	0.6	0.6
AUG09	0.00	0.41	15.9	0.0	0.0	21.8	16.8	-0.3	1.3	1.3
AUG16	1.13	0.68	15.4	0.5	1.2	27.1	16.6	0.2	0.9	1.1
AUG23	0.00	2.09	17.7	-2.2	1.0	8.6	17.7	-1.0	2.2	2.0
AUG30	0.00	0.15	16.7	1.0	1.1	15.8	17.3	0.4	0.6	0.6
SEP06	0.00	1.16	17.5	-0.8	0.3	13.0	17.4	-0.2	1.0	1.0
SEP13	0.00	0.16	16.8	0.7	0.9	17.9	17.1	0.3	0.5	0.5
SEP20	0.00	0.00	15.6	1.2	1.2	24.3	16.7	0.4	0.4	0.4
SEP27	0.00	0.10	15.8	-0.2	-0.1	35.1	16.4	0.3	0.4	0.4
OCT04	0.00	0.49	15.7	0.0	0.5	41.7	16.3	0.1	0.6	0.6
OCT11	0.00	0.54	15.4	0.4	0.9	40.3	16.3	-0.0	0.5	0.7
	7.65	6.98		0.5	7.1			0.8	15.4	15.6

ET SUMMARY INFORMATION

PERIOD	ETSM	ETWL	ETCMBN	ETADJ
	INCHES			
JUN	0.00	1.88	1.88	1.88**
JUL	0.00	4.98	4.98	4.98
AUG	3.33	5.30	5.30	5.30
SEP	2.54	2.36	2.36	2.24
OCT	1.20	0.87	1.10	0.90**
JUN - SEP	5.87	14.52	14.52	14.39**
SEASONAL	7.06	15.39	15.62	15.30

NOTE: See definitions of table headings at beginning of appendix.
** Indicates partial month of data.

Information for lysimeter number N at Hilliard, Wyoming for 1984.

WYHLN84 LYSIMETER ET DATA — 01-25-1989 15:54:52

DATE	IRRIG	RAIN	SM	DELSM	ETSM	WL	SMWL	DELWL	ETWL	ETCMBN
	INCHES									
MAY19	0.00	0.00				12.5	17.5	0.0	0.0	0.0
MAY26	0.00	0.04	16.7	0.0	0.0	18.1	17.1	0.4	0.4	0.4
JUN05	1.47	0.93	17.1	-0.4	0.5	18.0	17.1	-0.0	0.9	0.9
JUN12	-1.40	1.46	17.4	-0.3	2.6	7.0	19.7	-2.6	0.3	0.3
JUN18	0.00	0.00	16.7	0.8	-0.6	19.0	17.0	2.7	1.3	1.3
JUN26	1.47	0.04	15.4	1.3	1.3	27.8	16.6	0.4	0.5	0.7
JUL03	0.74	0.08	15.1	0.2	1.8	22.0	16.8	-0.2	1.3	1.6
JUL10	1.47	0.20	14.4	0.7	1.7	30.5	16.5	0.3	1.2	2.0
JUL17	1.03	0.08	14.8	-0.4	1.1	25.5	16.7	-0.2	1.4	1.0
JUL24	2.21	0.29	15.6	-0.7	0.6	28.5	16.6	0.1	1.4	0.7
JUL31	0.00	0.45	17.8	-2.2	0.4	12.8	17.5	-0.9	1.8	1.7
AUG07	0.00	0.00	16.5	1.3	1.3	21.6	16.9	0.6	0.6	0.6
AUG14	0.00	0.04	14.4	2.0	2.1	34.0	16.5	0.4	0.4	1.6
AUG21	1.21	1.13	14.9	-0.5	0.6	44.0	16.3	0.2	1.3	0.8
AUG28	0.00	0.24	17.2	-2.2	-0.8	22.8	16.8	-0.5	0.9	0.2
SEP04	0.74	0.00	14.9	2.2	2.2	28.0	16.6	0.2	0.2	0.9
SEP11	0.00	0.64	16.6	-1.7	-0.3	21.0	16.9	-0.3	1.1	0.4
SEP18	0.00	0.29	16.3	0.3	0.6	22.4	16.8	0.1	0.4	0.4
OCT03	0.00	1.17	17.2	-0.8	0.3	14.1	17.4	-0.5	0.6	0.6
	8.93	7.08		-0.5	15.5			0.1	16.1	16.1

ET SUMMARY INFORMATION

PERIOD	ETSM	ETWL	ETCMBN	ETADJ
	INCHES			
MAY	0.25	0.89	0.89	0.89**
JUN	4.59	3.28	3.64	3.64
JUL	4.60	6.41	6.04	6.04
AUG	4.17	3.36	3.64	3.46
SEP	1.80	2.06	1.78	1.50
OCT	0.07	0.13	0.13	0.10**
JUN - SEP	15.16	15.11	15.11	14.65
SEASONAL	15.48	16.12	16.12	15.64

NOTE: See definitions of table headings at beginning of appendix.
** Indicates partial month of data.

Appendix B continued. Summarized field data and analysis for non-weighing lysimeters in the upper Bear River Basin, 1983-1987.

Information for lysimeter number N at Hilliard, Wyoming for 1985.

WYHLN85 01-25-1989
LYSIMETER ET DATA 15:54:58

DATE	IRRIG	RAIN	SM	DELSM	ETSM	WL	SMWL	DELWL	ETWL	ETCMBN
	INCHES									
MAY18	-0.59	0.00	17.9	0.0	0.0	8.0	17.9	0.0	0.0	0.0
MAY25	-0.59	0.41	17.3	0.6	0.4	8.3	17.8	0.1	-0.1	-0.1
JUN01	0.00	0.07	15.8	1.5	1.0	21.1	16.9	0.9	0.4	0.4
JUN11	0.74	0.13	13.7	2.1	2.2	32.5	16.5	0.4	0.5	2.5
JUN18	1.03	0.00	13.0	0.7	1.4	39.0	16.4	0.1	0.9	1.6
JUN25	1.47	0.72	14.0	-1.0	0.8	40.0	16.3	0.0	1.8	0.8
JUL02	0.74	0.15	12.8	1.2	2.8	30.0	16.6	-0.2	1.4	2.6
JUL09	2.35	0.00	12.1	0.7	1.4	35.0	16.4	0.1	0.8	1.5
JUL16	1.47	0.00	13.9	-1.8	0.5	30.3	16.5	-0.1	2.3	0.4
JUL23	0.00	1.26	16.3	-2.4	0.3	10.5	17.8	-1.2	1.5	-0.2
JUL30	0.88	0.57	15.1	1.3	1.8	16.0	17.2	0.6	1.1	1.6
AUG06	1.47	0.00	14.2	0.9	1.8	24.0	16.8	0.5	1.4	2.3
AUG13	1.47	0.00	14.9	-0.7	0.8	22.0	16.8	-0.1	1.4	0.7
AUG20	1.03	0.00	14.9	0.0	1.5	23.5	16.8	0.1	1.5	1.6
AUG27	0.59	0.00	15.0	-0.1	0.9	23.0	16.8	-0.0	1.0	0.9
SEP03	0.29	0.32	15.4	-0.5	0.5	16.0	17.2	-0.4	0.5	0.0
SEP10	0.00	0.19	15.3	0.2	0.7	19.0	17.0	0.2	0.7	0.9
SEP17	0.00	0.12	15.0	0.3	0.4	29.0	16.6	0.5	0.6	0.8
SEP24	0.00	0.54	15.1	-0.1	0.4	24.0	16.8	-0.2	0.4	0.2
OCT01	0.00	0.00	14.7	0.5	0.5	31.0	16.5	0.2	0.2	0.7
OCT08	0.00	0.31	15.3	-0.7	-0.4	32.0	16.5	0.0	0.3	-0.3
OCT15	0.00	1.32	15.8	-0.4	0.9	9.5	17.6	-1.1	0.2	-0.0
	12.36	6.12		2.1	20.6			0.3	18.8	18.8

ET SUMMARY INFORMATION

PERIOD	ETSM	ETWL	ETCMBN	ETADJ
	INCHES			
MAY	1.28	0.24	0.24	0.24**
JUN	6.58	4.22	6.70	6.70
JUL	5.15	6.31	4.48	4.48
AUG	4.97	5.36	5.09	4.35
SEP	2.01	2.02	2.50	1.19
OCT	0.60	0.60	-0.25	-0.10**
JUN - SEP	18.71	17.92	18.77	16.72
SEASONAL	20.59	18.76	18.76	16.86

NOTE: See definitions of table headings at beginning of appendix.
** Indicates partial month of data.

Information for lysimeter number N at Hilliard, Wyoming for 1986.

WYHLN86 01-25-1989
LYSIMETER ET DATA 15:55:05

DATE	IRRIG	RAIN	SM	DELSM	ETSM	WL	SMWL	DELWL	ETWL	ETCMBN
	INCHES									
APR21	0.00	0.00	17.6	0.0	0.0	9.3	17.6	0.0	0.0	0.0
MAY03	-0.74	0.70	17.6	0.0	0.7	7.3	19.4	-1.8	-1.1	-1.1
MAY17	-1.47	0.09	17.6	0.0	-0.6	7.3	19.4	0.0	-0.6	-0.6
MAY24	0.00	0.80	16.8	0.8	0.1	15.8	17.3	2.2	1.5	1.5
JUN02	1.91	0.00	14.5	2.3	2.3	33.0	16.6	0.7	0.7	1.7
JUN10	1.91	0.32	15.6	-1.0	1.2	29.8	16.6	0.0	2.3	1.2
JUN17	2.43	0.04	15.6	0.0	2.0	26.5	16.7	-0.1	1.9	1.9
JUN24	2.94	0.00	15.9	-0.3	2.1	24.3	16.7	-0.1	2.3	2.3
JUL01	0.74	0.00	16.9	-1.0	1.9	12.5	17.5	-0.7	2.2	2.2
JUL08	2.50	0.18	16.4	0.5	1.4	23.5	16.8	0.7	1.6	1.6
JUL15	2.21	0.00	16.8	-0.4	2.1	20.5	16.9	-0.1	2.4	2.4
JUL22	0.00	0.84	17.6	-0.8	2.3	8.3	17.8	-0.8	2.2	2.2
JUL29	0.00	0.67	16.7	0.9	1.6	9.3	17.6	0.2	0.8	0.8
AUG05	1.77	0.00	14.9	1.7	1.7	25.8	16.7	0.9	0.9	1.6
AUG12	1.32	0.32	15.4	-0.5	1.6	23.5	16.8	-0.1	2.0	1.5
AUG19	1.32	0.00	15.8	-0.5	0.9	26.3	16.7	0.1	1.4	1.2
AUG26	0.00	1.67	16.9	-1.1	1.9	9.0	17.6	-0.9	2.0	2.0
SEP01	0.00	0.11	16.5	0.4	0.5	14.0	17.4	0.2	0.4	0.4
SEP09	0.74	0.00	16.0	0.5	0.5	23.5	16.8	0.6	0.6	0.6
SEP16	0.00	0.13	13.1	2.9	3.8	20.8	16.9	-0.1	0.7	3.2
SEP23	0.00	0.00	12.7	0.4	0.4	26.8	16.7	0.3	0.3	0.6
OCT04	-0.51	0.13	14.2	-1.5	-1.3	12.0	17.5	-0.9	-0.7	-2.2
OCT17	0.00	1.17	13.3	0.9	1.6	16.0	17.2	0.3	0.9	1.9
	17.06	7.18		4.3	28.6			0.4	24.6	26.9

ET SUMMARY INFORMATION

PERIOD	ETSM	ETWL	ETCMBN	ETADJ
	INCHES			
APR	0.53	-0.83	-0.83	-0.83**
MAY	1.43	1.08	1.91	1.91
JUN	7.38	8.50	7.67	7.67
JUL	8.16	7.59	7.78	7.78
AUG	6.07	6.42	6.22	5.69
SEP	3.89	1.19	3.11	2.48
OCT	1.10	0.67	1.06	0.44**
JUN - SEP	25.51	23.69	24.79	23.63
SEASONAL	28.57	24.61	26.93	25.15

NOTE: See definitions of table headings at beginning of appendix.
** Indicates partial month of data.

Appendix B continued. Summarized field data and analysis for non-weighing lysimeters in the upper Bear River Basin, 1983-1987.

Information for lysimeter number N at Hilliard, Wyoming for 1987.

WYHLN87 01-25-1989
LYSIMETER ET DATA 15:55:11

DATE	IRRIG	RAIN	SM	DELSM	ETSM	WL	SMWL	DELWL	ETWL	ETCMBN
	INCHES									
APR25	0.00	0.00	17.2	0.0	0.0	12.0	17.5	0.0	0.0	0.0
MAY02	0.00	0.33	17.2	0.0	0.3	13.0	17.4	0.1	0.4	0.4
MAY09	1.47	0.15	16.1	1.1	1.3	22.5	16.8	0.6	0.8	0.8
MAY16	0.00	0.31	16.7	-0.6	1.2	15.5	17.3	-0.5	1.3	1.3
MAY23	0.00	1.02	16.9	-0.2	0.8	14.0	17.4	-0.1	0.9	0.9
MAY30	0.00	0.46	16.7	0.2	0.6	15.5	17.3	0.1	0.6	0.6
JUN08	2.94	0.31	15.4	1.3	1.6	32.0	16.5	0.8	1.1	1.2
JUN15	0.00	0.42	17.0	-1.6	1.8	10.5	17.8	-1.3	2.1	1.9
JUN22	2.94	0.00	15.6	1.4	1.4	28.0	16.6	1.2	1.2	1.2
JUN29	0.74	0.26	17.1	-1.5	1.7	9.5	17.6	-1.0	2.2	2.2
JUL06	1.47	0.00	16.9	0.2	1.0	15.8	17.3	0.3	1.1	1.1
JUL13	0.74	0.25	17.7	-0.8	1.0	9.0	17.6	-0.4	1.4	1.4
JUL20	0.00	0.14	17.4	0.3	1.1	10.0	17.7	-0.0	0.8	0.8
JUL27	1.47	0.97	17.5	-0.1	0.9	12.0	17.5	0.1	1.1	1.1
AUG01	0.00	0.06	17.5	-0.0	1.5	9.0	17.6	-0.1	1.4	1.4
AUG10	0.00	0.00	14.7	2.8	2.8	28.5	16.6	1.0	1.0	1.9
AUG17	1.47	1.22	14.9	-0.2	1.1	28.0	16.6	-0.0	1.2	1.1
AUG24	0.74	0.61	15.4	-0.5	1.6	14.0	17.4	-0.8	1.3	0.8
AUG31	0.74	0.00	15.4	-0.0	0.7	16.5	17.2	0.2	0.9	0.9
SEP08	0.00	0.54	15.0	0.4	1.7	15.0	17.3	-0.1	1.2	1.6
SEP14	0.00	0.00	14.6	0.4	0.4	25.8	16.7	0.6	0.6	1.0
SEP21	0.00	0.00	14.1	0.5	0.5	32.5	16.5	0.2	0.2	0.7
SEP25	0.00	0.00	13.7	0.4	0.4	37.3	16.4	0.1	0.1	0.5
OCT02	2.94	0.00	12.8	0.8	0.8	45.0	16.2	0.2	0.2	1.0
OCT09	0.00	0.00	14.4	-1.6	1.4	21.5	17.6	-1.3	1.6	0.0
	17.65	7.05		2.8	27.5			-0.1	24.6	25.8

ET SUMMARY INFORMATION

PERIOD	ETSM	ETWL	ETCMBN	ETADJ
	INCHES			
APR	0.23	0.28	0.28	0.28**
MAY	4.21	3.81	3.83	3.83
JUN	6.40	6.58	6.56	6.56
JUL	5.01	5.38	5.38	5.38
AUG	6.49	4.74	4.96	4.84
SEP	3.60	2.19	4.51	2.65
OCT	1.59	1.65	0.30	0.11**
JUN - SEP	21.49	18.89	21.41	19.42
SEASONAL	27.53	24.63	25.83	23.65

NOTE: See definitions of table headings at beginning of appendix.
** Indicates partial month of data.

Information for lysimeter number S at Hilliard, Wyoming for 1983.

WYHLS83 01-25-1989
LYSIMETER ET DATA 15:55:17

DATE	IRRIG	RAIN	SM	DELSM	ETSM	WL	SMWL	DELWL	ETWL	ETCMBN
	INCHES									
JUN14	2.06	0.00				3.4	16.9	0.0	0.0	0.0
JUN21	1.03	0.00				13.8	16.5	0.4	2.5	2.5
JUN28	0.00	0.00				15.0	16.5	0.0	1.1	1.1
JUL06	1.47	0.08				16.0	16.5	0.0	0.1	0.1
JUL12	0.59	0.40				12.5	16.6	-0.1	1.7	1.7
JUL19	0.59	0.16				18.0	16.4	0.2	1.0	1.0
JUL26	1.03	0.48				20.0	16.3	0.1	1.1	1.1
AUG02	0.59	0.07				20.9	16.3	0.0	1.1	1.1
AUG09	1.18	0.41	16.6	0.0	0.0	25.9	16.1	0.2	1.2	1.2
AUG16	0.00	0.68	16.4	0.2	2.1	13.7	16.5	-0.5	1.4	1.4
AUG23	0.00	2.09	16.9	-0.5	1.6	3.6	16.9	-0.4	1.7	1.7
AUG30	0.00	0.15	16.7	0.2	0.3	11.8	16.6	0.3	0.4	0.4
SEP06	0.00	1.16	16.8	-0.1	1.0	9.1	16.7	-0.1	1.1	1.1
SEP13	0.00	0.16	16.9	-0.1	0.1	16.6	16.4	0.3	0.4	0.4
SEP20	0.00	0.00	16.4	0.5	0.5	30.1	15.9	0.5	0.5	0.5
SEP27	0.00	0.10	14.6	1.8	1.9	38.8	15.7	0.2	0.3	0.6
OCT04	0.00	0.49	14.4	0.2	0.7	42.4	15.6	0.1	0.6	0.8
OCT11	0.00	0.54	14.2	0.1	0.7	37.6	15.7	-0.1	0.4	0.6
	8.53	6.98		2.4	9.0			1.2	16.7	17.4

ET SUMMARY INFORMATION

PERIOD	ETSM	ETWL	ETCMBN	ETADJ
	INCHES			
JUN	0.00	3.55	3.55	3.55**
JUL	0.00	4.73	4.73	4.73
AUG	4.19	5.23	5.23	5.14
SEP	3.70	2.46	2.87	2.63
OCT	1.09	0.75	1.02	0.74**
JUN - SEP	7.89	15.98	16.39	16.05**
SEASONAL	8.98	16.73	17.41	16.79

NOTE: See definitions of table headings at beginning of appendix.
** Indicates partial month of data.

Information for lysimeter number S at Hilliard, Wyoming for 1984.

WYHLS84 01-25-1989
LYSIMETER ET DATA 15:55:23

DATE	IRRIG	RAIN	SM	DELSM	ETSM	WL	SMWL	DELWL	ETWL	ETCMBN
	INCHES									
MAY19	0.00	0.00				16.0	16.5	0.0	0.0	0.0
MAY26	0.00	0.04	13.5	0.0	0.0	22.1	16.2	0.2	0.3	0.3
JUN05	1.91	0.93	13.1	0.4	1.3	25.0	16.1	0.1	1.0	1.4
JUN12	-1.03	1.46	15.0	-1.8	1.5	2.3	17.3	-1.1	2.2	0.4
JUN18	0.00	0.00	14.6	0.4	-0.7	18.0	16.4	0.9	-0.1	0.2
JUN26	1.47	0.04	12.0	2.6	2.7	33.5	15.8	0.6	0.6	3.3
JUL03	1.47	0.08	12.4	-0.4	1.1	30.0	15.9	-0.1	1.5	1.0
JUL10	1.47	0.20	13.0	-0.6	1.0	26.8	16.0	-0.1	1.5	0.9
JUL17	1.47	0.08	13.7	-0.6	0.9	23.8	16.2	-0.1	1.4	0.8
JUL24	1.47	0.29	15.9	-2.2	-0.4	19.8	16.3	-0.1	1.6	0.4
JUL31	0.00	0.45	17.4	-1.5	0.4	7.3	16.8	-0.5	1.4	1.4
AUG07	-0.44	0.00	16.1	1.3	1.3	19.5	16.3	0.5	0.5	0.5
AUG14	0.00	0.04	9.6	6.5	6.1	43.0	15.6	0.8	0.4	5.7
AUG21	0.00	1.13	9.5	0.1	1.2	42.8	15.6	-0.0	1.1	1.2
AUG28	1.32	0.24	9.8	-0.3	-0.1	45.0	15.5	0.1	0.3	0.0
SEP04	0.00	0.00	12.1	-2.3	-1.0	22.0	16.2	-0.7	0.6	-1.7
SEP11	1.32	0.64	12.0	0.1	0.7	31.0	16.2	0.1	0.7	0.8
SEP18	-0.29	0.29	16.4	-4.4	-2.8	17.6	16.4	-0.2	1.4	-1.5
OCT03	0.00	1.17	15.4	1.1	1.9	6.9	16.8	-0.4	0.5	0.5
	10.15	7.08		-1.9	15.3			-0.4	16.9	15.4

ET SUMMARY INFORMATION

PERIOD	ETSM	ETWL	ETCMBN	ETADJ
	INCHES			
MAY	0.64	0.79	0.96	0.96**
JUN	4.83	4.04	5.14	5.14
JUL	2.41	6.62	3.93	3.93
AUG	8.14	2.52	6.65	5.96
SEP	-1.12	2.80	-1.34	-0.50
OCT	0.39	0.09	0.09	0.07**
JUN - SEP	14.26	15.99	14.38	14.53
SEASONAL	15.29	16.86	15.44	15.56

NOTE: See definitions of table headings at beginning of appendix.
** Indicates partial month of data.

Information for lysimeter number S at Hilliard, Wyoming for 1985.

WYHLS85 01-25-1989
LYSIMETER ET DATA 15:55:29

DATE	IRRIG	RAIN	SM	DELSM	ETSM	WL	SMWL	DELWL	ETWL	ETCMBN
	INCHES									
MAY18	0.00	0.00	17.0	0.0	0.0	16.8	16.4	0.0	0.0	0.0
MAY25	0.00	0.41	13.4	3.6	4.1	24.4	16.1	0.3	0.7	2.2
JUN01	0.00	0.07	10.9	2.5	2.6	41.9	15.6	0.5	0.6	3.1
JUN11	1.18	0.13	10.8	0.1	0.2	45.0	15.5	0.1	0.2	0.3
JUN18	1.77	0.00	10.7	0.1	1.3	45.3	15.5	0.0	1.2	1.3
JUN25	1.77	0.72	10.9	-0.2	2.3	44.5	15.5	-0.0	2.5	2.3
JUL02	0.44	0.15	12.3	-1.4	0.5	28.0	16.0	-0.4	1.5	0.0
JUL09	2.35	0.00	11.3	1.1	1.5	44.5	15.5	0.4	0.9	1.9
JUL16	2.35	0.00	11.5	-0.2	2.1	37.0	15.7	-0.2	2.2	1.9
JUL23	0.00	1.26	16.8	-5.3	-1.7	4.8	17.0	-1.3	2.3	-1.1
JUL30	0.00	0.57	15.3	1.5	2.1	10.0	16.7	0.4	0.9	0.9
AUG06	2.35	0.00	11.3	4.0	4.0	28.0	16.0	0.7	0.7	4.3
AUG13	1.47	0.00	14.5	-3.2	-0.9	19.5	16.3	-0.3	2.0	-1.2
AUG20	1.03	0.00	14.2	0.3	1.8	20.0	16.3	0.0	1.5	1.8
AUG27	1.32	0.00	14.2	0.0	1.0	21.0	16.3	0.0	1.1	1.1
SEP03	0.00	0.32	15.6	-1.4	0.2	12.0	16.6	-0.3	1.3	0.6
SEP10	0.00	0.19	13.6	2.0	2.1	22.0	16.2	0.4	0.6	1.8
SEP17	0.00	0.12	11.2	2.4	2.5	26.0	16.1	0.2	0.3	2.7
SEP24	0.00	0.54	11.3	-0.1	0.5	27.0	16.0	0.0	0.6	0.5
OCT01	0.00	0.00	10.8	0.5	0.5	38.0	15.7	0.3	0.3	0.8
OCT08	0.00	0.31	15.1	-4.2	-3.9	33.0	15.8	-0.1	0.2	-3.9
OCT15	0.00	1.32	15.1	0.0	1.3	17.0	16.4	-0.6	0.7	0.7
	16.03	6.12		1.9	24.1			0.0	22.2	22.2

ET SUMMARY INFORMATION

PERIOD	ETSM	ETWL	ETCMBN	ETADJ
	INCHES			
MAY	6.25	1.22	4.90	4.90**
JUN	4.49	5.00	4.31	4.31
JUL	4.72	6.81	4.34	4.34
AUG	5.53	5.91	5.70	4.99
SEP	5.62	2.28	5.95	1.73
OCT	-2.51	0.95	-3.03	-0.42**
JUN - SEP	20.36	19.99	20.30	15.37
SEASONAL	24.10	22.16	22.16	19.85

NOTE: See definitions of table headings at beginning of appendix.
** Indicates partial month of data.

Appendix B continued. Summarized field data and analysis for non-weighing lysimeters in the upper Bear River Basin, 1983-1987.

Information for lysimeter number S at Hilliard, Wyoming for 1986.

WYHLS86 01-25-1989
LYSIMETER ET DATA 15:55:35

DATE	IRRIG	RAIN	SM	DELSM	ETSM	WL	SMWL	DELWL	ETWL	ETCMBN
	INCHES									
APR21	-1.18	0.00	14.7	0.0	0.0	3.8	16.9	0.0	0.0	0.0
MAY03	0.00	0.70	14.8	-0.1	-0.6	11.5	16.6	0.3	-0.2	-0.3
MAY17	0.00	0.09	17.1	-2.3	-2.2	14.5	16.5	0.1	0.2	0.1
MAY24	0.00	0.80	16.7	0.4	1.2	17.5	16.4	0.1	0.9	0.9
JUN02	2.94	0.00	12.2	4.5	4.5	37.8	15.7	0.7	0.7	3.4
JUN10	1.47	0.32	16.2	-4.0	-0.7	17.0	16.4	-0.7	2.5	-0.1
JUN17	2.50	0.04	13.0	3.2	4.7	23.3	16.2	0.2	1.7	3.7
JUN24	2.94	0.00	14.1	-1.1	1.4	21.0	16.3	-0.1	2.4	1.3
JUL01	0.74	0.00	16.2	-2.1	0.8	7.3	16.8	-0.5	2.4	1.6
JUL08	2.13	0.18	13.6	2.6	3.5	22.3	16.2	0.6	1.5	2.8
JUL15	1.91	0.00	15.8	-2.2	-0.1	16.3	16.4	-0.2	1.9	0.6
JUL22	0.00	0.84	16.0	-0.2	2.5	2.5	17.2	-0.7	2.0	2.0
JUL29	0.00	0.67	15.1	0.9	1.6	6.5	16.8	0.3	1.0	1.0
AUG05	1.77	0.00	11.6	3.5	3.5	25.8	16.1	0.8	0.8	4.1
AUG12	1.47	0.32	12.5	-0.9	1.1	22.0	16.2	-0.2	1.9	1.0
AUG19	1.47	0.00	11.5	1.0	2.5	23.5	16.7	-0.4	1.0	2.0
AUG26	0.00	1.67	15.3	-3.7	-0.6	3.0	17.0	-0.3	2.8	-0.6
SEP01	0.00	0.11	15.5	-0.2	-0.1	9.0	16.7	0.3	0.4	0.4
SEP09	0.74	0.00	13.3	2.2	2.2	21.3	16.3	0.5	0.5	2.1
SEP16	0.00	0.13	14.1	-0.8	0.1	18.0	16.4	-0.1	0.7	-0.1
SEP23	0.00	0.00	10.6	3.5	3.5	26.0	16.1	0.3	0.3	3.8
OCT04	-0.59	0.13	15.1	-4.5	-4.4	8.5	16.7	-0.7	-0.5	-4.9
OCT17	0.00	1.17	10.5	4.6	5.2	26.0	16.1	0.7	1.3	5.6
	18.31	7.18		4.2	29.7			0.8	26.3	30.5

ET SUMMARY INFORMATION

PERIOD	ETSM	ETWL	ETCMBN	ETADJ
	INCHES			
APR	-0.44	-0.15	-0.23	-0.23**
MAY	2.37	1.61	3.61	3.61
JUN	7.11	8.92	6.95	6.95
JUL	8.68	7.00	7.83	7.83
AUG	5.43	6.64	5.69	4.85
SEP	2.97	1.24	2.81	2.88
OCT	3.57	1.06	3.87	0.76**
JUN - SEP	24.20	23.80	23.28	22.51
SEASONAL	29.70	26.32	30.53	26.65

NOTE: See definitions of table headings at beginning of appendix.
** Indicates partial month of data.

Information for lysimeter number S at Hilliard, Wyoming for 1987.

WYHLS87 01-25-1989
LYSIMETER ET DATA 15:55:42

DATE	IRRIG	RAIN	SM	DELSM	ETSM	WL	SMWL	DELWL	ETWL	ETCMBN
	INCHES									
APR25	0.00	0.00	15.4	0.0	0.0	21.0	16.3	0.0	0.0	0.0
MAY02	0.00	0.33	14.7	0.6	1.0	21.0	16.3	0.0	0.3	0.5
MAY09	2.21	0.15	13.1	1.7	1.8	37.5	15.7	0.6	0.7	2.4
MAY16	0.00	0.31	15.4	-2.4	0.1	17.0	16.4	-0.7	1.8	-0.0
MAY23	0.00	1.02	15.8	-0.4	0.6	16.0	16.5	-0.0	1.0	1.0
MAY30	0.00	0.46	16.2	-0.4	0.1	18.5	16.4	0.1	0.6	0.6
JUN08	4.41	0.31	12.8	3.4	3.7	44.5	15.5	0.8	1.1	3.2
JUN15	0.00	0.42	15.6	-2.8	2.1	6.0	16.9	-1.3	3.5	1.4
JUN22	2.94	0.00	13.2	2.4	2.4	33.3	15.8	1.1	1.1	2.8
JUN29	0.74	0.26	15.5	-2.3	0.9	17.5	16.4	-0.6	2.6	0.9
JUL06	2.94	0.00	13.3	2.2	2.9	36.3	15.7	0.7	1.4	3.0
JUL13	2.21	0.25	15.7	-2.4	0.8	17.0	16.4	-0.7	2.5	0.9
JUL20	0.00	0.14	16.1	-0.4	2.0	15.5	16.5	-0.1	2.3	2.3
JUL27	2.94	0.97	16.7	-0.6	0.3	20.0	16.3	0.2	1.1	1.1
AUG01	0.00	0.06	17.1	-0.4	2.6	3.0	17.0	-0.7	2.3	2.3
AUG10	0.00	0.00	12.0	5.1	5.1	27.0	16.0	1.0	1.0	3.8
AUG17	1.47	1.22	12.3	-0.2	1.0	25.0	16.1	-0.1	1.1	0.9
AUG24	0.00	0.61	14.2	-1.9	0.2	6.5	16.8	-0.7	1.4	-0.6
AUG31	0.74	0.00	13.2	1.0	1.0	17.5	16.4	0.4	0.4	1.4
SEP08	0.00	0.54	13.3	-0.1	1.2	12.0	16.6	-0.2	1.1	1.0
SEP14	0.00	0.00	11.8	1.5	1.5	23.8	16.2	0.4	0.4	1.9
SEP25	0.00	0.00	11.1	0.7	0.7	41.5	15.6	0.6	0.6	1.2
OCT02	0.00	0.00	10.7	0.4	0.4	45.0	15.5	0.1	0.1	0.5
OCT09	0.00	0.00	10.5	0.2	0.2	45.0	15.5	0.0	0.0	0.2
OCT16	0.00	0.41	10.5	0.0	0.4	45.0	15.5	0.0	0.4	0.4
	20.59	7.46		4.8	32.9			0.7	28.8	33.2

ET SUMMARY INFORMATION

PERIOD	ETSM	ETWL	ETCMBN	ETADJ
	INCHES			
APR	0.69	0.23	0.36	0.36**
MAY	3.35	4.27	4.38	4.38
JUN	9.08	8.38	8.38	8.38
JUL	7.69	8.99	8.76	8.76
AUG	7.69	4.37	6.04	5.22
SEP	3.69	2.12	4.53	1.83
OCT	0.70	0.43	0.72	0.13**
JUN - SEP	28.14	23.86	27.71	24.19
SEASONAL	32.88	28.80	33.16	29.05

NOTE: See definitions of table headings at beginning of appendix.
** Indicates partial month of data.

APPENDIX C

Average maximum and minimum air temperature and total precipitation for NOAA National Weather Service (NWS) Weather Stations in the Bear River Basin (1975-1987).

Appendix C. Average maximum and minimum air temperatures and precipitation for National Weather Service (NWS) stations in the Bear River Basin (1975-1987).

Sta. Evanston Index # 3100 USU 08-05-1988
Lat. 41 16 Long. 110 57 Elev. 6810

Max. Temp	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann.
1975	30.6	33.2	38.8	42.5	57.6	66.1	79.5E	78.1	71.6	56.2	41.4	36.8	52.7
1976	33.3	37.4	38.3	51.9	65.9	71.7	84.3	77.6	71.6	58.6	48.4	41.8	56.7
1977	34.1	42.4	39.3	59.2	59.2	80.6	81.4	78.7	71.0	60.7	43.8	36.9	57.3
1978	33.4	36.2	45.3	52.3	59.3	73.0	82.2	78.5	68.4	63.8	39.9	26.1	54.9
1979	21.5	33.8	41.5	52.4	63.6	74.0	83.2	78.5	77.6	61.6	38.7	39.8	55.5
1980	31.2	40.0	38.7	52.3	59.4	74.4	83.5	79.5	72.5	60.5	46.4	43.5	56.8
1981	41.9	41.2	45.0	57.7	60.0	74.9	84.2	84.8	75.8	54.1	49.4	39.1	59.0
1982	30.7	35.0	42.2	48.1E	62.3	72.0	79.9	83.5	66.4	54.3E	39.6	31.2	53.8
1983	37.4	37.6	41.7	45.6E	57.2E	70.3	79.1	78.9E	70.7E	60.7E	40.2E	28.0E	54.0
1984	24.1E	32.4E	40.1E	49.2E	63.4E	70.1E	83.6E	79.5E	68.7E	52.1E	39.1E	29.1E	52.6
1985	24.3E	33.1	38.6E	60.5	66.2	77.2	87.1	83.2	66.0E	58.2	35.6	22.4E	54.4
1986	34.3	36.1	49.9	52.0	62.2	78.7E	80.2	83.4	64.0	56.8	42.9	37.1	56.5
1987	29.5	37.6	41.9	61.3	64.3	75.5	78.8	78.8	74.8	63.6	41.8	29.9	56.5
Avg.	31.3	36.6	41.6	52.7	61.6	73.7	82.1	80.2	70.7	58.6	42.1	34.0	55.4

Min. Temp	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann.
1975	8.2	10.1	17.6	20.8	28.0	36.9	46.7E	39.8	32.2	24.5	13.3	13.9	24.3
1976	8.8	9.8	10.0	23.9	35.1	36.1	45.5	41.2	38.2	24.0	16.0	9.8	24.9
1977	7.6	10.9	13.4	24.2	30.8	43.2	46.0	45.4	37.1	29.7	21.6	16.2	27.2
1978	13.2	13.3	21.8	26.7	30.3	39.8	43.9	41.1	35.2	27.5	14.3	3.3	25.9
1979	0.8	11.2	19.3	25.1	32.9	37.9	44.4	43.9	37.7	28.3	11.1	12.2	25.4
1980	9.6	13.9	14.2	24.5	33.3	36.5	46.0	42.8	37.0	26.2	18.1	15.4	26.5
1981	13.9	13.5	19.7	27.7	33.9	40.0	43.6	43.6	38.0	26.1	20.5	16.3	28.1
1982	6.6	5.9	17.4	18.9E	31.0	37.8	44.1	46.8	38.7	27.9E	12.1	7.2	24.5
1983	14.9	12.3	22.1	20.6	30.4	37.8	44.9	51.5E	38.3E	29.7E	20.9E	10.1E	27.8
1984	5.9E	7.1E	15.7E	22.2E	33.8E	37.5E	45.6E	47.0E	37.0E	26.1E	17.2E	5.6E	25.1
1985	2.8E	6.9	10.7E	35.7	35.5	40.6	47.7	40.7	35.4E	27.9	16.8	3.2E	25.3
1986	12.9	19.7	25.7	29.2	34.2	41.3E	45.5	47.8	34.9	28.9	21.7	11.0	29.4
1987	7.6	15.8	19.0	29.8	36.5	41.5	45.4	44.0	36.0	29.9	18.8	9.3	27.8
Avg.	8.7	11.6	17.4	25.3	32.7	39.0	45.3	44.3	36.6	27.4	17.1	10.3	26.3

Precip.	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann.
1975	0.60	0.32	1.40	1.45	1.44	2.54	0.38	0.29	0.06	1.55	0.77	0.46	11.26
1976	0.25	1.62	0.44	1.27	1.57	0.95	0.73E	0.68	0.75	0.15	0.04	0.08	8.53
1977	0.31	0.29	1.40	0.11	1.58	0.10	1.48	2.10	1.91	0.94	0.77	0.83	11.82
1978	0.86	0.72	1.29	1.97	1.26	1.39	0.02	0.99	1.98	0.17	1.05	0.99	12.69
1979	0.97	0.32	0.59	0.09	1.11	0.10	0.59	1.58	0.23	1.89	0.87	0.20	8.54
1980	2.81	0.86	0.70	0.74	2.19	0.23	1.05	0.62	1.12	1.63	0.74	0.79	13.48
1981	0.46	0.41	2.40	0.59	2.23	0.75	0.48	0.07	0.94	2.68	0.52	0.90	12.43
1982	0.85	0.58	1.40	2.04E	0.37	1.31	2.38	0.51	4.26	1.04E	1.34	0.28	16.36
1983	0.16	0.85	1.21	1.38	2.91	1.85	1.47	3.48E	2.60E	1.45E	1.74E	1.82E	20.92
1984	0.04E	0.45E	0.62E	1.17E	1.50E	1.47E	1.63E	1.27E	2.44E	0.80E	0.87E	0.62E	12.88
1985	0.25E	0.60E	0.38E	0.60E	3.00	0.03	0.80	0.00	1.73E	0.14	1.88E	0.67E	10.08
1986	0.16	1.93	0.63	2.85	1.96	0.69E	0.39	1.37	1.16	0.59	0.34	0.16E	12.23
1987	0.58	0.48E	1.36	0.17	1.45	0.76	0.28	1.07	0.25	0.70	0.96	0.74	8.80
Avg.	0.64	0.73	1.06	1.11	1.74	0.94	0.90	1.08	1.49	1.06	0.91	0.66	12.31

NOTE:
Maximum and minimum temperatures are in degrees Fahrenheit.
Precipitation is in inches.
E behind value indicates an estimated value.

Appendix C continued. Average maximum and minimum air temperatures and precipitation for National Weather Service (NWS) stations in the Bear River Basin (1975-1987).

Sta. Woodruff Index # 9595 USU 08-05-1988
Lat. 41 32 Long. 111 09 Elev. 6315

Max. Temp	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann.
1975	29.4	32.7	40.6	44.3	59.1	66.7	79.7	75.9	71.5	54.9	38.5	34.8	52.3
1976	30.3	32.4	36.5	52.8	67.0	70.6	82.5	77.6	71.8	59.7	48.8	38.9	55.7
1977	34.2	43.1	41.0	60.9	60.5	79.1	81.6	78.6	73.2	63.0	45.4	37.2	58.2
1978	33.0	35.8	45.8	54.5	60.6	74.3	83.0	79.4	69.1	65.6	39.0	23.9	55.3
1979	16.9	31.7	40.1	54.2	65.5	75.0	82.8	80.0	80.1	63.3	37.5	35.8	55.2
1980	30.5	37.1	41.5	56.4	61.4	74.5	81.4	78.1	72.9	61.2	47.8	36.1	56.6
1981	35.3	41.0	47.3	60.0	62.3	75.3	83.8	84.4	76.3	55.6	49.0	38.2	59.0
1982	29.6	28.4	42.4	49.7	63.2	72.9	78.6	82.8	67.8	55.0	39.4	25.7	53.0
1983	33.0	34.4	43.5	46.7	59.1	69.9	79.1	80.8	72.0	62.5	39.7	27.5	54.0
1984	20.7	26.7	40.6	50.0	65.6	70.6	82.4	79.8	70.1	52.6	38.2	25.3	51.9
1985	21.4	27.0	37.7	59.2	67.7	76.8	84.0	81.7	66.7	59.9	35.8	19.0	53.1
1986	27.4	38.0	53.2	54.3	64.8	78.7	78.9	83.4	65.0	58.0	45.0	35.5	56.9
1987	25.1	37.7	43.9	63.5	65.6	76.3	79.7	79.3	75.4	64.4	38.0	28.7	56.5
Avg.	28.2	34.3	42.6	54.3	63.3	73.9	81.3	80.1	71.7	59.7	41.7	31.3	55.2

Min. Temp	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann.
1975	3.0	9.2	19.0	20.9	27.0	37.6	46.7	37.5	27.7	21.7	12.0	11.5	22.8
1976	6.9	4.3	12.8	24.6	33.4	36.4	43.6	39.2	33.1	18.1	9.1	1.9	21.9
1977	2.1	5.5	11.1	22.9	31.2	42.0	45.9	43.6	34.2	24.1	18.1	15.9	24.7
1978	7.5	5.1	18.3	27.0	29.1	37.5	42.0	38.0	32.0	22.7	8.5	-2.8	22.1
1979	-9.2	3.2	15.0	22.8	30.6	36.9	42.1	41.7	30.4	23.7	6.7	6.3	20.8
1980	7.8	10.3	18.7	24.4	35.4	37.1	45.3	39.9	34.2	22.7	16.7	9.8	25.2
1981	9.5	12.8	21.3	26.9	34.0	39.3	41.7	40.5	35.8	25.6	18.4	13.9	26.6
1982	2.4	2.2	20.5	19.9	30.2	37.0	44.9	44.2	37.1	24.1	12.2	2.0	23.1
1983	9.2	6.5	22.7	22.3	30.3	40.2	43.1	48.7	35.6	26.1	15.8	4.9	25.4
1984	-5.3	-3.9	13.1	22.2	32.1	37.6	44.8	44.2	33.6	21.6	14.9	-1.5	21.1
1985	-8.2	-5.7	6.9	26.0	33.0	38.6	47.1	37.3	30.8	21.2	10.6	-5.3	19.4
1986	0.7	16.2	22.4	26.4	30.9	42.0	43.8	42.6	31.5	24.0	18.2	6.4	25.4
1987	-0.4	14.6	18.0	26.2	34.9	40.0	44.3	38.7	30.6	23.2	13.8	4.9	24.1
Avg.	2.0	6.2	16.9	24.0	31.7	38.6	44.3	41.2	32.8	23.0	13.5	5.2	23.3

Precip.	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann.
1975	0.52	0.25	0.58	0.73	0.41	1.94	0.24	0.46	0.03	1.78	0.60	0.48	8.02
1976	0.04	0.81	0.28	0.61	1.51	1.00	0.46	0.38	0.28	0.03	0.03	0.00	5.43
1977	0.17	0.14	0.67	0.00	1.60	0.64	1.55	1.58	0.93	0.78	0.26	0.45	8.77
1978	0.62	1.11	0.56	1.21	0.59	0.98	0.17	0.55	2.62	0.01	1.28	0.48	10.18
1979	0.58	0.18	0.36	0.03	0.57	0.07	0.20	0.77	0.04	1.56	0.52	0.24	5.12
1980	1.94	0.56	0.64	0.80	2.08	0.83	0.87	0.20	0.70	1.45	0.79	0.39	11.25
1981	0.51	0.17	1.14	0.35	2.05	0.10	0.57	0.19	0.80	2.11	0.51	0.72	9.22
1982	0.67	0.42	0.96	1.77	0.92	0.40	1.42	0.49	4.39	0.44	1.09	0.70	13.67
1983	0.11	0.38	0.88	1.47	1.63	0.48	1.10	2.66	2.93	1.13	1.58	1.42	15.77
1984	0.03	0.29	0.11	0.91	0.58	0.82	2.28	1.24	2.63	0.94	1.03	0.33	11.19
1985	0.22	0.41	0.45	0.35	1.08	0.28	1.89	0.00	1.74	0.56	1.42	0.56	8.96
1986	0.08	0.84	0.75	2.04	0.80	0.65	0.52	1.50	1.86	1.52	0.18	0.07	10.81
1987	0.60	0.23	1.57	0.12	2.01	0.22	0.62	0.95	0.47	1.13	0.69	0.55	9.16
Avg.	0.47	0.45	0.69	0.80	1.22	0.65	0.91	0.84	1.49	1.03	0.77	0.49	9.81

NOTE:
Maximum and minimum temperatures are in degrees Fahrenheit.
Precipitation is in inches.
E behind value indicates an estimated value.

Appendix C continued. Average maximum and minimum air temperatures and precipitation for National Weather Service (NWS) stations in the Bear River Basin (1975-1987).

Sta. Border 3 N Index # 0915 USU 08-05-1988
Lat. 42 15 Long. 111 02 Elev. 6120

Max. Temp	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann.
1975	27.8	32.0	41.5	43.1	60.7	70.1	84.9	79.3	75.6	57.1	39.4	31.9	53.6
1976	28.3	29.9	34.2	50.6	69.2	71.3	84.8	78.5	74.9	61.8	47.3E	36.5	55.6
1977	27.4	41.0	42.2	63.0	61.3	80.5	83.3	79.3	73.4	62.9	42.5	32.2	57.4
1978	29.9	33.3	42.0	54.1	60.8	74.5	83.9	79.6	70.8	66.5	39.0	21.6	54.7
1979	16.4	28.9	39.8	53.6	66.0	76.2	84.5	81.0	80.5	64.5	37.7	32.2	55.1
1980	27.6	33.7	39.0	52.8	61.8	73.6	82.1	79.0	74.5	62.6	47.8	35.5	55.8
1981	34.3	37.1	47.6	60.5	62.8	73.7	83.6	85.0	77.9	56.6	46.6	33.6	58.3
1982	26.8	27.3	41.6	48.8	63.5	73.0	79.4	83.6	69.1	55.0	35.8	24.3	52.3
1983	29.0	30.2	40.6	46.1	58.9	70.7	80.4	81.1	72.8	62.5	39.2	24.6	53.0
1984	20.2	24.8	37.2	45.6	64.6	70.8	81.8	80.3	70.6	51.9	38.0	23.5	50.8
1985	19.4	23.5	34.7	58.3	67.8	76.3	84.3	82.6	67.9	59.9	34.8	17.5	52.3
1986	25.4	35.3	46.0	52.6	64.4	79.8	77.4	83.1	64.2	56.8	41.0	34.2	55.0
1987	23.1	32.1	41.3	64.2	66.6	75.4	78.5	79.9E	74.7	63.4	37.3	25.7	55.2
Avg.	25.8	31.5	40.6	53.3	63.7	74.3	82.2	80.9	72.8	60.1	40.5	28.7	54.5

Min. Temp	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann.
1975	0.9	4.0	16.8	19.4	29.4	36.8	46.5	38.1	28.6	23.2	13.5	9.8	22.3
1976	3.9	3.6	2.7	24.6	34.7	36.3	43.7	39.0	34.9	19.9	10.6E	1.8	21.3
1977	1.3	4.7	12.2	24.7	31.5	42.0	44.6	42.6	33.4	24.0	16.8	10.9	24.1
1978	11.3	8.8	17.5	28.3	31.7	37.6	41.6	38.5	34.3	22.1	10.0	-3.2	23.2
1979	-9.8	5.3	13.8	23.0	32.0	36.5	41.2	40.6	30.7	23.5	7.1	0.9	20.4
1980	2.3	8.2	12.6	23.0	35.0	38.0	44.7	42.1	36.0	24.8	18.2	10.4	24.6
1981	8.0	9.1	22.7	29.2	35.3	40.2	44.0	42.9	34.6	25.3	18.3	12.7	26.9
1982	0.9	-1.5	17.4	20.6	32.4	39.0	45.6	44.2	36.6	24.2	10.5	4.6	22.9
1983	7.1	4.9	22.8	22.3	31.8	40.4	44.1	48.4	35.7	27.9	18.4	4.0	25.6
1984	-2.2	-2.5	14.5	21.4	34.5	38.8	45.4	43.9	32.3	22.6	15.2	-3.6	21.7
1985	-7.5	-6.2	6.8	26.3	33.5	37.3	45.5	36.5	30.2	21.9	11.7	-6.4	19.1
1986	0.8	16.8	22.3	28.5	33.8	44.5	44.9	44.6	33.4	27.4	19.6	8.5	27.1
1987	-0.1	9.8	19.3	26.8	37.9	39.9	45.4	38.5E	30.8	21.8	14.6	0.7	23.8
Avg.	1.3	5.0	15.5	24.5	33.3	39.0	44.4	41.5	33.2	23.7	14.2	3.9	23.3

Precip.	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann.
1975	1.28	1.52	1.41	0.96	1.22	2.48	0.49	0.40	0.15	1.95	1.34	0.77	13.97
1976	0.84	1.59	1.42	0.70	1.51	1.30	0.64	1.26	1.34	0.34	0.11	0.29	11.34
1977	0.56	0.48	0.82	0.25	3.05	0.99	2.44	2.78	1.46	1.02	1.82	2.99	18.66
1978	1.14	1.77	0.64	2.31	2.20	0.18	0.71	1.66	2.40	0.00	1.25	1.09	15.35
1979	1.60	1.22	0.59	0.14	1.98	0.47	0.28	0.98	0.35	1.67	0.89	0.20	10.37
1980	3.65	1.59	1.60	1.09	3.99	1.47	0.43	0.98	0.89	0.84	0.48	0.81	17.82
1981	0.93	0.35	1.52	0.40	3.57	0.58	0.66	0.46	0.38	2.66	1.14	2.11	14.76
1982	2.27	0.96	1.63	0.83	0.79	0.46	2.83	0.73	4.92	1.51	1.52	0.64	19.09
1983	0.61	0.79	0.93	2.01	2.57	1.47	1.87	2.96	2.26	2.03	2.82	2.93	23.25
1984	0.09	0.53	0.55	1.20	0.78	1.67	2.28	1.82	2.92	0.74	0.94	0.86	14.38
1985	0.37	1.05	0.71	0.40	1.16	0.30	1.73	0.00	2.34	0.93	3.35	1.08E	13.42
1986	0.81	2.51	1.40	3.56	1.50	0.75E	1.74	0.70	3.17	1.25	0.44E	0.00	17.83
1987	1.02	0.74	0.44	0.05	3.38	0.98	1.79	1.50E	0.46	0.99	1.86	0.86	14.07
Avg.	1.17	1.16	1.05	1.07	2.13	1.01	1.38	1.25	1.77	1.23	1.38	1.13	15.72

NOTE:
Maximum and minimum temperatures are in degrees Fahrenheit.
Precipitation is in inches.
E behind value indicates an estimated value.

Appendix C continued. Average maximum and minimum air temperatures and precipitation for National Weather Service (NWS) stations in the Bear River Basin (1975-1987).

Lifton Pumping Sta Index # 5275 USU 08-05-1988
Lat. 42 07 Long. 111 18 Elev. 5926

Max. Temp	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann.
1975	30.9	31.9	38.5	42.8	57.7	66.9	82.1	76.5	71.0	54.7	38.4	35.1	52.2
1976	30.5	34.1	34.7	48.8	64.9	69.9	83.2	76.5	71.4	57.2	46.4	38.0	54.6
1977	31.3	37.1	37.8	59.0	57.4	79.4	81.4	77.6	69.3	58.1	42.5	35.8	55.6
1978	33.3	35.0	44.9	51.9	59.0	72.7	82.2	77.4	67.8	61.6	38.9	24.2	54.1
1979	18.2	31.5	39.0	50.8	63.5	73.6	82.0	78.5	76.2	60.3	37.3	36.8	54.0
1980	30.4	36.5	38.2	52.1	58.7	71.1	80.5	75.5	69.5	55.9	44.9	35.6	54.1
1981	34.4	39.0	44.9	56.8	59.8	72.3	82.4	82.8	73.1	53.7	45.1	35.9	56.7
1982	28.4	28.6	40.2	47.6	60.4	70.8	77.9	81.6	65.3	52.4	38.2	28.2	51.6
1983	34.4	34.2	40.8	45.8	57.3	69.3	78.4	79.6	69.8	59.2	40.7	27.6	53.1
1984	24.3	28.6	39.0	45.0	61.8	68.4	79.9	79.0	66.7	50.2E	39.5	29.7	51.0
1985	23.1	23.0	33.9	52.0	64.5	73.8	82.6	79.2	65.2	55.6	36.3	23.2	51.0
1986	28.4	36.9	46.5	50.4	60.1	77.2	76.7	81.1	63.1	53.9	43.7	36.0	54.5
1987	28.4	35.8	42.0	59.5	64.6	74.9	77.6	77.6	73.5	62.4	42.6	32.4	55.9
Avg.	28.9	33.2	40.0	51.0	60.7	72.3	80.5	78.7	69.4	56.6	41.1	32.2	53.7

Min. Temp	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann.
1975	7.3	6.8	18.3	24.3	35.1	44.1	55.5	45.3	36.2	27.0	15.2	15.6	27.6
1976	9.9	5.9	6.9	27.5	40.7	44.6	50.9	44.6	38.9	25.6	17.9	8.9	26.9
1977	2.7	5.8	12.3	28.9	35.2	48.2	50.3	47.1	37.6	28.2	19.7	17.8	27.8
1978	13.5	10.9	21.4	31.0	35.0	44.6	49.5	44.4	37.7	28.2	14.9	0.3	27.6
1979	-9.0	4.6	14.9	27.9	38.2	45.0	50.0	46.9	39.0	29.3	13.3	11.6	26.0
1980	8.3	12.2	16.6	27.3	39.9	46.1	52.8	47.1	40.8	27.9	21.0	17.5	29.8
1981	15.1	13.5	23.9	33.4	38.7	46.7	50.8	48.8	40.8	30.3	23.9	16.9	31.9
1982	6.3	1.7	17.7	23.8	37.8	46.2	52.9	52.2	41.5	29.3	17.0	11.1	28.1
1983	16.0	7.9	22.9	27.0	37.4	47.4	52.8	54.2	42.5	33.4	24.5	10.0	31.3
1984	2.7	-0.8	12.0	23.5	39.7	45.9	54.4	51.1	39.6	27.4E	22.0	5.3	26.9
1985	-5.4	-10.0	3.0	30.3	41.6	47.2	54.1	44.0	36.7	27.3	17.4	5.6	24.3
1986	1.6	16.7	26.7	33.9	39.5	52.2	49.5	49.5	36.8	30.8	23.1	13.4	31.1
1987	1.6	11.3	19.9	32.9	43.5	47.7	48.9	44.5	37.4	31.1	22.3	9.4	29.2
Avg.	5.4	6.7	16.7	28.6	38.6	46.6	51.7	47.7	38.9	28.9	19.4	11.0	28.3

Precip.	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann.
1975	0.71	0.81	1.20	0.86	0.89	2.57	0.38	0.12	0.04	2.46	0.86	0.45	11.35
1976	0.50	1.27	1.25	0.77	1.68	1.04	0.81	0.80	0.83	0.07	0.03	0.00	9.05
1977	0.44	0.39	0.40	0.09	3.05	0.30	1.64	2.98	1.07	0.84	1.00	1.84	14.04
1978	0.42	1.22	1.05	2.18	1.08	0.29	0.12	0.92	2.08	0.00	0.88	1.28	11.52
1979	0.91	0.67	0.27	0.02	0.93	0.21	0.14	0.96	0.09	1.38	0.40	0.19	6.17
1980	3.30	1.08	0.87	1.36	2.83	2.26	0.75	1.01	0.97	1.24	0.76	0.21	16.64
1981	0.57	0.20	1.02	0.61	2.36	1.16	0.35	0.16	0.46	2.60	1.39	1.73	12.61
1982	1.15	0.77	1.47	1.31	1.34	0.36	3.15	0.61	5.64	1.10	1.07	1.20	19.17
1983	0.12	0.11	1.02	1.53	3.29	0.86	1.86	3.45	2.62	1.13	1.85	0.93	18.77
1984	0.08	0.06	0.03	0.81	1.82	1.06	1.27	0.86	2.31	1.09E	1.26	0.55	11.20
1985	0.16	0.58	0.92	0.24	1.03	0.31	1.45	0.00	1.33	0.81	1.87	0.53	9.23
1986	0.60	3.44	0.94	2.85	0.92	0.20	0.83	0.72	1.49	1.58	0.22	0.00	13.79
1987	0.79	0.49	0.43	0.00	3.26	0.47	1.58	1.24	0.48	1.29	1.58	0.72	12.33
Avg.	0.75	0.85	0.84	0.97	1.88	0.85	1.10	1.06	1.49	1.20	1.01	0.74	12.76

NOTE:
Maximum and minimum temperatures are in degrees Fahrenheit.
Precipitation is in inches.
E behind value indicates an estimated value.

Appendix C continued. Average maximum and minimum air temperatures and precipitation for National Weather Service (NWS) stations in the Bear River Basin (1975-1987).

Sta. Soda Springs Index # 8535 USU 08-05-1988
Lat. 42 39 Long. 111 35 Elev. 5842

Max. Temp	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann.
1975	31.0E	33.9E	36.9E	42.4E	58.5E	76.3E	84.6E	77.1E	73.7E	55.8E	39.5E	33.5E	53.6
1976	29.4E	31.4E	31.7E	49.5E	67.6E	68.7E	83.9E	76.0E	73.3E	60.7E	48.4E	32.9E	54.5
1977	34.3E	33.7E	41.0E	59.3E	59.1E	75.1E	82.9E	78.6E	70.8E	61.6E	39.2E	46.3E	56.8
1978	38.7E	37.7E	47.6E	51.9E	60.3E	72.5E	85.0E	77.8	68.9E	62.5E	29.8E	22.2	54.6
1979	18.1	28.7	36.3	49.4	61.3	76.7E	84.8E	79.6E	78.6E	59.4E	33.5E	37.0	53.6
1980	30.6	38.4	39.8	57.2	60.1	74.3	84.5	79.7	72.8	63.4	46.2	38.7	57.1
1981	37.4	35.7E	47.4	56.8	63.1	77.1	86.2E	85.7	75.8	54.6	38.9E	40.9E	58.3
1982	32.2E	26.9E	39.1E	48.2	59.8	67.6E	80.8E	81.7E	68.0	54.9	39.8E	29.6	52.4
1983	33.9	35.1	41.3	47.4	58.6	69.8E	82.1	81.4	70.4	59.4E	38.3	24.9	53.6
1984	24.1	27.3	38.1	45.0	62.9	69.9	81.8	80.2	68.2	49.2	37.5	26.7	50.9
1985	22.4	26.4	35.8	57.7	67.5	75.4	85.6	80.1E	66.3E	58.5E	32.0E	30.9	53.2
1986	38.1E	39.0E	50.5E	50.0E	60.6E	74.4	81.0E	83.1	63.4	59.5E	42.4	37.0	56.6
1987	27.7	36.8	42.6	61.6	67.0	75.1	79.1	79.0	76.2	65.6	35.7E	6.9	54.4
Avg.	30.6	33.2	40.6	52.0	62.0	73.3	83.3	80.0	71.3	58.9	38.6	31.3	54.6

Min. Temp	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann.
1975	5.6E	8.4E	22.7E	22.5E	28.9E	38.4E	48.1E	40.8E	28.1E	25.2E	15.3E	11.6E	24.6
1976	4.8E	6.3E	5.8E	24.6E	34.9E	39.4E	44.6E	42.0E	35.7E	8.4E	12.7E	8.7E	22.3
1977	2.3E	9.3E	9.8E	25.5E	33.0E	39.5E	48.8E	45.5E	34.9E	24.3E	16.9E	15.9E	25.5
1978	14.4E	16.1E	26.5E	28.5E	30.9E	39.8E	47.0E	41.9	33.0E	26.7	13.4E	-1.5	26.4
1979	-0.7	13.0	14.1	21.5	32.1	41.2E	49.0E	45.7E	34.6E	22.4E	13.7E	13.5	25.0
1980	5.2	16.6	17.3	24.8	35.1	40.4	47.8	41.9	37.7	25.4	19.1	13.5	27.1
1981	15.7	10.1E	22.9	29.8	34.2	41.9	49.5E	47.1	34.9	25.6	17.9E	12.7E	28.5
1982	5.1E	6.9E	20.2E	22.1	32.0	40.0E	47.3E	43.5E	41.0	32.0	14.8E	12.6	26.5
1983	19.5	14.8	25.6	26.7	34.9	38.3E	48.0	52.9	40.6	26.7E	21.8	4.0	29.5
1984	0.3	4.6	15.7	24.1	35.9	38.2	46.0	45.8	34.4	22.1	20.0	3.8	24.2
1985	-0.5	-1.9	11.4	28.3	35.5	39.3	48.1	37.3E	32.4E	40.1E	18.4E	-1.8E	23.9
1986	4.4E	18.1E	20.6E	27.8E	34.3E	38.6E	47.2E	44.0	32.9	26.1E	18.4	6.7	26.6
1987	-0.4	12.8	18.9	28.7	38.4	39.1	45.9	40.5	32.3	23.7	25.2E	6.9	26.0
Avg.	5.8	10.4	17.8	25.8	33.9	39.5	47.5	43.8	34.8	25.3	17.5	8.2	25.9

Precip.	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann.
1975	1.20E	1.55E	2.38E	1.59E	1.57E	1.39E	1.94E	0.68E	0.20E	0.84E	0.95E	0.93E	15.22
1976	0.59E	2.92E	1.43E	1.69E	1.61E	0.77E	.58E	1.70E	0.81E	0.90E	0.05E	0.18E	13.23
1977	0.40E	2.79E	0.99E	0.49E	3.86E	0.15E	.95E	4.44E	0.49E	0.38E	1.18E	0.85E	16.97
1978	1.20E	1.25E	1.74E	1.95E	1.16E	0.85E	0.26E	1.31	2.55E	0.00	2.54E	1.15	15.96
1979	1.50	1.91	0.49	0.40	0.98	1.26E	2.16E	2.28E	0.22E	0.80E	0.84E	0.60	13.44
1980	2.62	1.37	1.34	0.83	5.12	2.51	0.74	1.25	1.18	1.90	0.75	1.19	20.80
1981	0.49	0.87E	2.05	1.00	4.29	1.66	0.10E	0.13	0.43	2.80	1.14E	0.16E	15.12
1982	1.27E	4.87E	2.02E	2.81	0.98	0.67E	1.49E	1.19E	2.40	0.76	0.92E	0.79	20.17
1983	0.93	0.72	0.62	0.99	1.34	0.72E	2.70	4.00	2.23	3.24E	3.91	2.37	23.77
1984	0.25	1.56	0.92	1.64	0.84	2.45	2.33	1.48	2.35	1.05	1.09	0.50	16.46
1985	0.44	1.71	2.13	0.34	2.03	1.15	4.07	0.07	1.45E	0.57E	1.89E	0.48E	16.33
1986	0.74E	1.25E	1.25	3.22E	1.27E	0.93E	1.17E	2.08	3.03	0.57E	1.06E	0.02	16.59
1987	0.36E	0.22	1.25E	0.50	3.26	0.59	2.55	2.63	0.10	1.01	2.45E	0.97	15.89
Avg.	0.92	1.77	1.43	1.34	2.18	1.16	1.62	1.79	1.34	1.14	1.44	0.78	16.92

NOTE:
Maximum and minimum temperatures are in degrees Fahrenheit.
Precipitation is in inches.
E behind value indicates an estimated value.

Appendix C continued. Average maximum and minimum air temperatures and precipitation for National Weather Service (NWS) stations in the Bear River Basin (1975-1987).

Sta. Grace Index # 3732 USU 08-05-1988
Lat. 42 35 Long. 111 44 Elev. 5550

Max. Temp	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann.
1975	28.5	31.6	38.7	44.7	60.8	70.7	83.9	79.7	75.8	58.5	40.9	36.5	54.2
1976	30.5	35.8	36.0	51.8	70.0	73.1E	84.7	79.4	74.9E	61.2E	49.2E	43.3E	57.5
1977	32.3	42.8	42.7	65.5	61.8	80.9	82.6	79.8	72.7	64.1	44.1	35.6	58.7
1978	32.7	36.7	49.6	54.7	62.9E	75.2	84.1	79.4	71.2	66.3	40.5	24.8	56.5
1979	20.2	33.2	41.2	54.6	68.2	77.3	83.3	81.1	79.4	63.9	38.4	38.6	56.6
1980	30.6	38.8	42.0	59.0	61.5	72.5	82.6	79.1	73.8	61.2	47.0	38.7	57.2
1981	35.9	40.0	49.4	59.2	63.1E	73.5	84.1	86.8	77.4	56.7	47.4	36.2	59.1
1982	27.1	31.0	43.9	52.1	64.0	73.7	80.0	84.3	70.2	55.5	37.9	29.0	54.1
1983	34.5	37.7	44.6	49.8	62.1	71.8E	80.5E	81.7	74.5	61.6	40.5	27.7E	55.6
1984	24.8	30.2	40.6	48.5	66.5	71.2	82.5	81.4	70.3	53.5	41.3	28.3	53.3
1985	26.7	29.5	36.2E	63.1E	69.6	77.7	84.0E	82.7	67.7	59.9E	37.0	26.0	55.0
1986	35.3	39.4	52.9E	55.8	64.7	82.0	79.6	85.5	67.0	61.9	45.8	38.5E	59.0
1987	31.3	40.8	48.6	67.6	69.5	78.8	81.2	81.4	79.3	67.4	45.4	36.5	60.7
Avg.	30.0	36.0	43.6	55.9	65.0	75.3	82.5	81.7	73.4	60.9	42.7	33.8	56.7

Min. Temp	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann.
1975	9.9	12.1	20.6	24.3	31.6	41.9	51.1	43.6	35.3	30.8	17.3	19.6	28.2
1976	13.1	12.3	10.3	28.3	37.6	40.0E	48.3	42.2	38.4E	25.8E	17.5	8.5	26.9
1977	7.6	9.4	11.9	27.3	35.3	47.3	49.7	48.1	40.1	30.6	23.6	22.5	29.5
1978	17.1	19.1	25.8	31.9	33.9E	40.0	45.4	43.1	37.3	27.7	18.5	5.1	28.7
1979	-2.5	14.5	17.9	27.0	36.9	41.8	46.6	46.7	38.4	30.2	13.9	15.3	27.2
1980	11.5	18.7	21.9	29.2	36.7	40.5	46.6	43.6	37.6	27.3	23.0	16.3	29.4
1981	16.7	15.8	23.5	30.2	36.7E	42.9	48.1	47.5	39.0	31.4	24.9	19.9	31.4
1982	10.3	8.5	26.0	27.7	34.2	40.9	49.7	48.9	40.6	29.4	16.5	14.4	28.9
1983	19.2	16.8	28.5	28.1	34.3	42.0E	47.2E	51.4	40.2	32.4	24.1	12.8E	31.4
1984	5.8	5.6	18.5	25.3	37.1	40.3	48.7	48.9	37.1	25.9	22.6	7.3	26.9
1985	1.7	2.2	12.4E	29.6E	37.2	41.2	52.1E	42.4	36.1	27.1E	17.7	3.3	25.3
1986	12.4	22.6	25.1E	30.4	35.2	44.9	46.2	48.2	36.5	28.9	22.2	12.6E	30.4
1987	5.3	16.8	23.2	30.0	39.3	42.6	46.6	43.6	36.3	28.2	21.0	16.0	29.1
Avg.	9.9	13.4	20.4	28.4	35.8	42.0	48.2	46.0	37.9	28.9	20.2	13.4	28.7

Precip.	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann.
1975	0.96	1.28	1.22	1.27	1.47	1.31	1.39	0.12	0.17	1.53	0.68	0.34	11.74
1976	0.75	1.62	1.46	2.15	0.81	1.92E	1.00	0.98	0.87E	0.63E	0.00	0.24E	12.43
1977	0.23	0.33	0.46	0.15	2.25	0.99	1.03	3.36	1.32	0.52	1.43	3.00	15.07
1978	0.91	1.44	1.14	2.32	0.91E	0.00	0.11	1.49	1.09	0.00	0.90	1.49	11.80
1979	1.45	1.73	0.96	0.44	0.74	0.47	0.22	1.11	0.21	1.18	0.53	0.26	9.30
1980	3.48	1.47	1.26	1.15	5.66	1.86	0.89	0.96	1.12	1.24	0.67	1.11	20.87
1981	0.80	0.45	2.11	1.55	3.24E	1.08	0.45	0.38	0.49	3.04	1.68	3.07	18.34
1982	3.00	1.09	3.00	1.68	0.60	1.69	2.74	1.09	2.63	1.97	1.66	1.59	22.74
1983	0.47	0.54	1.79	2.35	1.93	1.37E	2.14	3.29	2.87	2.50	3.41	3.58	26.24
1984	0.47	1.61	1.06	1.60	1.04	2.20	2.81	1.65	2.82	1.68	1.44	0.70	19.08
1985	0.40	0.94	1.22E	0.62E	2.26	0.68	2.35E	0.25	2.58	1.16E	2.36	0.87	15.69
1986	0.99	4.41	1.45E	3.68	1.59	0.26	1.74	2.45	3.84	0.90	0.80	0.12E	22.23
1987	1.19E	0.76	0.83	0.21	4.38	0.95	2.33	2.01	0.02	0.79	1.32	0.97	15.76
Avg.	1.16	1.36	1.38	1.47	2.07	1.14	1.48	1.47	1.54	1.32	1.30	1.33	17.02

NOTE:
Maximum and minimum temperatures are in degrees Fahrenheit.
Precipitation is in inches.
E behind value indicates an estimated value.

Appendix C continued. Average maximum and minimum air temperatures and precipitation for National Weather Service (NWS) stations in the Bear River Basin (1975-1987).

Logan 5 SW Exp. Farm Index # 5194 USU 08-05-1988
Lat. 41 40 Long. 111 54 Elev. 4490

Max. Temp	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann.
1975	31.7	36.9	45.1	48.5	64.0	74.3	89.0	82.7	77.9	62.9	43.7	38.2	57.9
1976	33.1	35.3	38.4	57.1	72.4	76.0	89.1	81.8	76.2	62.7	51.0	39.9	59.4
1977	28.8	39.8	43.6	64.4	63.5	84.0	87.6	84.1	75.8	65.1	49.5	44.1	60.9
1978	37.3	42.4	54.9	56.8	64.3	78.5	88.8	83.7	72.8	67.9	42.6	31.2	60.1
1979	23.0	36.1	45.5	57.9	69.0	78.7	87.6	85.6	82.9	67.6	42.7	38.5	59.6
1980	36.1	42.0	47.3	61.6	64.8	76.4	87.4	83.2	76.7	62.5	48.8	36.1	60.2
1981	32.6	40.4	51.9	61.0	64.9	77.5	88.9	90.4	79.6	59.1	51.7	41.8	61.6
1982	31.0	32.2	48.0	53.4	65.1	77.5	83.9	87.1	71.6	56.8	43.6	33.5	57.0
1983	37.8	41.9	49.8	51.5	62.3	75.6	85.2	86.7	75.6	63.0	45.8	31.7	58.9
1984	26.2	29.2	42.6	54.8	67.7	74.5	87.7	86.0	73.5	55.5	45.7	31.2	56.2
1985	24.8	27.8	38.4	62.7	71.7	81.2	90.6	85.3	70.2	61.3	39.7	24.7	56.5
1986	30.7	43.9	56.2	55.2	65.5	84.7	83.5	88.5	68.4	61.2	47.4	35.9	60.1
1987	26.5	40.1	49.9	66.6	70.9	81.2	82.4	83.8	79.7	68.3	44.5	33.6	60.6
Avg.	30.7	37.5	47.0	57.8	66.6	78.5	87.1	85.3	75.5	62.6	45.9	35.4	59.2

Min. Temp	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann.
1975	8.8	17.8	23.1	29.9	34.3	43.8	53.0	46.0	34.1	30.2	19.0	16.6	29.7
1976	6.9	4.8	9.3	30.7	39.9	43.6	52.4	47.1	41.0	26.0	16.1	6.1	27.0
1977	4.3	8.6	18.9	31.9	38.0	48.0	52.1	51.2	40.7	31.1	24.8	23.0	31.0
1978	22.1	23.3	31.5	33.8	36.0	43.7	50.4	47.7	40.5	29.7	17.9	9.5	32.2
1979	-1.7	9.5	23.4	31.6	38.4	44.1	50.5	50.6	40.7	31.6	15.1	11.9	28.8
1980	17.3	19.2	26.2	33.8	40.2	43.7	52.2	49.3	40.5	30.0	22.8	11.9	32.3
1981	20.7	16.6	28.7	34.5	40.1	46.6	50.2	50.9	42.2	31.6	25.7	21.4	34.1
1982	6.5	7.6	29.0	28.6	36.4	43.4	51.3	49.7	44.8	31.5	21.5	14.4	30.4
1983	21.8	24.3	31.2	31.8	39.8	47.3	50.7	54.9	43.0	35.4	26.6	12.2	34.9
1984	6.6	5.1	22.7	32.7	39.7	43.8	52.7	50.8	38.5	29.4	25.6	7.2	29.6
1985	-0.2	-1.8	11.8	34.7	41.2	46.0	53.2	44.9	38.4	29.9	16.6	5.5	26.7
1986	6.2	27.6	34.0	34.6	39.7	50.3	50.7	52.4	39.3	32.6	24.9	14.5	33.9
1987	1.5	22.7	27.3	33.3	42.6	46.4	49.0	46.5	39.1	30.2	22.2	10.2	30.9
Avg.	9.3	14.3	24.4	32.5	38.9	45.4	51.4	49.4	40.2	30.7	21.4	12.6	30.9

Precip.	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann.
1975	1.34	1.37	4.35	2.31	1.95	1.42	1.46	0.13	0.18	3.51	1.46	1.29	20.77
1976	0.61	3.27	2.15	2.12	0.65	1.16	0.83	0.60	0.85	0.42	0.03	0.10	12.79
1977	0.29	0.43	1.28	0.38	2.38	0.23	0.87	5.30	1.35	1.30	1.35	2.28	17.44
1978	1.36	1.87	1.69	3.43	1.21	0.21	0.11	0.98	2.96	0.00	0.91	2.20	16.93
1979	1.73	1.66	0.71	0.50	1.42	1.02	0.58	0.85	0.09	3.39	0.80	0.46	13.21
1980	4.86	2.75	2.10	0.64	3.56	2.69	1.18	0.90	0.93	1.17	1.27	1.30	23.35
1981	1.00	0.80	1.46	0.62	3.43	1.51	0.49	0.25	0.41	4.11	1.18	2.54	17.80
1982	1.98	2.23	3.57	2.28	2.84	0.30	1.40	0.56	5.26	2.24	1.93	2.13	26.72
1983	0.68	1.38	2.07	2.28	3.91	0.71	1.52	4.06	3.42	2.17	2.66	5.50	30.36
1984	0.32	1.48	1.41	2.65	1.75	4.72	1.59	0.41	2.65	2.15	2.71	1.26	23.10
1985	0.29	1.68	1.82	1.32	1.76	1.03	1.50	0.00	2.74	2.11	4.05	0.99	19.29
1986	1.86	7.80	2.37	5.62	2.13	0.23	1.79	0.47	4.29	0.88	0.71	0.12	28.27
1987	1.91	0.98	1.57	0.20	5.32	0.25	1.65	1.24	0.00	0.78	1.29	1.58	16.77
Avg.	1.40	2.13	2.04	1.87	2.49	1.19	1.15	1.21	1.93	1.86	1.57	1.67	20.52

NOTE:
Maximum and minimum temperatures are in degrees Fahrenheit.
Precipitation is in inches.
E behind value indicates an estimated value.

Appendix C continued. Average maximum and minimum air temperatures and precipitation for National Weather Service (NWS) stations in the Bear River Basin (1975-1987).

Sta. Malad City Index # 5559 USU 08-05-1988
Lat. 42 10 Long. 112 19 Elev. 4467

Max. Temp	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann.
1975	29.3	35.1	44.8	51.3	64.1	75.1	89.6	85.0	79.3	61.4E	44.7	35.5	57.9
1976	32.1	35.5	39.5	58.4	72.8	77.3	90.0	83.5	78.8	64.5	52.5	43.1	60.7
1977	33.3	43.5E	48.1	68.5	64.7	85.2	88.3	85.3	77.2	67.7	47.4	39.0	62.4
1978	37.1	42.1	55.5	57.5	65.9	79.9	90.5	85.8	75.2	70.5	41.9	29.1	60.9
1979	24.3	35.6	45.6	60.9	71.7	82.2	89.8	85.3	84.3	67.5	42.5	37.0	60.6
1980	33.9	42.8	48.5	63.6	63.9	78.6	89.3	86.2	78.5	65.2	49.4	37.9	61.5
1981	33.2	42.5	53.0	63.4	65.9	80.7	90.9	92.5	83.4	60.2	50.1	38.9	62.9
1982	30.0	31.1	47.1	56.0	66.8	77.1	84.1	89.4	73.5	58.4	43.5	30.5	57.3
1983	36.0	39.1	49.7	52.6	65.2	76.2	85.2	85.2	77.4	64.2	44.2	28.7	58.6
1984	24.9	29.1	42.5	54.9	70.3	74.9	86.1	86.2	74.4	55.6	45.4	30.3	56.2
1985	26.1	29.0	40.0	65.6	73.0	82.6	90.2	88.3	72.2	63.1	38.5	24.0	57.7
1986	31.3	42.8	58.2	59.1	69.2	85.9	84.5	89.6	68.9	62.7E	48.9	38.1	61.6
1987	30.7	43.8	51.7	70.7	71.7	83.5	84.4	86.5	81.5	69.7	47.7	35.8	63.1
Avg.	30.9	37.8	48.0	60.2	68.1	79.9	87.9	86.8	77.3	63.9	45.9	34.5	60.1

Min. Temp	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann.
1975	6.4	14.8	24.8	27.6	32.9	40.7	51.8	43.9	35.1	28.6E	19.0	16.8	28.5
1976	8.7	6.7	12.8	30.1	38.6	40.7	48.3	45.8	38.9	26.1	18.7	8.1	27.0
1977	7.3	11.1E	18.2	28.9	36.9	47.8	49.5	48.2	38.7	28.6	23.0	22.7	30.1
1978	23.4	24.4	29.6	33.5	35.6	40.3	46.9	43.5	37.9	26.3	16.4	9.3	30.6
1979	2.0	12.1	22.2	28.8	37.1	42.5	47.4	48.5	37.7	30.5	15.2	13.2	28.1
1980	17.1	21.7	23.9	30.3	39.2	41.7	47.6	45.0	39.3	27.5	23.3	18.0	31.2
1981	20.6	15.7	25.9	32.0	38.7	43.3	47.9	47.3	39.3	30.2	24.6	20.6	32.2
1982	7.5	6.1	26.1	26.7	36.2	42.8	50.8	49.7	42.3	29.1	20.2	12.2	29.1
1983	17.8	17.3	29.1	28.7	35.7	43.1	48.4	53.3	41.6	32.7	25.5	11.5	32.1
1984	6.1	2.6	20.4	29.7	38.1	42.0	49.6	50.9	38.7	28.7	23.1	6.9	28.1
1985	0.7	0.1	15.9	31.5	38.8	44.3	52.2	43.7	37.7	27.9	19.1	2.7	26.2
1986	8.1	24.5	28.2	31.3	35.2	47.2	48.3	49.4	38.8	29.9E	23.8	12.4	31.4
1987	8.4	22.3	25.5	29.4	41.0	44.8	48.9	45.5	36.5	30.9	26.0	14.5	31.1
Avg.	10.3	13.8	23.3	29.9	37.2	43.2	49.0	47.3	38.7	29.0	21.4	13.0	29.7

Precip.	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann.
1975	1.38	1.22	1.70	1.48	1.48	0.93	1.94	0.17	0.36	2.16E	1.05	0.57	14.44
1976	0.83	1.93	0.63	2.09	1.37	2.19	0.58	1.69	0.60	0.84	0.00	0.00	12.75
1977	0.50	0.39E	0.29	0.19	3.32	1.51	0.95	1.87	1.41	0.24	1.72	1.96	14.35
1978	1.48	1.98	2.92	3.06	0.73	0.17	0.26	0.69	1.19	0.00	1.36	1.32	15.16
1979	1.85	1.58	0.54	0.38	1.27	0.54	2.16	2.48	0.20	1.42	1.12	0.08	13.62
1980	3.50	1.99	1.08	0.94	5.59	1.22	0.39	0.64	0.54	0.79	0.68	0.58	17.94
1981	1.04	0.15	1.57	0.63	3.27	0.53	0.10	0.18	0.12	2.78	1.12	3.09	14.58
1982	1.60	1.48	3.18	1.19	2.45	1.28	4.02	0.69	3.88	1.55	1.64	1.91	24.87
1983	1.04	1.13	2.30	1.75	2.43	1.47	1.55	2.86	2.33	2.59	2.90	3.76	26.11
1984	0.65	1.51	0.52	0.93	0.68	2.54	4.22	2.02	0.91	1.92	1.12	0.62	17.64
1985	0.34	1.16	1.74	0.38	1.34	0.48	1.47	0.05	2.00	0.77	1.97	0.65	12.35
1986	0.83	3.12	0.94	2.85	1.37	0.15	1.17	0.57	2.66	0.43	0.17	0.10	14.36
1987	0.63	0.90	0.69	0.07	4.47	0.82	2.02	1.18	0.04	1.36	1.72	0.70	14.60
Avg.	1.21	1.43	1.39	1.23	2.29	1.06	1.60	1.16	1.25	1.30	1.27	1.18	16.37

NOTE:
Maximum and minimum temperatures are in degrees Fahrenheit.
Precipitation is in inches.
E behind value indicates an estimated value.

Appendix C continued. Average maximum and minimum air temperatures and precipitation for National Weather Service (NWS) stations in the Bear River Basin (1975-1987).

Sta. Tremonton Index # 8817 USU 08-05-1988
Lat. 41 43 Long. 112 10 Elev. 4310

Max. Temp	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann.
1975	31.2E	39.0E	47.3E	49.7E	65.2E	75.9E	89.5E	84.9E	78.9E	63.8E	45.2E	37.7E	59.0
1976	33.5E	39.2E	43.8E	59.4E	73.9E	77.9E	89.9E	84.2E	78.7E	63.7E	52.3E	42.4E	61.6
1977	32.5E	43.3E	49.1E	67.9E	65.3E	85.2E	88.4E	85.5E	77.0E	66.4E	49.6E	42.0E	62.7
1987	38.2E	44.4E	56.0E	59.1E	66.5E	80.3E	90.0E	86.0E	75.0E	69.1E	43.4E	31.4E	61.6
1979	24.7E	38.1E	47.8E	60.5E	71.7E	80.5E	89.1E	85.5E	82.6E	67.6E	42.6E	38.7E	60.8
1980	36.1	43.6	50.8	65.3	65.3	78.7	88.7	84.9	77.6	63.7	49.3	38.8	61.9
1981	33.5	42.8	53.1	63.6	67.0	79.6	90.4	92.2	81.4	59.3	51.5	41.2	63.0
1982	31.0	33.8	48.5	55.5	68.3	78.5	84.7	89.3	73.5	57.7	44.9	33.3	58.3
1983	37.9	42.7	49.9	53.1	64.0	75.8	85.2	86.4	76.4	63.9	46.1	30.4	59.3
1984	25.8	30.4	43.0	56.2	69.8	75.3	87.2	85.6	73.8	56.0	47.2	31.8	56.8
1985	27.4	29.0	41.8	65.5	73.2	81.8	89.7	85.9	71.5	62.4	40.0	26.5	57.9
1986	32.2	43.6	57.8	57.2	68.5	85.9	84.8	89.3	69.9	61.9	48.8	37.7	61.5
1987	29.8	43.5	51.5	67.9	72.5	82.1	84.2	85.1	79.9	69.0	47.2	35.5	62.4
Avg.	31.8	39.5	49.3	60.1	68.6	79.8	87.8	86.5	76.6	63.4	46.8	36.0	60.5

Min. Temp	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann.
1975	14.5E	22.8E	30.1E	33.3E	41.6E	49.3E	64.6E	57.2E	43.8E	34.4E	22.5E	22.1E	36.3
1976	15.3E	18.9E	26.4E	36.3E	46.9E	49.5E	60.2E	56.8E	49.7E	35.9E	23.8E	14.5E	36.2
1977	13.5E	21.3E	25.6E	37.2E	44.7E	59.5E	62.4E	59.5E	47.9E	40.3E	29.2E	26.9E	39.0
1987	25.3E	28.3E	33.7E	38.0E	43.5E	48.8E	59.2E	55.9E	47.2E	40.1E	24.8E	15.7E	38.4
1979	9.6E	19.1E	30.7E	35.4E	45.1E	51.9E	59.2E	59.5E	48.3E	41.5E	20.2E	18.8E	36.6
1980	21.5	25.3	29.2	37.9	44.3	50.7	59.5	55.8	48.2	38.0	28.2	21.7	38.4
1981	22.9	21.9	32.2	39.1	44.3	53.7	61.0	60.4	50.8	36.8	30.8	24.8	39.9
1982	13.5	16.0	30.8	32.5	43.0	52.3	59.4	59.9	50.9	34.9	25.5	19.1	36.5
1983	24.3	25.8	33.4	33.9	43.0	51.2	58.1	61.1	49.6	39.4	29.5	16.8	38.8
1984	12.2	8.6	26.3	34.3	45.6	50.2	59.3	60.5	47.3	34.7	29.4	14.5	35.2
1985	9.6	7.7	24.4	39.9	47.5	54.2	62.2	55.4	45.2	34.8	23.4	13.1	34.8
1986	13.6	29.4	35.9	37.1	43.0	57.2	58.9	60.9	46.6	37.4	29.3	18.8	39.0
1987	14.1	26.5	30.8	38.4	48.5	54.6	58.1	56.5	48.7	41.2	29.9	18.8	38.8
Avg.	16.1	20.9	30.0	36.4	44.7	52.5	60.2	58.4	48.0	37.6	26.7	18.9	37.5

Precip.	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann.
1975	1.68E	1.40E	4.29E	2.06E	1.17E	2.06E	0.66E	0.27E	0.16E	3.33E	1.14E	1.37E	19.59
1976	0.84E	3.40E	1.43E	1.93E	0.11E	2.21E	0.26E	0.37E	0.84E	0.96E	0.06E	0.09E	12.50
1977	0.83E	0.19E	0.46E	.23E	3.09E	1.13E	2.50E	4.14E	1.41E	0.66E	1.18E	1.61E	17.43
1987	1.96E	3.53E	2.15E	2.49E	0.17E	0.45E	0.12E	0.85E	3.21E	0.19E	0.60E	3.29E	19.01
1979	2.34E	3.05E	0.36E	0.78E	0.55E	0.89E	1.99E	1.53E	0.08E	0.67E	0.60E	0.27E	13.11
1980	3.78	3.43	2.36	0.71	5.01	2.71	1.10	0.94	0.86	1.73	0.85	0.78	24.26
1981	1.81	0.13	1.71	0.92	3.45	0.57	0.14	0.13	0.23	4.62	0.95	2.36	17.02
1982	1.71	1.27	4.52	1.05	1.40	1.18	1.67	0.68	4.27	2.24	1.92	2.55	24.46
1983	0.97	1.58	2.66	2.59	4.05	1.73	1.30	2.89	2.95	2.18	2.25	5.70	30.85
1984	0.49	1.61	0.91	2.44	1.11	2.57	3.96	0.96	2.55	1.62	2.31	1.31	21.84
1985	0.46	1.83	1.18	0.31	1.19	0.36	4.18	0.00	2.56	0.84	3.24	1.23	17.38
1986	1.40	3.49	2.01	4.31	0.94	0.16	1.86	0.81	5.13	0.39	0.26	0.09	20.85
1987	1.24	1.04	1.18	0.20	5.97	0.22	1.53	0.86	0.27	0.82	2.32	0.71	16.36
Avg.	1.50	2.00	1.94	1.54	2.17	1.25	1.64	1.11	1.89	1.56	1.36	1.64	19.59

NOTE:
Maximum and minimum temperatures are in degrees Fahrenheit.
Precipitation is in inches.
E behind value indicates an estimated value.

Appendix C continued. Average maximum and minimum air temperatures and precipitation for National Weather Service (NWS) stations in the Bear River Basin (1975-1987).

Sta. Brigham City Waste P Index # 0928 USU 08-05-1988
Lat. 41 31 Long. 112 3 Elev. 4230

Max Temp	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann.
1975	33.3	41.1	49.8	53.7	67.1	77.6	92.0	87.0	77.8	63.3	47.1E	39.9	60.8
1976	36.8	41.3	45.9	61.7	76.9	81.4	92.5	85.2	79.7	63.6	52.6	40.7	63.2
1977	34.5	46.2	48.6	68.0	67.8E	88.1	91.1	87.5	79.2	67.3	50.1	43.5E	64.3
1978	40.7E	45.0	56.2	62.1	69.1	83.0E	93.2	87.1	75.7	70.6	43.0	33.6	63.3
1979	28.7	39.0	52.0	62.4	73.8	86.1	91.2	86.5	84.1	67.4	42.9	38.3	62.7
1980	39.3	45.5	49.5	66.4	67.8	81.3	91.7	87.6	79.9	66.5	51.9	39.7	63.9
1981	35.4	46.2	55.8	66.8	70.4	83.7	92.1	91.8	82.0	61.6	52.2	42.4	65.0
1982	33.1E	36.6	50.2	58.2	70.2	81.1	87.3	90.2	75.4	59.1	45.3	36.0	60.2
1983	39.3	45.2	52.1	54.4	66.9	79.2	87.9	87.8	78.4	65.9	47.5	33.6	61.5
1984	26.7	31.1	45.1	57.1	72.2	77.5	89.9	88.1	77.6	57.8	49.0	33.3	58.8
1985	28.1	32.6	45.3	66.6	76.2E	84.8	91.6	88.2	73.9	64.4	41.9	29.3	60.2
1986	33.6	46.2	58.9	60.7	70.5	87.5	87.1	91.0	73.0	65.0	50.9E	37.8	63.5
1987	33.7	44.6	53.4	71.5E	75.9	85.1	87.5	87.5	82.3	70.5	48.9	38.1	64.9
Avg.	34.1	41.6	51.0	62.3	71.1	82.8	90.4	88.1	78.4	64.8	47.9	37.4	62.5

Min Temp	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
1975	14.2	25.0	28.9	29.7	39.0	48.0	60.2	51.5	44.6	35.6	22.7E	20.6	35.0
1976	15.6	17.6	18.5	36.6	47.4	49.3	58.6	54.4	49.8	34.5	25.6	15.4	35.3
1977	14.7	21.2	24.9	37.7	43.3E	56.8	59.2	57.3	48.2	38.0	29.9	28.0E	38.3
1978	26.5E	28.6	34.6	36.5	42.0	47.7E	57.4	56.2	48.2	38.4	24.4	14.3	37.9
1979	13.5	17.5	28.2	34.7	43.8E	50.1E	56.2	54.6	50.3	38.6	20.4	18.2	35.5
1980	22.0	23.4	26.7	35.4	40.9	46.7	52.5	49.5	45.2	32.1	27.8	22.4	35.4
1981	24.2	25.7	31.9	39.5	44.3	51.7	55.6	56.9	49.4	37.5	30.9	26.4	39.5
1982	13.0E	15.0	31.7	32.6	41.7	50.3	56.7	57.3	47.5	34.3	25.0	20.6	35.5
1983	23.8	27.1	34.6	34.2	42.5	51.3	57.3	58.7	49.0	39.2	30.8	21.1	39.1
1984	13.5	9.7	26.1	34.2	44.8	50.0	57.1	57.4	45.8	35.1	29.0	13.9	34.7
1985	6.9	6.3	23.0	38.3	45.1E	51.2	59.4	51.7	43.9	33.8	22.2	17.0	33.2
1986	15.2	30.2	34.6	36.0	42.8	52.3	53.2	56.2	44.5	36.6	28.9E	19.5	37.5
1987	15.4	26.4	29.5	35.6E	46.0	52.4	54.7	50.8	44.0	36.6	28.9	19.2	36.6
Avg.	16.8	21.1	28.7	35.5	43.4	50.6	56.8	54.8	47.0	36.2	26.7	19.7	36.4

Precip.	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
1975	1.52	1.44	4.07	2.81	1.76	2.12	0.61	0.02	0.14	3.73	0.75	1.85	20.82
1976	0.51	3.67	2.00	2.89	0.69	1.26	0.55	2.26	0.93	2.34	0.03	0.03	17.16
1977	1.03	0.58	0.33	0.76	4.69E	0.57	2.15	3.50	1.32	0.77	1.03	1.32	18.05
1978	2.31	2.39	1.97	4.58	1.32	0.65E	0.32	1.17	3.14	0.00	2.10	1.47	21.42
1979	3.83	1.81	0.85	0.52	1.23	0.58	1.21	1.16	0.19	1.96	1.34	0.82	15.50
1980	6.23	1.45	2.43	0.82	5.57	2.78	0.14	0.62	1.47	2.03	1.24	1.60E	26.38
1981	1.85E	1.48E	0.43	0.81	4.47	0.92	0.18	0.16	0.20	4.57	0.87	2.07	18.01
1982	1.95	1.29	4.90	1.23	1.26	0.43	3.54	0.62	7.96	2.91	2.85	1.65	30.59
1983	1.38	1.84	3.19	3.34	3.26	0.70	1.54	3.42	4.05	2.48	2.47	6.26	33.93
1984	0.69	1.89	1.45	3.29	1.63	2.26	1.96	0.79	2.33	1.87	2.38	1.07	21.61
1985	0.40	1.49	0.97	0.85	2.30E	0.35	2.16	0.00	3.00	1.39	4.45E	1.13	18.49
1986	1.49	3.39	2.58	4.96	0.97	0.27	1.11	0.38	3.91	0.54	2.30E	0.08	21.98
1987	1.42E	1.22	0.81	0.27E	4.45	1.19	1.80	0.78	0.50	1.07	1.81	0.93	16.25
Avg.	1.89	1.84	2.00	2.09	2.58	1.08	1.33	1.14	2.24	1.97	1.82	1.56	21.55

NOTE:
Maximum and minimum temperatures are in degrees Fahrenheit.
Precipitation is in inches.
E behind value indicates an estimated value.

APPENDIX D

Subbasin crops, agricultural land use and crop growth dates.

Appendix D. Subbasin crops, agricultural land use and crop growth dates.

Evanston, WY subbasin, 32,000 cropped acres

CROP	CROP %	BEGINNING GROWTH OR PLANTING		EFFECTIVE COVER		LAST HARVEST	
		MONTH	DAY	MONTH	DAY	MONTH	DAY
ALFALFA	2	MAY	1	JUN	10	SEP	1
Cutting Dates: JUL 1, AUG 10							
OTHER HAY	60	MAY	1	JUL	1	OCT	1
PASTURE	37	MAY	1	JUN	10	SEP	31
SP WHEAT	1	MAY	10	JUL	25	SEP	5

Randolph, UT subbasin, 48,672 cropped acres

CROP	CROP %	BEGINNING GROWTH OR PLANTING		EFFECTIVE COVER		LAST HARVEST	
		MONTH	DAY	MONTH	DAY	MONTH	DAY
ALFALFA	4	MAY	1	JUN	10	SEP	1
Cutting Dates: JUL 1, AUG 10							
OTHER HAY	82	MAY	1	JUL	1	OCT	1
PASTURE	11	MAY	1	JUN	10	SEP	31
SP WHEAT	3	APR	25	JUL	15	AUG	30

Cokeville, WY subbasin, 29,145 cropped acres

CROP	CROP %	BEGINNING GROWTH OR PLANTING		EFFECTIVE COVER		LAST HARVEST	
		MONTH	DAY	MONTH	DAY	MONTH	DAY
ALFALFA	2	MAY	1	JUN	10	SEP	1
Cutting Dates: JUL 1, AUG 10							
OTHER HAY	65	MAY	1	JUL	1	OCT	1
PASTURE	31	MAY	1	JUN	10	SEP	31
SP WHEAT	2	APR	25	JUL	15	AUG	30

Appendix D (continued)

Thomas Fork, WY subbasin, 21243 cropped acres

CROP	CROP %	BEGINNING GROWTH OR PLANTING		EFFECTIVE COVER		LAST HARVEST	
		MONTH	DAY	MONTH	DAY	MONTH	DAY
ALFALFA	2	MAY	1	JUN	10	SEP	1
Cutting Dates: JUL 1, AUG 10							
OTHER HAY	62	MAY	1	JUL	1	OCT	1
PASTURE	35	MAY	1	JUN	10	SEP	31
SP WHEAT	1	APR	25	JUL	15	AUG	30

Bear Lake subbasin, 51,600 cropped acres

CROP	CROP %	BEGINNING GROWTH OR PLANTING		EFFECTIVE COVER		LAST HARVEST	
		MONTH	DAY	MONTH	DAY	MONTH	DAY
ALFALFA	17	MAY	1	JUN	10	SEP	1
Cutting Dates: JUL 1, AUG 15							
OTHER HAY	39	MAY	1	JUL	1	OCT	1
PASTURE	24	MAY	1	JUN	10	SEP	31
S BARLEY	20	APR	25	JUL	5	AUG	25

Soda Springs, ID subbasin, 15,500 cropped acres

CROP	CROP %	BEGINNING GROWTH OR PLANTING		EFFECTIVE COVER		LAST HARVEST	
		MONTH	DAY	MONTH	DAY	MONTH	DAY
ALFALFA	17	APR	25	MAY	25	OCT	1
Cutting Dates: JUNE 10, JUL 20, AUG 24							
OTHER HAY	39	MAY	1	JUL	1	OCT	1
PASTURE	24	APR	15	JUN	1	SEP	31
SP WHEAT	7	APR	15	JUN	25	AUG	15
WN WHEAT	6	APR	25	JUN	10	AUG	5
S BARLEY	7	APR	15	JUN	15	AUG	5

Appendix D (continued)

Oneida, ID subbasin, 33,000 cropped acres

CROP	CROP %	BEGINNING GROWTH OR PLANTING		EFFECTIVE COVER		LAST HARVEST	
		MONTH	DAY	MONTH	DAY	MONTH	DAY
ALFALFA	37	APR	25	MAY	25	OCT	1
Cutting Dates: JUN 10, JUL 20, AUG 24							
OTHER HAY	12	MAY	1	JUL	1	OCT	1
PASTURE	19	APR	15	JUN	1	SEP	31
SP WHEAT	8	APR	15	JUN	25	AUG	15
WN WHEAT	8	APR	25	JUN	10	AUG	5
S BARLEY	8	APR	15	JUN	15	AUG	5
SGR BEET	4	MAY	10	JUL	1	SEP	20
POTATOES	4	MAY	15	JUL	1	AUG	1

Cache Valley subbasin, 152,000 cropped acres

CROP	CROP %	BEGINNING GROWTH OR PLANTING		EFFECTIVE COVER		LAST HARVEST	
		MONTH	DAY	MONTH	DAY	MONTH	DAY
ALFALFA	35	APR	15	MAY	10	OCT	1
Cutting Dates: MAY 27, JUL 1, AUG 1, SEP 10							
OTHER HAY	4	MAY	1	JUL	1	OCT	1
PASTURE	18	APR	15	JUN	1	SEP	31
SP WHEAT	6	APR	15	JUN	25	AUG	1
WN WHEAT	15	APR	15	JUN	15	JUL	24
S BARLEY	12	MAR	15	MAY	30	JUL	24
SGR BEET	3	MAY	10	JUL	1	SEP	20
CORN	6	MAY	10	JUL	20	SEP	15
POTATOES	1	MAY	15	JUL	1	AUG	1

Malad ID, subbasin, 27,647 cropped acres

CROP	CROP %	BEGINNING GROWTH OR PLANTING		EFFECTIVE COVER		LAST HARVEST	
		MONTH	DAY	MONTH	DAY	MONTH	DAY
ALFALFA	29	MAY	1	JUN	10	SEP	1
Cutting Dates: JUL 1, AUG 10							
OTHER HAY	3	MAY	1	JUL	1	OCT	1
PASTURE	48	MAY	1	JUN	10	SEP	31
SP WHEAT	5	APR	15	JUN	30	AUG	5
WN WHEAT	9	APR	25	JUN	10	JUL	24
S BARLEY	5	APR	15	JUN	15	JUL	30
CORN	1	MAY	10	JUL	20	SEP	15
POTATOES	1	MAY	15	JUL	1	SEP	1

Appendix D (continued)

Tremonton, UT subbasin, 65,591 cropped acres

CROP	CROP %	BEGINNING GROWTH OR PLANTING		EFFECTIVE COVER		LAST HARVEST	
		MONTH	DAY	MONTH	DAY	MONTH	DAY
ALFALFA	28	APR	15	MAY	10	OCT	1
Cutting Dates: MAY 27, JUL 1, AUG 1, SEP 10							
PASTURE	20	APR	15	JUN	1	SEP	31
SP WHEAT	6	APR	15	JUN	25	AUG	1
WN WHEAT	14	APR	1	MAY	25	JUL	10
S BARLEY	7	MAR	15	MAY	30	JUL	24
SGR BEET	13	MAY	5	JUN	25	SEP	15
CORN	10	MAY	10	JUL	20	SEP	15
POTATOES	2	MAY	15	JUL	1	SEP	10

Brigham, UT subbasin, 11,783 cropped acres

CROP	CROP %	BEGINNING GROWTH OR PLANTING		EFFECTIVE COVER		LAST HARVEST	
		MONTH	DAY	MONTH	DAY	MONTH	DAY
ALFALFA	25	APR	15	MAY	10	OCT	1
Cutting Dates: MAY 27, JUL 1, AUG 1, SEP 10							
PASTURE	21	APR	15	JUN	1	SEP	31
SP WHEAT	5	APR	15	JUN	25	AUG	1
WN WHEAT	5	APR	1	MAY	25	JUL	10
S BARLEY	6	MAR	15	MAY	30	JUL	24
SGR BEET	15	MAY	5	JUN	25	SEP	15
CORN	12	MAY	10	JUL	20	SEP	15
PEACHES	9	APR	15	JUL	5	SEP	15
POTATOES	2	MAY	15	JUL	1	SEP	10

APPENDIX E

Calculated seasonal consumptive use for subbasins of the Bear River Basin (water years 1976-1987) using Hargreaves, SCS Blaney-Criddle, SCS Blaney-Criddle Calibrated k_t, and FAO Blaney-Criddle Equations.

Appendix E. Calculated seasonal consumptive use for subbasins of the Bear River Basin (water years 1976-1987) using various ET equations.

BEAR RIVER SUBBASIN EVANSTON NOAA WEATHER STATION EVANSTON 03-07-1989
ET EQUATION: HARGREAVES

	PRECIPITATION			SUBBBASIN CROPS										
WYR	OCT-APR	MAY-SEPT	ANN TOTL	ALF ALFA	OTHER HAY	PAS TURE	SPRNG WHEAT	WINTER WHEAT	SPRING BARLEY	SUGAR BEET	CORN	PEAC HES	OTHER	WGHTD TOTAL
				2. %	60. %	37. %	1. %	0. %	0. %	0. %	0. %	0. %	0. %	
	-----INCHES-------			----------SEASONAL CONSUMPTIVE USE, INCHES----------										
1976	6.36	4.68	11.04	23.2	23.5	19.9	19.5							22.1
1977	2.38	7.17	9.55	23.5	23.8	20.0	19.6							22.3
1978	7.38	5.64	13.02	22.6	22.9	19.3	19.2							21.5
1979	4.18	3.61	7.79	23.5	23.8	20.3	19.7							22.4
1980	8.07	5.21	13.28	23.1	23.4	19.8	19.7							22.0
1981	7.02	4.47	11.49	23.9	24.2	20.6	20.7							22.8
1982	8.97	8.83	17.80	22.6	22.7	19.2	19.3							21.4
1983	6.26	12.31	18.57	21.3	21.5	18.3	18.1							20.3
1984	7.29	8.31	15.60	22.4	22.7	19.2	19.1							21.4
1985	4.12	5.56	9.68	24.7	25.0	20.9	21.0							23.4
1986	8.26	5.57	13.83	23.4	23.5	19.7	19.7							22.1
1987	3.68	3.81	7.49	23.1	23.2	19.9	19.1							21.9
AVG	6.16	6.26	12.43	23.1	23.3	19.8	19.6							22.0
AF/A				1.92	1.95	1.65	1.63							1.83

BEAR RIVER SUBBASIN EVANSTON NOAA WEATHER STATION EVANSTON 03-07-1989
ET EQUATION: SCS BLANEY-CRIDDLE

	PRECIPITATION			SUBBBASIN CROPS										
WYR	OCT-APR	MAY-SEPT	ANN TOTL	ALF ALFA	OTHER HAY	PAS TURE	SPRNG WHEAT	WINTER WHEAT	SPRING BARLEY	SUGAR BEET	CORN	PEAC HES	OTHER	WGHTD TOTAL
				2. %	60. %	37. %	1. %	0. %	0. %	0. %	0. %	0. %	0. %	
	-----INCHES-------			----------SEASONAL CONSUMPTIVE USE, INCHES----------										
1976	6.36	4.68	11.04	22.2	22.6	19.2	18.5							21.3
1977	2.38	7.17	9.55	23.9	24.3	20.2	19.9							22.7
1978	7.38	5.64	13.02	21.5	21.9	18.3	18.1							20.5
1979	4.18	3.61	7.79	22.8	23.1	19.7	19.0							21.8
1980	8.07	5.21	13.28	22.2	22.6	19.1	18.9							21.3
1981	7.02	4.47	11.49	23.4	23.7	20.2	20.0							22.4
1982	8.97	8.83	17.80	22.0	21.9	18.8	19.0							20.8
1983	6.26	12.31	18.57	21.5	21.5	18.6	18.8							20.4
1984	7.29	8.31	15.60	22.2	22.4	19.0	19.1							21.1
1985	4.12	5.56	9.68	24.8	25.4	21.0	20.6							23.7
1986	8.26	5.57	13.83	24.1	24.0	20.1	20.2							22.6
1987	3.68	3.81	7.49	23.8	23.9	20.3	19.2							22.5
AVG	6.16	6.26	12.43	22.8	23.1	19.5	19.3							21.8
AF/A				1.90	1.93	1.63	1.61							1.81

Appendix E continued. Calculated seasonal consumptive use for subbasins of the Bear River Basin (water years 1976-1987) using various ET equations.

BEAR RIVER SUBBASIN EVANSTON NOAA WEATHER STATION EVANSTON 03-07-1989
ET EQUATION: SCS BLANEY-CRIDDLE CALIBRATED Kt

	PRECIPITATION			SUBBBASIN CROPS										
WYR	OCT-APR	MAY-SEPT	ANN TOTL	ALF ALFA	OTHER HAY	PAS TURE	SPRNG WHEAT	WINTER WHEAT	SPRING BARLEY	SUGAR BEET	CORN	PEAC HES	OTHER	WGHTD TOTAL
				2. %	60. %	37. %	1. %	0. %	0. %	0. %	0. %	0. %	0. %	
	-----INCHES-------			----------SEASONAL CONSUMPTIVE USE, INCHES----------										
1976	6.36	4.68	11.04	22.4	22.7	19.2	18.8							21.4
1977	2.38	7.17	9.55	23.5	23.8	19.9	19.7							22.3
1978	7.38	5.64	13.02	21.9	22.3	18.7	18.5							20.9
1979	4.18	3.61	7.79	22.7	23.0	19.6	19.1							21.7
1980	8.07	5.21	13.28	22.4	22.8	19.2	19.1							21.4
1981	7.02	4.47	11.49	23.2	23.5	19.9	19.7							22.1
1982	8.97	8.83	17.80	22.3	22.3	19.0	19.1							21.1
1983	6.26	12.31	18.57	21.9	22.0	18.9	19.0							20.8
1984	7.29	8.31	15.60	22.4	22.6	19.2	19.2							21.3
1985	4.12	5.56	9.68	24.1	24.5	20.4	20.2							22.9
1986	8.26	5.57	13.83	23.6	23.7	19.9	19.9							22.2
1987	3.68	3.81	7.49	23.4	23.5	19.9	19.2							22.1
AVG	6.16	6.26	12.43	22.8	23.1	19.5	19.3							21.7
AF/A				1.90	1.92	1.62	1.61							1.81

BEAR RIVER SUBBASIN EVANSTON NOAA WEATHER STATION EVANSTON 03-07-1989
ET EQUATION: FAO BLANEY-CRIDDLE

	PRECIPITATION			SUBBBASIN CROPS										
WYR	OCT-APR	MAY-SEPT	ANN TOTL	ALF ALFA	OTHER HAY	PAS TURE	SPRNG WHEAT	WINTER WHEAT	SPRING BARLEY	SUGAR BEET	CORN	PEAC HES	OTHER	WGHTD TOTAL
				2. %	60. %	37. %	1. %	0. %	0. %	0. %	0. %	0. %	0. %	
	-----INCHES-------			----------SEASONAL CONSUMPTIVE USE, INCHES----------										
1976	6.36	4.68	11.04	22.4	22.8	19.3	18.8							21.4
1977	2.38	7.17	9.55	23.4	23.7	19.9	19.6							22.3
1978	7.38	5.64	13.02	22.0	22.4	18.8	18.6							21.0
1979	4.18	3.61	7.79	22.8	23.1	19.6	19.2							21.8
1980	8.07	5.21	13.28	22.5	22.8	19.3	19.1							21.4
1981	7.02	4.47	11.49	23.2	23.4	19.9	19.7							22.1
1982	8.97	8.83	17.80	22.3	22.4	19.1	19.1							21.1
1983	6.26	12.31	18.57	22.0	22.1	18.9	19.0							20.9
1984	7.29	8.31	15.60	22.4	22.7	19.2	19.2							21.3
1985	4.12	5.56	9.68	24.0	24.3	20.3	20.0							22.8
1986	8.26	5.57	13.83	23.5	23.6	19.9	19.8							22.2
1987	3.68	3.81	7.49	23.4	23.6	20.0	19.3							22.2
AVG	6.16	6.26	12.43	22.8	23.1	19.5	19.3							21.7
AF/A				1.90	1.92	1.63	1.61							1.81

Appendix E continued. Calculated seasonal consumptive use for subbasins of the Bear River Basin (water years 1976-1987) using various ET equations.

BEAR RIVER SUBBASIN RANDOLPH NOAA WEATHER STATION WOODRUFF 03-07-1989
ET EQUATION: HARGREAVES

	PRECIPITATION			SUBBBASIN CROPS										
WYR	OCT-APR	MAY-SEPT	ANN TOTL	ALF ALFA 4. %	OTHER HAY 82. %	PASTURE 11. %	SPRNG WHEAT 3. %	WINTER WHEAT 0. %	SPRING BARLEY 0. %	SUGAR BEET 0. %	CORN 0. %	PEAC HES 0. %	OTHER 0. %	WGHTD TOTAL
	-----INCHES-------			----------SEASONAL CONSUMPTIVE USE, INCHES----------										
1976	4.60	3.63	8.23	23.9	24.2	20.2	20.6							23.7
1977	1.04	6.30	7.34	24.5	24.9	20.6	21.1							24.3
1978	4.99	4.91	9.90	24.2	24.6	20.4	21.2							24.0
1979	2.92	1.65	4.57	25.1	25.5	21.4	21.6							24.9
1980	6.26	4.68	10.94	23.8	24.2	20.1	20.7							23.6
1981	4.80	3.71	8.51	25.2	25.5	21.3	22.1							24.9
1982	7.16	7.62	14.78	23.6	23.6	19.8	20.5							23.1
1983	5.07	8.80	13.87	22.6	22.8	19.2	19.7							22.3
1984	5.47	7.55	13.02	23.6	23.9	19.9	20.6							23.4
1985	3.73	4.99	8.72	25.4	25.6	21.2	22.0							25.0
1986	6.25	5.33	11.58	24.8	24.8	20.5	21.4							24.2
1987	4.29	4.27	8.56	24.7	24.9	20.9	21.1							24.4
AVG	4.72	5.29	10.00	24.3	24.5	20.4	21.0							24.0
AF/A				2.02	2.04	1.70	1.75							2.00

BEAR RIVER SUBBASIN RANDOLPH NOAA WEATHER STATION WOODRUFF 03-07-1989
ET EQUATION: SCS BLANEY-CRIDDLE

	PRECIPITATION			SUBBBASIN CROPS										
WYR	OCT-APR	MAY-SEPT	ANN TOTL	ALF ALFA 4. %	OTHER HAY 82. %	PASTURE 11. %	SPRNG WHEAT 3. %	WINTER WHEAT 0. %	SPRING BARLEY 0. %	SUGAR BEET 0. %	CORN 0. %	PEAC HES 0. %	OTHER 0. %	WGHTD TOTAL
	-----INCHES-------			----------SEASONAL CONSUMPTIVE USE, INCHES----------										
1976	4.60	3.63	8.23	23.1	23.4	19.6	19.8							22.9
1977	1.04	6.30	7.34	25.4	25.8	21.3	21.9							25.1
1978	4.99	4.91	9.90	22.8	23.2	19.2	19.8							22.6
1979	2.92	1.65	4.57	24.1	24.3	20.5	20.6							23.8
1980	6.26	4.68	10.94	23.8	24.2	20.2	20.4							23.6
1981	4.80	3.71	8.51	25.0	25.2	21.3	21.5							24.7
1982	7.16	7.62	14.78	23.5	23.5	19.8	20.6							23.0
1983	5.07	8.80	13.87	23.6	23.4	20.0	20.7							23.0
1984	5.47	7.55	13.02	23.6	23.8	20.0	20.7							23.3
1985	3.73	4.99	8.72	25.1	25.6	20.9	21.7							24.9
1986	6.25	5.33	11.58	25.1	25.1	20.7	21.7							24.5
1987	4.29	4.27	8.56	24.8	25.1	20.9	20.8							24.5
AVG	4.72	5.29	10.00	24.2	24.4	20.4	20.8							23.8
AF/A				2.01	2.03	1.70	1.74							1.99

Appendix E continued. Calculated seasonal consumptive use for subbasins of the Bear River Basin (water years 1976-1987) using various ET equations.

BEAR RIVER SUBBASIN RANDOLPH NOAA WEATHER STATION WOODRUFF 03-07-1989
ET EQUATION: SCS BLANEY-CRIDDLE CALIBRATED Kt

	PRECIPITATION			SUBBBASIN CROPS									
WYR	OCT-APR	MAY-SEPT	ANN TOTL	ALF ALFA	OTHER HAY	PAS TURE	SPRNG WHEAT	WINTER WHEAT	SPRING BARLEY	SUGAR BEET	CORN	PEAC HES	OTHER	WGHTD TOTAL
				4. %	82. %	11. %	3. %	0. %	0. %	0. %	0. %	0. %	0. %	
	-----INCHES-------			----------SEASONAL CONSUMPTIVE USE, INCHES----------										
1976	4.60	3.63	8.23	23.3	23.7	19.7	20.1							23.1
1977	1.04	6.30	7.34	24.9	25.2	20.9	21.5							24.6
1978	4.99	4.91	9.90	23.2	23.5	19.5	20.1							22.9
1979	2.92	1.65	4.57	24.0	24.2	20.3	20.7							23.7
1980	6.26	4.68	10.94	23.8	24.1	20.1	20.5							23.6
1981	4.80	3.71	8.51	24.6	24.8	20.8	21.2							24.3
1982	7.16	7.62	14.78	23.7	23.7	19.9	20.6							23.2
1983	5.07	8.80	13.87	23.7	23.7	20.0	20.7							23.2
1984	5.47	7.55	13.02	23.8	24.0	20.0	20.7							23.4
1985	3.73	4.99	8.72	24.6	25.0	20.6	21.3							24.4
1986	6.25	5.33	11.58	24.7	24.8	20.5	21.3							24.2
1987	4.29	4.27	8.56	24.4	24.7	20.5	20.8							24.1
AVG	4.72	5.29	10.00	24.1	24.3	20.2	20.8							23.7
AF/A				2.01	2.02	1.69	1.73							1.98

BEAR RIVER SUBBASIN RANDOLPH NOAA WEATHER STATION WOODRUFF 03-07-1989
ET EQUATION: FAO BLANEY-CRIDDLE

	PRECIPITATION			SUBBBASIN CROPS									
WYR	OCT-APR	MAY-SEPT	ANN TOTL	ALF ALFA	OTHER HAY	PAS TURE	SPRNG WHEAT	WINTER WHEAT	SPRING BARLEY	SUGAR BEET	CORN	PEAC HES	OTHER	WGHTD TOTAL
				4. %	82. %	11. %	3. %	0. %	0. %	0. %	0. %	0. %	0. %	
	-----INCHES-------			----------SEASONAL CONSUMPTIVE USE, INCHES----------										
1976	4.60	3.63	8.23	23.4	23.7	19.8	20.2							23.2
1977	1.04	6.30	7.34	24.8	25.1	20.8	21.4							24.5
1978	4.99	4.91	9.90	23.3	23.6	19.6	20.2							23.0
1979	2.92	1.65	4.57	24.1	24.3	20.4	20.7							23.7
1980	6.26	4.68	10.94	23.9	24.2	20.2	20.6							23.7
1981	4.80	3.71	8.51	24.6	24.8	20.8	21.2							24.3
1982	7.16	7.62	14.78	23.7	23.7	19.9	20.6							23.2
1983	5.07	8.80	13.87	23.8	23.7	20.1	20.7							23.2
1984	5.47	7.55	13.02	23.8	23.9	20.0	20.7							23.4
1985	3.73	4.99	8.72	24.6	25.0	20.5	21.3							24.4
1986	6.25	5.33	11.58	24.7	24.7	20.4	21.3							24.1
1987	4.29	4.27	8.56	24.5	24.8	20.6	20.8							24.2
AVG	4.72	5.29	10.00	24.1	24.3	20.3	20.8							23.7
AF/A				2.01	2.02	1.69	1.73							1.98

Appendix E continued. Calculated seasonal consumptive use for subbasins of the Bear River Basin (water years 1976-1987) using various ET equations.

BEAR RIVER SUBBASIN COKEVILE NOAA WEATHER STATION BORDER 03-07-1989
ET EQUATION: HARGREAVES

	PRECIPITATION			SUBBBASIN CROPS										
WYR	OCT-APR	MAY-SEPT	ANN TOTL	ALF ALFA	OTHER HAY	PAS TURE	SPRNG WHEAT	WINTER WHEAT	SPRING BARLEY	SUGAR BEET	CORN	PEAC HES	OTHER	WGHTD TOTAL
				2. %	65. %	31. %	2. %	0. %	0. %	0. %	0. %	0. %	0. %	
	-----INCHES-------			----------SEASONAL CONSUMPTIVE USE, INCHES----------										
1976	8.61	6.05	14.66	25.0	25.2	21.5	21.9							24.0
1977	2.85	10.72	13.57	25.5	25.8	21.7	22.3							24.5
1978	11.69	7.15	18.84	24.7	25.0	21.1	21.9							23.7
1979	5.89	4.06	9.95	26.0	26.3	22.5	22.7							25.0
1980	10.69	7.76	18.45	24.2	24.4	20.8	21.3							23.2
1981	5.33	5.65	10.98	25.2	25.4	21.8	22.4							24.2
1982	11.60	9.73	21.33	24.0	23.9	20.5	21.2							22.8
1983	8.01	11.13	19.14	23.1	23.2	19.9	20.5							22.2
1984	10.15	9.47	19.62	23.6	23.8	20.3	20.9							22.6
1985	5.07	5.53	10.60	25.9	26.0	22.0	22.8							24.7
1986	13.64	7.86	21.50	24.6	24.5	20.7	21.5							23.2
1987	3.94	8.11	12.05	24.7	24.7	21.2	21.3							23.6
AVG	8.12	7.77	15.89	24.7	24.9	21.2	21.7							23.6
AF/A				2.06	2.07	1.76	1.81							1.97

BEAR RIVER SUBBASIN COKEVILE NOAA WEATHER STATION BORDER 03-07-1989
ET EQUATION: SCS BLANEY-CRIDDLE

	PRECIPITATION			SUBBBASIN CROPS										
WYR	OCT-APR	MAY-SEPT	ANN TOTL	ALF ALFA	OTHER HAY	PAS TURE	SPRNG WHEAT	WINTER WHEAT	SPRING BARLEY	SUGAR BEET	CORN	PEAC HES	OTHER	WGHTD TOTAL
				2. %	65. %	31. %	2. %	0. %	0. %	0. %	0. %	0. %	0. %	
	-----INCHES-------			----------SEASONAL CONSUMPTIVE USE, INCHES----------										
1976	8.61	6.05	14.66	23.9	24.1	20.8	20.7							23.0
1977	2.85	10.72	13.57	25.6	25.9	21.8	22.4							24.6
1978	11.69	7.15	18.84	23.2	23.5	20.0	20.4							22.3
1979	5.89	4.06	9.95	24.3	24.4	21.1	21.1							23.3
1980	10.69	7.76	18.45	24.0	24.2	20.8	21.0							23.1
1981	5.33	5.65	10.98	25.5	25.6	22.1	22.4							24.5
1982	11.60	9.73	21.33	24.1	24.0	20.7	21.4							22.9
1983	8.01	11.13	19.14	23.9	23.8	20.7	21.4							22.8
1984	10.15	9.47	19.62	23.7	23.8	20.3	21.1							22.6
1985	5.07	5.53	10.60	24.5	24.8	20.8	21.5							23.5
1986	13.64	7.86	21.50	26.0	25.7	21.7	22.6							24.4
1987	3.94	8.11	12.05	24.9	25.0	21.3	21.1							23.8
AVG	8.12	7.77	15.89	24.5	24.6	21.0	21.4							23.4
AF/A				2.04	2.05	1.75	1.78							1.95

Appendix E continued. Calculated seasonal consumptive use for subbasins of the Bear River Basin (water years 1976-1987) using various ET equations.

BEAR RIVER SUBBASIN COKEVILE NOAA WEATHER STATION BORDER 03-07-1989
ET EQUATION: SCS BLANEY-CRIDDLE CALIBRATED Kt

	PRECIPITATION			SUBBBASIN CROPS										
WYR	OCT-APR	MAY-SEPT	ANN TOTL	ALF ALFA 2. %	OTHER HAY 65. %	PASTURE 31. %	SPRNG WHEAT 2. %	WINTER WHEAT 0. %	SPRING BARLEY 0. %	SUGAR BEET 0. %	CORN 0. %	PEACHES 0. %	OTHER 0. %	WGHTD TOTAL
	-----INCHES-------			----------SEASONAL CONSUMPTIVE USE, INCHES----------										
1976	8.61	6.05	14.66	23.9	24.1	20.7	20.8							23.0
1977	2.85	10.72	13.57	25.1	25.3	21.3	22.0							24.0
1978	11.69	7.15	18.84	23.5	23.7	20.2	20.7							22.6
1979	5.89	4.06	9.95	24.2	24.3	20.9	21.1							23.2
1980	10.69	7.76	18.45	24.1	24.2	20.7	21.1							23.1
1981	5.33	5.65	10.98	25.0	25.1	21.6	22.0							23.9
1982	11.60	9.73	21.33	24.1	24.1	20.7	21.4							23.0
1983	8.01	11.13	19.14	24.0	24.0	20.7	21.3							22.9
1984	10.15	9.47	19.62	23.9	23.9	20.4	21.1							22.8
1985	5.07	5.53	10.60	24.4	24.6	20.7	21.4							23.3
1986	13.64	7.86	21.50	25.3	25.2	21.3	22.1							23.9
1987	3.94	8.11	12.05	24.6	24.6	21.0	21.1							23.4
AVG	8.12	7.77	15.89	24.3	24.4	20.8	21.4							23.3
AF/A				2.03	2.04	1.74	1.78							1.94

BEAR RIVER SUBBASIN COKEVILE NOAA WEATHER STATION BORDER 03-07-1989
ET EQUATION: FAO BLANEY-CRIDDLE

	PRECIPITATION			SUBBBASIN CROPS										
WYR	OCT-APR	MAY-SEPT	ANN TOTL	ALF ALFA 2. %	OTHER HAY 65. %	PASTURE 31. %	SPRNG WHEAT 2. %	WINTER WHEAT 0. %	SPRING BARLEY 0. %	SUGAR BEET 0. %	CORN 0. %	PEACHES 0. %	OTHER 0. %	WGHTD TOTAL
	-----INCHES-------			----------SEASONAL CONSUMPTIVE USE, INCHES----------										
1976	8.61	6.05	14.66	24.0	24.2	20.7	20.9							23.0
1977	2.85	10.72	13.57	25.0	25.3	21.3	21.9							24.0
1978	11.69	7.15	18.84	23.7	23.9	20.3	20.8							22.7
1979	5.89	4.06	9.95	24.3	24.4	21.0	21.2							23.3
1980	10.69	7.76	18.45	24.2	24.3	20.8	21.1							23.2
1981	5.33	5.65	10.98	25.0	25.1	21.6	22.0							24.0
1982	11.60	9.73	21.33	24.1	24.1	20.7	21.4							23.0
1983	8.01	11.13	19.14	24.0	24.0	20.7	21.3							22.9
1984	10.15	9.47	19.62	23.9	23.9	20.4	21.1							22.8
1985	5.07	5.53	10.60	24.4	24.6	20.8	21.4							23.3
1986	13.64	7.86	21.50	25.2	25.1	21.3	22.0							23.9
1987	3.94	8.11	12.05	24.7	24.7	21.1	21.2							23.5
AVG	8.12	7.77	15.89	24.4	24.5	20.9	21.4							23.3
AF/A				2.03	2.04	1.74	1.78							1.94

Appendix E continued. Calculated seasonal consumptive use for subbasins of the Bear River Basin (water years 1976-1987) using various ET equations.

BEAR RIVER SUBBASIN THOMASFK NOAA WEATHER STATION BORDER 03-07-1989
ET EQUATION: HARGREAVES

	PRECIPITATION			SUBBBASIN CROPS										
WYR	OCT-APR	MAY-SEPT	ANN TOTL	ALF ALFA 2. %	OTHER HAY 62. %	PAS TURE 35. %	SPRNG WHEAT 1. %	WINTER WHEAT 0. %	SPRING BARLEY 0. %	SUGAR BEET 0. %	CORN 0. %	PEAC HES 0. %	OTHER 0. %	WGHTD TOTAL
	-----INCHES-------			----------SEASONAL CONSUMPTIVE USE, INCHES----------										
1976	8.61	6.05	14.66	25.0	25.2	21.5	21.9							23.9
1977	2.85	10.72	13.57	25.5	25.8	21.7	22.3							24.4
1978	11.69	7.15	18.84	24.7	25.0	21.1	21.9							23.6
1979	5.89	4.06	9.95	26.0	26.3	22.5	22.7							24.9
1980	10.69	7.76	18.45	24.2	24.4	20.8	21.3							23.1
1981	5.33	5.65	10.98	25.2	25.4	21.8	22.4							24.1
1982	11.60	9.73	21.33	24.0	23.9	20.5	21.2							22.7
1983	8.01	11.13	19.14	23.1	23.2	19.9	20.5							22.0
1984	10.15	9.47	19.62	23.6	23.8	20.3	20.9							22.5
1985	5.07	5.53	10.60	25.9	26.0	22.0	22.8							24.5
1986	13.64	7.86	21.50	24.6	24.5	20.7	21.5							23.1
1987	3.94	8.11	12.05	24.7	24.7	21.2	21.3							23.5
AVG	8.12	7.77	15.89	24.7	24.9	21.2	21.7							23.5
AF/A				2.06	2.07	1.76	1.81							1.96

BEAR RIVER SUBBASIN THOMASFK NOAA WEATHER STATION BORDER 03-07-1989
ET EQUATION: SCS BLANEY-CRIDDLE

	PRECIPITATION			SUBBBASIN CROPS										
WYR	OCT-APR	MAY-SEPT	ANN TOTL	ALF ALFA 2. %	OTHER HAY 62. %	PAS TURE 35. %	SPRNG WHEAT 1. %	WINTER WHEAT 0. %	SPRING BARLEY 0. %	SUGAR BEET 0. %	CORN 0. %	PEAC HES 0. %	OTHER 0. %	WGHTD TOTAL
	-----INCHES-------			----------SEASONAL CONSUMPTIVE USE, INCHES----------										
1976	8.61	6.05	14.66	23.9	24.1	20.8	20.7							22.9
1977	2.85	10.72	13.57	25.6	25.9	21.8	22.4							24.4
1978	11.69	7.15	18.84	23.2	23.5	20.0	20.4							22.2
1979	5.89	4.06	9.95	24.3	24.4	21.1	21.1							23.2
1980	10.69	7.76	18.45	24.0	24.2	20.8	21.0							23.0
1981	5.33	5.65	10.98	25.5	25.6	22.1	22.4							24.4
1982	11.60	9.73	21.33	24.1	24.0	20.7	21.4							22.8
1983	8.01	11.13	19.14	23.9	23.8	20.7	21.4							22.7
1984	10.15	9.47	19.62	23.7	23.8	20.3	21.1							22.5
1985	5.07	5.53	10.60	24.5	24.8	20.8	21.5							23.4
1986	13.64	7.86	21.50	26.0	25.7	21.7	22.6							24.3
1987	3.94	8.11	12.05	24.9	25.0	21.3	21.1							23.6
AVG	8.12	7.77	15.89	24.5	24.6	21.0	21.4							23.3
AF/A				2.04	2.05	1.75	1.78							1.94

Appendix E continued. Calculated seasonal consumptive use for subbasins of the Bear River Basin (water years 1976-1987) using various ET equations.

BEAR RIVER SUBBASIN THOMASFK NOAA WEATHER STATION BORDER 03-07-1989
ET EQUATION: SCS BLANEY-CRIDDLE CALIBRATED Kt

	PRECIPITATION			SUBBBASIN CROPS										
WYR	OCT-APR	MAY-SEPT	ANN TOTL	ALF ALFA	OTHER HAY	PAS TURE	SPRNG WHEAT	WINTER WHEAT	SPRING BARLEY	SUGAR BEET	CORN	PEAC HES	OTHER	WGHTD TOTAL
				2. %	62. %	35. %	1. %	0. %	0. %	0. %	0. %	0. %	0. %	
	-----INCHES-------			----------SEASONAL CONSUMPTIVE USE, INCHES----------										
1976	8.61	6.05	14.66	23.9	24.1	20.7	20.8							22.9
1977	2.85	10.72	13.57	25.1	25.3	21.3	22.0							23.9
1978	11.69	7.15	18.84	23.5	23.7	20.2	20.7							22.4
1979	5.89	4.06	9.95	24.2	24.3	20.9	21.1							23.1
1980	10.69	7.76	18.45	24.1	24.2	20.7	21.1							23.0
1981	5.33	5.65	10.98	25.0	25.1	21.6	22.0							23.8
1982	11.60	9.73	21.33	24.1	24.1	20.7	21.4							22.9
1983	8.01	11.13	19.14	24.0	24.0	20.7	21.3							22.8
1984	10.15	9.47	19.62	23.9	23.9	20.4	21.1							22.7
1985	5.07	5.53	10.60	24.4	24.6	20.7	21.4							23.2
1986	13.64	7.86	21.50	25.3	25.2	21.3	22.1							23.8
1987	3.94	8.11	12.05	24.6	24.6	21.0	21.1							23.3
AVG	8.12	7.77	15.89	24.3	24.4	20.8	21.4							23.1
AF/A				2.03	2.04	1.74	1.78							1.93

BEAR RIVER SUBBASIN THOMASFK NOAA WEATHER STATION BORDER 03-07-1989
ET EQUATION: FAO BLANEY-CRIDDLE

	PRECIPITATION			SUBBBASIN CROPS										
WYR	OCT-APR	MAY-SEPT	ANN TOTL	ALF ALFA	OTHER HAY	PAS TURE	SPRNG WHEAT	WINTER WHEAT	SPRING BARLEY	SUGAR BEET	CORN	PEAC HES	OTHER	WGHTD TOTAL
				2. %	62. %	35. %	1. %	0. %	0. %	0. %	0. %	0. %	0. %	
	-----INCHES-------			----------SEASONAL CONSUMPTIVE USE, INCHES----------										
1976	8.61	6.05	14.66	24.0	24.2	20.7	20.9							22.9
1977	2.85	10.72	13.57	25.0	25.3	21.3	21.9							23.8
1978	11.69	7.15	18.84	23.7	23.9	20.3	20.8							22.6
1979	5.89	4.06	9.95	24.3	24.4	21.0	21.2							23.2
1980	10.69	7.76	18.45	24.2	24.3	20.8	21.1							23.0
1981	5.33	5.65	10.98	25.0	25.1	21.6	22.0							23.9
1982	11.60	9.73	21.33	24.1	24.1	20.7	21.4							22.9
1983	8.01	11.13	19.14	24.0	24.0	20.7	21.3							22.8
1984	10.15	9.47	19.62	23.9	23.9	20.4	21.1							22.6
1985	5.07	5.53	10.60	24.4	24.6	20.8	21.4							23.2
1986	13.64	7.86	21.50	25.2	25.1	21.3	22.0							23.7
1987	3.94	8.11	12.05	24.7	24.7	21.1	21.2							23.4
AVG	8.12	7.77	15.89	24.4	24.5	20.9	21.4							23.2
AF/A				2.03	2.04	1.74	1.78							1.93

Appendix E continued. Calculated seasonal consumptive use for subbasins of the Bear River Basin (water years 1976-1987) using various ET equations.

BEAR RIVER SUBBASIN BEARLAKE NOAA WEATHER STATION LIFTON 03-07-1989
ET EQUATION: HARGREAVES

	PRECIPITATION			SUBBBASIN CROPS										
WYR	OCT-APR	MAY-SEPT	ANN TOTL	ALF ALFA	OTHER HAY	PASTURE	SPRNG WHEAT	WINTER WHEAT	SPRING BARLEY	SUGAR BEET	CORN	PEACHES	OTHER	WGHTD TOTAL
				17. %	39. %	24. %	0. %	0. %	20. %	0. %	0. %	0. %	0. %	
	-----INCHES-------			----------SEASONAL CONSUMPTIVE USE, INCHES----------										
1976	7.56	5.16	12.72	23.3	24.3	20.0			20.1					22.3
1977	1.42	9.04	10.46	24.1	25.1	20.3			20.8					22.9
1978	8.55	4.49	13.04	23.3	24.3	19.8			20.3					22.3
1979	4.03	2.33	6.36	24.1	25.1	20.7			20.6					23.0
1980	8.58	7.82	16.40	21.9	22.9	18.8			19.0					21.0
1981	4.61	4.49	9.10	23.6	24.5	20.3			20.5					22.6
1982	10.42	11.10	21.52	22.1	22.7	18.7			19.0					20.9
1983	6.15	12.08	18.23	21.3	22.0	18.2			18.3					20.2
1984	4.89	7.32	12.21	21.7	22.5	18.5			18.7					20.6
1985	4.80	4.12	8.92	23.7	24.5	20.0			20.4					22.5
1986	11.04	4.16	15.20	22.8	23.4	19.2			19.6					21.5
1987	3.51	7.03	10.54	23.6	24.5	20.2			20.0					22.4
AVG	6.30	6.59	12.89	23.0	23.8	19.6			19.8					21.8
AF/A				1.91	1.99	1.63			1.65					1.82

BEAR RIVER SUBBASIN BEARLAKE NOAA WEATHER STATION LIFTON 03-07-1989
ET EQUATION: SCS BLANEY-CRIDDLE

	PRECIPITATION			SUBBBASIN CROPS										
WYR	OCT-APR	MAY-SEPT	ANN TOTL	ALF ALFA	OTHER HAY	PASTURE	SPRNG WHEAT	WINTER WHEAT	SPRING BARLEY	SUGAR BEET	CORN	PEACHES	OTHER	WGHTD TOTAL
				17. %	39. %	24. %	0. %	0. %	20. %	0. %	0. %	0. %	0. %	
	-----INCHES-------			----------SEASONAL CONSUMPTIVE USE, INCHES----------										
1976	7.56	5.16	12.72	21.9	22.9	18.9			18.8					21.0
1977	1.42	9.04	10.46	22.7	23.6	19.2			19.7					21.6
1978	8.55	4.49	13.04	21.1	22.0	18.0			18.4					20.2
1979	4.03	2.33	6.36	22.6	23.4	19.5			19.2					21.5
1980	8.58	7.82	16.40	21.7	22.7	18.7			18.8					20.8
1981	4.61	4.49	9.10	23.1	23.9	19.9			19.9					22.0
1982	10.42	11.10	21.52	22.2	22.8	19.0			19.3					21.1
1983	6.15	12.08	18.23	22.3	22.8	19.2			19.3					21.2
1984	4.89	7.32	12.21	22.1	22.8	18.9			19.2					21.0
1985	4.80	4.12	8.92	23.1	24.1	19.5			20.0					22.0
1986	11.04	4.16	15.20	23.3	23.9	19.4			20.0					21.9
1987	3.51	7.03	10.54	23.1	23.9	19.7			19.2					21.8
AVG	6.30	6.59	12.89	22.4	23.2	19.2			19.3					21.3
AF/A				1.87	1.94	1.60			1.61					1.78

Appendix E continued. Calculated seasonal consumptive use for subbasins of the Bear River Basin (water years 1976-1987) using various ET equations.

BEAR RIVER SUBBASIN BEARLAKE NOAA WEATHER STATION LIFTON 03-07-1989
ET EQUATION: SCS BLANEY-CRIDDLE CALIBRATED Kt

	PRECIPITATION			SUBBBASIN CROPS										
WYR	OCT-APR	MAY-SEPT	ANN TOTL	ALF ALFA	OTHER HAY	PAS TURE	SPRNG WHEAT	WINTER WHEAT	SPRING BARLEY	SUGAR BEET	CORN	PEAC HES	OTHER	WGHTD TOTAL
				17. %	39. %	24. %	0. %	0. %	20. %	0. %	0. %	0. %	0. %	
	-----INCHES-------			----------SEASONAL CONSUMPTIVE USE, INCHES----------										
1976	7.56	5.16	12.72	22.1	23.0	19.0			19.0					21.1
1977	1.42	9.04	10.46	22.6	23.5	19.2			19.6					21.5
1978	8.55	4.49	13.04	21.6	22.5	18.4			18.7					20.6
1979	4.03	2.33	6.36	22.5	23.4	19.4			19.3					21.4
1980	8.58	7.82	16.40	22.0	22.9	18.8			19.0					21.0
1981	4.61	4.49	9.10	22.9	23.7	19.7			19.7					21.8
1982	10.42	11.10	21.52	22.4	23.0	19.1			19.3					21.2
1983	6.15	12.08	18.23	22.4	23.0	19.2			19.3					21.3
1984	4.89	7.32	12.21	22.2	23.0	19.0			19.3					21.2
1985	4.80	4.12	8.92	22.9	23.9	19.4			19.8					21.8
1986	11.04	4.16	15.20	23.1	23.7	19.4			19.7					21.8
1987	3.51	7.03	10.54	22.8	23.6	19.4			19.2					21.6
AVG	6.30	6.59	12.89	22.5	23.3	19.2			19.3					21.4
AF/A				1.87	1.94	1.60			1.61					1.78

BEAR RIVER SUBBASIN BEARLAKE NOAA WEATHER STATION LIFTON 03-07-1989
ET EQUATION: FAO BLANEY-CRIDDLE

	PRECIPITATION			SUBBBASIN CROPS										
WYR	OCT-APR	MAY-SEPT	ANN TOTL	ALF ALFA	OTHER HAY	PAS TURE	SPRNG WHEAT	WINTER WHEAT	SPRING BARLEY	SUGAR BEET	CORN	PEAC HES	OTHER	WGHTD TOTAL
				17. %	39. %	24. %	0. %	0. %	20. %	0. %	0. %	0. %	0. %	
	-----INCHES-------			----------SEASONAL CONSUMPTIVE USE, INCHES----------										
1976	7.56	5.16	12.72	22.1	23.1	19.0			19.0					21.1
1977	1.42	9.04	10.46	22.6	23.5	19.2			19.6					21.5
1978	8.55	4.49	13.04	21.7	22.6	18.5			18.8					20.7
1979	4.03	2.33	6.36	22.6	23.4	19.4			19.3					21.5
1980	8.58	7.82	16.40	22.0	23.0	18.9			19.0					21.0
1981	4.61	4.49	9.10	22.9	23.7	19.7			19.7					21.8
1982	10.42	11.10	21.52	22.3	23.0	19.1			19.3					21.2
1983	6.15	12.08	18.23	22.4	23.0	19.2			19.3					21.3
1984	4.89	7.32	12.21	22.2	23.0	19.0			19.2					21.1
1985	4.80	4.12	8.92	22.8	23.8	19.3			19.7					21.7
1986	11.04	4.16	15.20	23.0	23.6	19.3			19.7					21.7
1987	3.51	7.03	10.54	22.9	23.7	19.5			19.2					21.7
AVG	6.30	6.59	12.89	22.5	23.3	19.2			19.3					21.4
AF/A				1.87	1.94	1.60			1.61					1.78

Appendix E continued. Calculated seasonal consumptive use for subbasins of the Bear River Basin (water years 1976-1987) using various ET equations.

BEAR RIVER SUBBASIN SODASPRG NOAA WEATHER STATION SODASPRG 03-07-1989
ET EQUATION: HARGREAVES

	PRECIPITATION			SUBBBASIN CROPS										
WYR	OCT-APR	MAY-SEPT	ANN TOTL	ALF ALFA	OTHER HAY	PAS TURE	SPRNG WHEAT	WINTER WHEAT	SPRING BARLEY	SUGAR BEET	CORN	PEAC HES	OTHER	WGHTD TOTAL
				17. %	39. %	24. %	7. %	6. %	7. %	0. %	0. %	0. %	0. %	
	-----INCHES-------			----------SEASONAL CONSUMPTIVE USE, INCHES----------										
1976	9.35	5.47	14.82	28.1	24.8	21.1	20.2	20.3	19.2					23.5
1977	5.80	9.89	15.69	27.4	24.8	20.9	20.3	20.1	19.2					23.3
1978	8.55	6.13	14.68	27.5	24.8	20.9	20.4	20.1	19.2					23.3
1979	7.99	6.90	14.89	29.1	25.8	21.8	21.1	20.9	19.9					24.4
1980	8.40	10.80	19.20	28.0	25.2	21.3	20.6	20.3	19.4					23.7
1981	8.25	6.61	14.86	29.9	26.6	22.6	21.8	21.4	20.4					25.1
1982	15.07	6.73	21.80	26.1	23.2	19.9	19.0	18.6	17.7					22.0
1983	5.73	10.99	16.72	26.3	23.5	19.9	19.3	18.9	18.1					22.2
1984	13.89	9.45	23.34	26.8	24.0	20.3	19.7	19.5	18.5					22.6
1985	7.26	8.77	16.03	28.9	26.2	22.1	21.6	21.6	20.4					24.7
1986	9.40	8.48	17.88	27.0	24.6	20.8	20.2	19.9	19.0					23.1
1987	3.98	9.13	13.11	29.0	25.5	21.9	20.6	20.7	19.6					24.2
AVG	8.64	8.28	16.92	27.9	24.9	21.1	20.4	20.2	19.2					23.5
AF/A				2.32	2.08	1.76	1.70	1.68	1.60					1.96

BEAR RIVER SUBBASIN SODASPRG NOAA WEATHER STATION SODASPRG 03-07-1989
ET EQUATION: SCS BLANEY-CRIDDLE

	PRECIPITATION			SUBBBASIN CROPS										
WYR	OCT-APR	MAY-SEPT	ANN TOTL	ALF ALFA	OTHER HAY	PAS TURE	SPRNG WHEAT	WINTER WHEAT	SPRING BARLEY	SUGAR BEET	CORN	PEAC HES	OTHER	WGHTD TOTAL
				17. %	39. %	24. %	7. %	6. %	7. %	0. %	0. %	0. %	0. %	
	-----INCHES-------			----------SEASONAL CONSUMPTIVE USE, INCHES----------										
1976	9.35	5.47	14.82	27.1	24.0	20.3	19.6	19.8	18.7					22.7
1977	5.80	9.89	15.69	27.3	24.9	20.9	20.5	20.1	19.3					23.3
1978	8.55	6.13	14.68	26.1	24.0	20.0	19.8	19.5	18.7					22.4
1979	7.99	6.90	14.89	28.8	26.0	21.7	21.4	21.0	20.1					24.4
1980	8.40	10.80	19.20	28.1	25.3	21.3	20.7	20.6	19.6					23.8
1981	8.25	6.61	14.86	30.5	27.5	23.2	22.6	22.1	21.2					25.9
1982	15.07	6.73	21.80	26.4	23.3	19.9	19.0	18.5	17.7					22.1
1983	5.73	10.99	16.72	28.2	24.7	21.3	20.1	19.3	18.5					23.4
1984	13.89	9.45	23.34	26.6	23.7	20.1	19.5	19.3	18.3					22.4
1985	7.26	8.77	16.03	28.0	25.8	21.6	21.3	21.7	20.4					24.2
1986	9.40	8.48	17.88	26.4	24.2	20.4	20.0	19.6	18.7					22.7
1987	3.98	9.13	13.11	28.5	25.3	21.7	20.5	21.0	19.7					24.0
AVG	8.64	8.28	16.92	27.7	24.9	21.0	20.4	20.2	19.2					23.4
AF/A				2.31	2.07	1.75	1.70	1.68	1.60					1.95

Appendix E continued. Calculated seasonal consumptive use for subbasins of the Bear River Basin (water years 1976-1987) using various ET equations.

BEAR RIVER SUBBASIN SODASPRG NOAA WEATHER STATION SODASPRG 03-07-1989
ET EQUATION: SCS BLANEY-CRIDDLE CALIBRATED Kt

	PRECIPITATION			SUBBBASIN CROPS										
WYR	OCT-APR	MAY-SEPT	ANN TOTL	ALF ALFA 17. %	OTHER HAY 39. %	PAS TURE 24. %	SPRNG WHEAT 7. %	WINTER WHEAT 6. %	SPRING BARLEY 7. %	SUGAR BEET 0. %	CORN 0. %	PEAC HES 0. %	OTHER 0. %	WGHTD TOTAL
	-----INCHES-------			----------SEASONAL CONSUMPTIVE USE, INCHES----------										
1976	9.35	5.47	14.82	26.9	24.0	20.3	19.6	19.7	18.6					22.6
1977	5.80	9.89	15.69	27.1	24.6	20.7	20.2	19.9	19.0					23.1
1978	8.55	6.13	14.68	26.4	24.0	20.1	19.8	19.5	18.7					22.5
1979	7.99	6.90	14.89	28.1	25.3	21.3	20.8	20.5	19.6					23.8
1980	8.40	10.80	19.20	27.6	24.9	20.9	20.4	20.2	19.3					23.4
1981	8.25	6.61	14.86	29.2	26.3	22.2	21.6	21.2	20.3					24.7
1982	15.07	6.73	21.80	26.6	23.6	20.1	19.3	18.9	18.1					22.3
1983	5.73	10.99	16.72	27.8	24.5	21.0	20.0	19.4	18.5					23.2
1984	13.89	9.45	23.34	26.7	23.9	20.2	19.6	19.4	18.4					22.5
1985	7.26	8.77	16.03	27.5	25.1	21.1	20.7	20.8	19.7					23.6
1986	9.40	8.48	17.88	26.6	24.2	20.4	19.9	19.6	18.7					22.7
1987	3.98	9.13	13.11	27.8	24.7	21.0	20.1	20.4	19.2					23.4
AVG	8.64	8.28	16.92	27.4	24.6	20.8	20.2	19.9	19.0					23.2
AF/A				2.28	2.05	1.73	1.68	1.66	1.58					1.93

BEAR RIVER SUBBASIN SODASPRG NOAA WEATHER STATION SODASPRG 03-07-1989
ET EQUATION: FAO BLANEY-CRIDDLE

	PRECIPITATION			SUBBBASIN CROPS										
WYR	OCT-APR	MAY-SEPT	ANN TOTL	ALF ALFA 17. %	OTHER HAY 39. %	PAS TURE 24. %	SPRNG WHEAT 7. %	WINTER WHEAT 6. %	SPRING BARLEY 7. %	SUGAR BEET 0. %	CORN 0. %	PEAC HES 0. %	OTHER 0. %	WGHTD TOTAL
	-----INCHES-------			----------SEASONAL CONSUMPTIVE USE, INCHES----------										
1976	9.35	5.47	14.82	27.0	24.0	20.3	19.6	19.7	18.6					22.7
1977	5.80	9.89	15.69	27.1	24.5	20.7	20.2	19.8	19.0					23.1
1978	8.55	6.13	14.68	26.4	24.0	20.2	19.8	19.5	18.7					22.6
1979	7.99	6.90	14.89	27.9	25.1	21.1	20.7	20.3	19.4					23.6
1980	8.40	10.80	19.20	27.6	24.8	20.9	20.3	20.1	19.2					23.4
1981	8.25	6.61	14.86	28.9	26.0	21.9	21.3	20.9	20.0					24.4
1982	15.07	6.73	21.80	26.7	23.7	20.1	19.4	19.0	18.1					22.4
1983	5.73	10.99	16.72	27.7	24.4	20.9	19.9	19.4	18.5					23.1
1984	13.89	9.45	23.34	26.7	23.9	20.2	19.6	19.4	18.4					22.5
1985	7.26	8.77	16.03	27.5	25.0	21.1	20.6	20.7	19.6					23.6
1986	9.40	8.48	17.88	26.6	24.2	20.4	19.9	19.6	18.7					22.7
1987	3.98	9.13	13.11	27.8	24.8	21.1	20.2	20.3	19.2					23.4
AVG	8.64	8.28	16.92	27.3	24.5	20.8	20.1	19.9	18.9					23.1
AF/A				2.28	2.04	1.73	1.68	1.66	1.58					1.93

Appendix E continued. Calculated seasonal consumptive use for subbasins of the Bear River Basin (water years 1976-1987) using various ET equations.

BEAR RIVER SUBBASIN ONEIDA NOAA WEATHER STATION GRACE 03-07-1989
ET EQUATION: HARGREAVES

	PRECIPITATION			SUBBBASIN CROPS										
WYR	OCT-APR	MAY-SEPT	ANN TOTL	ALF ALFA 37. %	OTHER HAY 12. %	PAS TURE 19. %	SPRNG WHEAT 8. %	WINTER WHEAT 8. %	SPRING BARLEY 8. %	SUGAR BEET 4. %	CORN 0. %	PEAC HES 0. %	OTHER 4. %	WGHTD TOTAL
	-----INCHES-------			----------SEASONAL CONSUMPTIVE USE, INCHES----------										
1976	8.53	5.58	14.11	28.4	25.3	21.4	20.7	20.6	19.6	22.9			14.2	23.9
1977	2.04	8.95	10.99	27.3	24.9	20.9	20.5	20.2	19.4	22.4			14.2	23.3
1978	10.76	3.60	14.36	27.4	24.8	20.9	20.5	20.2	19.3	22.6			14.2	23.3
1979	6.97	2.75	9.72	29.1	25.8	21.9	21.0	21.0	19.9	23.5			14.5	24.5
1980	9.33	10.49	19.82	26.7	23.9	20.2	19.6	19.2	18.4	22.1			13.6	22.6
1981	7.93	5.64	13.57	28.3	25.0	21.3	20.4	19.8	19.0	23.6			14.1	23.7
1982	16.56	8.75	25.31	26.6	23.8	20.3	19.5	19.2	18.3	21.9			13.3	22.5
1983	10.37	11.60	21.97	26.4	23.4	19.9	19.1	18.8	18.0	21.7			13.2	22.2
1984	14.23	10.52	24.75	26.7	23.9	20.2	19.6	19.4	18.5	21.8			13.4	22.6
1985	7.00	8.12	15.12	28.3	25.7	21.7	21.1	21.0	19.9	22.9			14.3	24.1
1986	14.92	9.88	24.80	27.7	25.3	21.3	20.9	20.6	19.6	22.7			14.2	23.7
1987	4.81	9.69	14.50	29.4	26.0	22.2	21.1	21.1	20.0	23.5			14.6	24.7
AVG	9.45	7.96	17.42	27.7	24.8	21.0	20.3	20.1	19.2	22.6			14.0	23.5
AF/A				2.31	2.07	1.75	1.70	1.67	1.60	1.89			1.17	1.95

BEAR RIVER SUBBASIN ONEIDA NOAA WEATHER STATION GRACE 03-07-1989
ET EQUATION: SCS BLANEY-CRIDDLE

	PRECIPITATION			SUBBBASIN CROPS										
WYR	OCT-APR	MAY-SEPT	ANN TOTL	ALF ALFA 37. %	OTHER HAY 12. %	PAS TURE 19. %	SPRNG WHEAT 8. %	WINTER WHEAT 8. %	SPRING BARLEY 8. %	SUGAR BEET 4. %	CORN 0. %	PEAC HES 0. %	OTHER 4. %	WGHTD TOTAL
	-----INCHES-------			----------SEASONAL CONSUMPTIVE USE, INCHES----------										
1976	8.53	5.58	14.11	27.6	24.6	20.8	20.0	20.3	19.1	21.8			13.7	23.3
1977	2.04	8.95	10.99	28.5	26.2	21.9	21.6	21.4	20.5	23.3			14.9	24.5
1978	10.76	3.60	14.36	25.7	23.3	19.6	19.1	18.9	18.1	21.0			13.2	21.9
1979	6.97	2.75	9.72	28.8	25.4	21.7	20.6	20.7	19.6	22.9			14.2	24.2
1980	9.33	10.49	19.82	25.9	23.2	19.6	18.9	18.8	17.9	21.0			13.1	21.9
1981	7.93	5.64	13.57	28.5	25.2	21.6	20.5	20.1	19.2	23.5			14.1	24.0
1982	16.56	8.75	25.31	27.0	24.0	20.4	19.6	19.1	18.3	22.3			13.4	22.7
1983	10.37	11.60	21.97	27.0	23.7	20.4	19.2	18.7	17.9	22.3			13.3	22.6
1984	14.23	10.52	24.75	26.7	23.9	20.2	19.6	19.4	18.4	21.8			13.3	22.6
1985	7.00	8.12	15.12	28.0	25.8	21.5	21.3	21.5	20.3	22.4			14.5	24.0
1986	14.92	9.88	24.80	27.6	25.4	21.4	20.9	20.7	19.7	22.5			14.1	23.7
1987	4.81	9.69	14.50	29.1	25.9	22.1	20.9	21.4	20.1	22.5			14.3	24.5
AVG	9.45	7.96	17.42	27.5	24.7	20.9	20.2	20.1	19.1	22.3			13.9	23.3
AF/A				2.29	2.06	1.74	1.68	1.67	1.59	1.86			1.15	1.94

Appendix E continued. Calculated seasonal consumptive use for subbasins of the Bear River Basin (water years 1976-1987) using various ET equations.

BEAR RIVER SUBBASIN ONEIDA NOAA WEATHER STATION GRACE 03-07-1989
ET EQUATION: SCS BLANEY-CRIDDLE CALIBRATED Kt

	PRECIPITATION			SUBBBASIN CROPS										
WYR	OCT-APR	MAY-SEPT	ANN TOTL	ALF ALFA	OTHER HAY	PAS TURE	SPRNG WHEAT	WINTER WHEAT	SPRING BARLEY	SUGAR BEET	CORN	PEAC HES	OTHER	WGHTD TOTAL
				37. %	12. %	19. %	8. %	8. %	8. %	4. %	0. %	0. %	4. %	
	-----INCHES-------			----------SEASONAL CONSUMPTIVE USE, INCHES----------										
1976	8.53	5.58	14.11	27.3	24.4	20.6	19.9	20.0	18.9	21.8			13.6	23.1
1977	2.04	8.95	10.99	27.9	25.4	21.3	21.0	20.7	19.8	22.8			14.4	23.8
1978	10.76	3.60	14.36	26.1	23.5	19.9	19.3	19.1	18.2	21.3			13.3	22.2
1979	6.97	2.75	9.72	28.1	24.9	21.2	20.3	20.2	19.2	22.5			13.9	23.6
1980	9.33	10.49	19.82	26.2	23.4	19.8	19.2	19.0	18.1	21.3			13.2	22.2
1981	7.93	5.64	13.57	27.9	24.8	21.2	20.3	19.9	19.0	23.0			13.9	23.5
1982	16.56	8.75	25.31	27.0	24.0	20.4	19.7	19.3	18.4	22.2			13.5	22.8
1983	10.37	11.60	21.97	26.9	23.8	20.4	19.4	19.0	18.1	22.2			13.4	22.6
1984	14.23	10.52	24.75	26.8	24.0	20.3	19.6	19.4	18.4	21.9			13.4	22.7
1985	7.00	8.12	15.12	27.5	25.1	21.1	20.7	20.8	19.7	22.3			14.1	23.6
1986	14.92	9.88	24.80	27.3	24.9	21.0	20.5	20.2	19.3	22.3			13.9	23.3
1987	4.81	9.69	14.50	28.2	25.1	21.4	20.4	20.6	19.5	22.3			14.0	23.8
AVG	9.45	7.96	17.42	27.3	24.5	20.7	20.0	19.9	18.9	22.2			13.7	23.1
AF/A				2.27	2.04	1.73	1.67	1.65	1.57	1.85			1.14	1.92

BEAR RIVER SUBBASIN ONEIDA NOAA WEATHER STATION GRACE 03-07-1989
ET EQUATION: FAO BLANEY-CRIDDLE

	PRECIPITATION			SUBBBASIN CROPS										
WYR	OCT-APR	MAY-SEPT	ANN TOTL	ALF ALFA	OTHER HAY	PAS TURE	SPRNG WHEAT	WINTER WHEAT	SPRING BARLEY	SUGAR BEET	CORN	PEAC HES	OTHER	WGHTD TOTAL
				37. %	12. %	19. %	8. %	8. %	8. %	4. %	0. %	0. %	4. %	
	-----INCHES-------			----------SEASONAL CONSUMPTIVE USE, INCHES----------										
1976	8.53	5.58	14.11	27.3	24.4	20.6	19.9	20.0	18.9	21.9			13.6	23.1
1977	2.04	8.95	10.99	27.8	25.2	21.2	20.8	20.5	19.6	22.7			14.3	23.7
1978	10.76	3.60	14.36	26.3	23.7	20.0	19.4	19.2	18.3	21.4			13.4	22.3
1979	6.97	2.75	9.72	28.0	24.9	21.1	20.3	20.2	19.2	22.5			13.9	23.6
1980	9.33	10.49	19.82	26.4	23.6	20.0	19.3	19.1	18.2	21.5			13.3	22.3
1981	7.93	5.64	13.57	27.8	24.8	21.1	20.2	19.9	18.9	22.9			13.9	23.5
1982	16.56	8.75	25.31	27.0	24.1	20.5	19.7	19.3	18.4	22.2			13.5	22.8
1983	10.37	11.60	21.97	27.0	23.9	20.4	19.5	19.1	18.2	22.2			13.4	22.7
1984	14.23	10.52	24.75	26.8	24.0	20.3	19.7	19.4	18.5	21.9			13.4	22.7
1985	7.00	8.12	15.12	27.5	25.0	21.0	20.6	20.6	19.5	22.2			14.0	23.5
1986	14.92	9.88	24.80	27.2	24.8	20.9	20.4	20.1	19.2	22.2			13.8	23.2
1987	4.81	9.69	14.50	28.1	25.1	21.3	20.4	20.5	19.4	22.3			14.0	23.7
AVG	9.45	7.96	17.42	27.3	24.4	20.7	20.0	19.8	18.9	22.2			13.7	23.1
AF/A				2.27	2.04	1.73	1.67	1.65	1.57	1.85			1.14	1.92

Appendix E continued. Calculated seasonal consumptive use for subbasins of the Bear River Basin (water years 1976-1987) using various ET equations.

BEAR RIVER SUBBASIN CACHEVAL NOAA WEATHER STATION LOGAN5 03-07-1989
ET EQUATION: HARGREAVES

	PRECIPITATION			SUBBBASIN CROPS										
WYR	OCT-APR	MAY-SEPT	ANN TOTL	ALF ALFA 35. %	OTHER HAY 4. %	PAS TURE 18. %	SPRNG WHEAT 6. %	WINTER WHEAT 15. %	SPRING BARLEY 12. %	SUGAR BEET 3. %	CORN 6. %	PEAC HES 0. %	OTHER 1. %	WGHTD TOTAL
	-----INCHES-------			----------SEASONAL CONSUMPTIVE USE, INCHES----------										
1976	14.41	4.09	18.50	30.4	30.2	24.0	21.0	22.4	21.7	25.4	23.0		16.2	25.7
1977	2.93	10.13	13.06	30.7	30.5	24.2	21.4	22.5	21.8	25.8	23.3		16.7	25.9
1978	13.28	5.47	18.75	29.8	29.7	23.6	20.9	21.9	21.0	25.4	23.1		16.3	25.3
1979	7.71	3.96	11.67	31.3	30.7	24.6	21.1	22.5	21.7	26.3	23.9		16.6	26.3
1980	15.00	9.26	24.26	29.5	29.2	23.3	20.2	21.3	20.6	25.1	22.7		15.9	24.9
1981	7.62	6.09	13.71	30.8	30.2	24.3	20.8	21.8	21.0	26.7	24.3		16.4	25.8
1982	17.89	10.36	28.25	28.8	28.6	22.8	19.7	20.9	20.2	24.5	22.2		15.3	24.3
1983	12.71	13.62	26.33	28.1	27.7	22.2	19.2	20.0	19.2	24.4	22.2		15.1	23.6
1984	16.19	11.12	27.31	29.2	28.9	23.1	20.0	21.1	20.4	25.0	22.6		15.6	24.6
1985	11.23	7.03	18.26	31.4	31.5	24.9	22.0	23.4	22.7	26.3	23.8		16.9	26.7
1986	24.80	8.91	33.71	29.5	29.5	23.4	20.5	21.7	21.1	25.0	22.6		15.8	25.0
1987	6.37	8.46	14.83	31.3	30.6	24.5	20.8	22.5	22.1	25.6	23.3		16.3	26.2
AVG	12.51	8.21	20.72	30.1	29.8	23.7	20.6	21.8	21.1	25.5	23.1		16.1	25.4
AF/A				2.51	2.48	1.98	1.72	1.82	1.76	2.12	1.92		1.34	2.11

BEAR RIVER SUBBASIN CACHEVAL NOAA WEATHER STATION LOGAN5 03-07-1989
ET EQUATION: SCS BLANEY-CRIDDLE

	PRECIPITATION			SUBBBASIN CROPS										
WYR	OCT-APR	MAY-SEPT	ANN TOTL	ALF ALFA 35. %	OTHER HAY 4. %	PAS TURE 18. %	SPRNG WHEAT 6. %	WINTER WHEAT 15. %	SPRING BARLEY 12. %	SUGAR BEET 3. %	CORN 6. %	PEAC HES 0. %	OTHER 1. %	WGHTD TOTAL
	-----INCHES-------			----------SEASONAL CONSUMPTIVE USE, INCHES----------										
1976	14.41	4.09	18.50	29.5	29.4	23.3	20.6	21.9	21.1	24.9	22.5		15.9	25.0
1977	2.93	10.13	13.06	30.8	30.7	24.4	21.6	22.6	21.8	26.3	23.7		16.8	26.1
1978	13.28	5.47	18.75	28.5	28.4	22.6	19.9	20.7	19.9	24.6	22.3		15.7	24.1
1979	7.71	3.96	11.67	30.5	29.8	24.0	20.5	21.7	20.9	26.0	23.7		16.1	25.5
1980	15.00	9.26	24.26	29.4	29.0	23.2	20.1	21.2	20.5	25.1	22.7		15.8	24.7
1981	7.62	6.09	13.71	31.0	30.4	24.5	20.7	21.9	21.1	26.8	24.3		16.4	26.0
1982	17.89	10.36	28.25	28.1	27.6	22.2	19.1	20.0	19.1	24.6	22.3		15.0	23.6
1983	12.71	13.62	26.33	29.5	28.8	23.4	19.7	20.6	19.8	25.7	23.5		15.6	24.7
1984	16.19	11.12	27.31	29.0	28.8	23.0	20.0	21.0	20.2	25.1	22.7		15.5	24.5
1985	11.23	7.03	18.26	30.9	31.3	24.5	22.2	23.6	22.8	25.6	23.1		16.9	26.4
1986	24.80	8.91	33.71	30.5	30.5	24.2	21.3	22.6	21.9	25.8	23.3		16.4	25.9
1987	6.37	8.46	14.83	30.8	30.2	24.1	20.7	22.6	22.2	24.7	22.4		15.9	25.9
AVG	12.51	8.21	20.72	29.9	29.6	23.6	20.5	21.7	20.9	25.4	23.0		16.0	25.2
AF/A				2.49	2.46	1.97	1.71	1.81	1.75	2.12	1.92		1.33	2.10

Appendix E continued. Calculated seasonal consumptive use for subbasins of the Bear River Basin (water years 1976-1987) using various ET equations.

BEAR RIVER SUBBASIN CACHEVAL NOAA WEATHER STATION LOGAN5 03-07-1989
ET EQUATION: SCS BLANEY-CRIDDLE CALIBRATED Kt

	PRECIPITATION			SUBBBASIN CROPS										
WYR	OCT-APR	MAY-SEPT	ANN TOTL	ALF ALFA 35. %	OTHER HAY 4. %	PASTURE 18. %	SPRNG WHEAT 6. %	WINTER WHEAT 15. %	SPRING BARLEY 12. %	SUGAR BEET 3. %	CORN 6. %	PEACHES 0. %	OTHER 1. %	WGHTD TOTAL
	-----INCHES-------			----------SEASONAL CONSUMPTIVE USE, INCHES----------										
1976	14.41	4.09	18.50	29.6	29.4	23.3	20.5	21.8	21.1	24.9	22.5		15.8	25.0
1977	2.93	10.13	13.06	30.5	30.4	24.1	21.2	22.3	21.6	25.9	23.3		16.5	25.8
1978	13.28	5.47	18.75	29.0	28.8	22.9	20.1	21.1	20.3	24.7	22.4		15.7	24.5
1979	7.71	3.96	11.67	30.3	29.7	23.9	20.4	21.7	21.0	25.6	23.3		16.0	25.4
1980	15.00	9.26	24.26	29.5	29.2	23.3	20.2	21.4	20.7	25.0	22.7		15.8	24.9
1981	7.62	6.09	13.71	30.7	30.1	24.2	20.6	21.8	21.1	26.2	23.8		16.2	25.7
1982	17.89	10.36	28.25	28.8	28.3	22.7	19.5	20.6	19.8	24.7	22.4		15.3	24.2
1983	12.71	13.62	26.33	29.7	29.1	23.5	19.9	21.0	20.3	25.5	23.2		15.7	24.9
1984	16.19	11.12	27.31	29.3	29.1	23.2	20.1	21.2	20.5	25.1	22.7		15.6	24.7
1985	11.23	7.03	18.26	30.5	30.7	24.1	21.5	22.9	22.2	25.4	22.9		16.5	26.0
1986	24.80	8.91	33.71	30.4	30.3	24.1	21.0	22.3	21.7	25.6	23.1		16.2	25.7
1987	6.37	8.46	14.83	30.4	29.9	23.9	20.5	22.2	21.8	24.7	22.4		15.8	25.5
AVG	12.51	8.21	20.72	29.9	29.6	23.6	20.5	21.7	21.0	25.3	22.9		15.9	25.2
AF/A				2.49	2.46	1.97	1.70	1.81	1.75	2.11	1.91		1.33	2.10

BEAR RIVER SUBBASIN CACHEVAL NOAA WEATHER STATION LOGAN5 03-07-1989
ET EQUATION: FAO BLANEY-CRIDDLE

	PRECIPITATION			SUBBBASIN CROPS										
WYR	OCT-APR	MAY-SEPT	ANN TOTL	ALF ALFA 35. %	OTHER HAY 4. %	PASTURE 18. %	SPRNG WHEAT 6. %	WINTER WHEAT 15. %	SPRING BARLEY 12. %	SUGAR BEET 3. %	CORN 6. %	PEACHES 0. %	OTHER 1. %	WGHTD TOTAL
	-----INCHES-------			----------SEASONAL CONSUMPTIVE USE, INCHES----------										
1976	14.41	4.09	18.50	29.6	29.4	23.3	20.4	21.8	21.0	24.9	22.5		15.8	25.0
1977	2.93	10.13	13.06	30.4	30.2	24.0	21.0	22.2	21.5	25.7	23.2		16.4	25.7
1978	13.28	5.47	18.75	29.1	28.9	23.0	20.1	21.1	20.4	24.7	22.4		15.7	24.6
1979	7.71	3.96	11.67	30.3	29.7	23.8	20.4	21.7	21.0	25.5	23.2		16.0	25.4
1980	15.00	9.26	24.26	29.6	29.3	23.4	20.2	21.4	20.8	25.0	22.7		15.8	24.9
1981	7.62	6.09	13.71	30.5	30.0	24.1	20.5	21.8	21.1	26.0	23.6		16.1	25.6
1982	17.89	10.36	28.25	28.8	28.4	22.8	19.6	20.7	20.0	24.7	22.4		15.3	24.2
1983	12.71	13.62	26.33	29.6	29.1	23.4	20.0	21.1	20.3	25.4	23.1		15.7	24.9
1984	16.19	11.12	27.31	29.3	29.1	23.2	20.1	21.3	20.5	25.0	22.6		15.6	24.7
1985	11.23	7.03	18.26	30.4	30.5	24.0	21.3	22.7	22.1	25.3	22.8		16.4	25.8
1986	24.80	8.91	33.71	30.2	30.1	23.9	20.8	22.2	21.5	25.4	23.0		16.1	25.5
1987	6.37	8.46	14.83	30.4	30.0	23.9	20.5	22.2	21.7	24.8	22.6		15.9	25.6
AVG	12.51	8.21	20.72	29.9	29.5	23.6	20.4	21.7	21.0	25.2	22.8		15.9	25.2
AF/A				2.49	2.46	1.96	1.70	1.81	1.75	2.10	1.90		1.32	2.10

Appendix E continued. Calculated seasonal consumptive use for subbasins of the Bear River Basin (water years 1976-1987) using various ET equations.

BEAR RIVER SUBBASIN MALAD NOAA WEATHER STATION MALADCTY 03-07-1989
ET EQUATION: HARGREAVES

	PRECIPITATION			SUBBBASIN CROPS										
WYR	OCT-APR	MAY-SEPT	ANN TOTL	ALF ALFA 29. %	OTHER HAY 3. %	PAS TURE 48. %	SPRNG WHEAT 5. %	WINTER WHEAT 9. %	SPRING BARLEY 5. %	SUGAR BEET 0. %	CORN 1. %	PEAC HES 0. %	OTHER 1. %	WGHTD TOTAL
	-----INCHES-------			----------SEASONAL CONSUMPTIVE USE, INCHES----------										
1976	9.26	6.43	15.69	29.0	30.4	25.3	26.0	22.9	22.3		24.1		20.9	26.4
1977	2.21	9.06	11.27	29.7	31.2	25.7	26.6	23.4	22.7		24.5		21.5	26.9
1978	13.36	3.04	16.40	29.5	30.9	25.5	26.7	23.0	22.5		24.6		21.5	26.7
1979	7.03	6.65	13.68	30.3	31.8	26.4	26.9	23.9	23.2		25.2		21.8	27.6
1980	10.13	8.38	18.51	28.8	30.3	25.1	26.2	22.3	21.8		24.5		21.2	26.2
1981	5.44	4.20	9.64	30.4	31.8	26.6	27.7	23.3	22.7		26.1		22.4	27.6
1982	14.44	12.32	26.76	27.7	28.7	24.0	25.0	21.3	20.6		23.1		20.1	25.0
1983	11.32	10.64	21.96	27.1	28.3	23.6	24.4	21.1	20.5		22.8		19.7	24.6
1984	12.86	10.37	23.23	27.4	28.6	23.8	24.8	21.4	20.8		22.9		19.8	24.9
1985	7.28	5.34	12.62	30.3	31.6	26.1	27.3	23.9	23.1		24.8		21.8	27.4
1986	11.13	5.92	17.05	29.8	30.9	25.4	26.7	23.4	22.5		24.0		21.3	26.8
1987	2.99	8.53	11.52	30.3	31.5	26.3	26.5	23.7	22.7		24.8		21.5	27.4
AVG	8.95	7.57	16.53	29.2	30.5	25.3	26.2	22.8	22.1		24.3		21.1	26.5
AF/A				2.43	2.54	2.11	2.19	1.90	1.84		2.02		1.76	2.20

BEAR RIVER SUBBASIN MALAD NOAA WEATHER STATION MALADCTY 03-07-1989
ET EQUATION: SCS BLANEY-CRIDDLE

	PRECIPITATION			SUBBBASIN CROPS										
WYR	OCT-APR	MAY-SEPT	ANN TOTL	ALF ALFA 29. %	OTHER HAY 3. %	PAS TURE 48. %	SPRNG WHEAT 5. %	WINTER WHEAT 9. %	SPRING BARLEY 5. %	SUGAR BEET 0. %	CORN 1. %	PEAC HES 0. %	OTHER 1. %	WGHTD TOTAL
	-----INCHES-------			----------SEASONAL CONSUMPTIVE USE, INCHES----------										
1976	9.26	6.43	15.69	27.9	29.2	24.4	25.0	21.8	21.1		23.5		20.1	25.4
1977	2.21	9.06	11.27	30.1	31.4	25.9	27.0	23.5	22.9		24.8		21.8	27.2
1978	13.36	3.04	16.40	27.7	29.1	24.2	25.0	21.5	20.9		23.4		20.2	25.2
1979	7.03	6.65	13.68	29.5	30.6	25.8	26.2	22.7	22.0		24.8		21.2	26.7
1980	10.13	8.38	18.51	27.8	29.1	24.4	25.1	21.5	20.9		23.7		20.3	25.3
1981	5.44	4.20	9.64	30.0	31.3	26.4	27.2	22.8	22.1		25.8		22.0	27.3
1982	14.44	12.32	26.76	27.8	28.7	24.3	25.5	20.9	20.3		24.0		20.4	25.2
1983	11.32	10.64	21.96	27.8	28.6	24.4	25.2	20.6	20.1		24.2		20.4	25.2
1984	12.86	10.37	23.23	27.6	28.5	24.0	25.2	21.0	20.3		23.6		20.1	25.0
1985	7.28	5.34	12.62	30.1	31.6	25.8	27.1	24.0	23.2		24.6		21.7	27.2
1986	11.13	5.92	17.05	30.2	31.1	25.7	27.1	23.4	22.5		24.5		21.7	27.1
1987	2.99	8.53	11.52	30.3	31.5	26.3	26.4	23.8	22.7		24.5		21.4	27.4
AVG	8.95	7.57	16.53	28.9	30.1	25.1	26.0	22.3	21.6		24.3		20.9	26.2
AF/A				2.41	2.50	2.09	2.17	1.86	1.80		2.02		1.75	2.18

Appendix E continued. Calculated seasonal consumptive use for subbasins of the Bear River Basin (water years 1976-1987) using various ET equations.

BEAR RIVER SUBBASIN MALAD NOAA WEATHER STATION MALADCTY 03-07-1989
ET EQUATION: SCS BLANEY-CRIDDLE CALIBRATED Kt

	PRECIPITATION			SUBBBASIN CROPS										
WYR	OCT-APR	MAY-SEPT	ANN TOTL	ALF ALFA 29. %	OTHER HAY 3. %	PAS TURE 48. %	SPRNG WHEAT 5. %	WINTER WHEAT 9. %	SPRING BARLEY 5. %	SUGAR BEET 0. %	CORN 1. %	PEAC HES 0. %	OTHER 1. %	WGHTD TOTAL
	-----INCHES-------			----------SEASONAL CONSUMPTIVE USE, INCHES----------										
1976	9.26	6.43	15.69	28.5	29.7	24.8	25.5	22.3	21.6		23.7		20.5	25.9
1977	2.21	9.06	11.27	30.1	31.4	25.9	27.0	23.6	22.9		24.7		21.7	27.2
1978	13.36	3.04	16.40	28.4	29.8	24.7	25.5	22.2	21.5		23.7		20.6	25.8
1979	7.03	6.65	13.68	29.7	30.8	25.8	26.4	23.0	22.3		24.7		21.3	26.9
1980	10.13	8.38	18.51	28.6	29.9	24.9	25.7	22.2	21.5		24.0		20.7	26.0
1981	5.44	4.20	9.64	30.1	31.3	26.2	27.1	23.1	22.3		25.4		21.9	27.3
1982	14.44	12.32	26.76	28.6	29.6	24.9	25.9	21.8	21.1		24.2		20.8	25.9
1983	11.32	10.64	21.96	28.6	29.5	24.9	25.7	21.6	21.0		24.3		20.8	25.9
1984	12.86	10.37	23.23	28.4	29.4	24.6	25.7	21.8	21.1		23.9		20.6	25.7
1985	7.28	5.34	12.62	30.0	31.4	25.8	27.0	23.8	23.0		24.5		21.6	27.1
1986	11.13	5.92	17.05	30.2	31.2	25.8	27.0	23.5	22.6		24.5		21.7	27.1
1987	2.99	8.53	11.52	30.2	31.4	26.1	26.5	23.7	22.7		24.5		21.4	27.3
AVG	8.95	7.57	16.53	29.3	30.5	25.4	26.3	22.7	22.0		24.3		21.1	26.5
AF/A				2.44	2.54	2.11	2.19	1.89	1.83		2.03		1.76	2.21

BEAR RIVER SUBBASIN MALAD NOAA WEATHER STATION MALADCTY 03-07-1989
ET EQUATION: FAO BLANEY-CRIDDLE

	PRECIPITATION			SUBBBASIN CROPS										
WYR	OCT-APR	MAY-SEPT	ANN TOTL	ALF ALFA 29. %	OTHER HAY 3. %	PAS TURE 48. %	SPRNG WHEAT 5. %	WINTER WHEAT 9. %	SPRING BARLEY 5. %	SUGAR BEET 0. %	CORN 1. %	PEAC HES 0. %	OTHER 1. %	WGHTD TOTAL
	-----INCHES-------			----------SEASONAL CONSUMPTIVE USE, INCHES----------										
1976	9.26	6.43	15.69	28.3	29.4	24.5	25.4	22.1	21.4		23.5		20.3	25.6
1977	2.21	9.06	11.27	29.5	30.6	25.4	26.6	23.0	22.5		24.3		21.3	26.6
1978	13.36	3.04	16.40	27.9	28.9	24.1	25.2	21.6	21.1		23.3		20.3	25.2
1979	7.03	6.65	13.68	29.2	30.2	25.3	26.1	22.6	22.0		24.3		21.0	26.4
1980	10.13	8.38	18.51	28.2	29.3	24.4	25.4	21.8	21.3		23.6		20.4	25.5
1981	5.44	4.20	9.64	29.4	30.4	25.5	26.6	22.5	21.9		24.8		21.3	26.6
1982	14.44	12.32	26.76	28.1	28.9	24.3	25.6	21.3	20.9		23.7		20.4	25.3
1983	11.32	10.64	21.96	28.0	28.7	24.3	25.4	21.1	20.7		23.8		20.4	25.3
1984	12.86	10.37	23.23	28.0	28.9	24.2	25.4	21.5	20.9		23.5		20.3	25.3
1985	7.28	5.34	12.62	29.6	30.8	25.3	26.6	23.3	22.7		24.1		21.2	26.7
1986	11.13	5.92	17.05	29.3	30.1	25.0	26.4	22.7	22.1		23.9		21.1	26.3
1987	2.99	8.53	11.52	29.6	30.6	25.6	26.2	23.1	22.3		24.1		21.0	26.7
AVG	8.95	7.57	16.53	28.7	29.7	24.8	25.9	22.2	21.6		23.9		20.8	26.0
AF/A				2.40	2.48	2.07	2.16	1.85	1.80		1.99		1.73	2.16

Appendix E continued. Calculated seasonal consumptive use for subbasins of the Bear River Basin (water years 1976-1987) using various ET equations.

BEAR RIVER SUBBASIN TREMONTN NOAA WEATHER STATION TREMONTN 03-07-1989
ET EQUATION: HARGREAVES

	PRECIPITATION			SUBBBASIN CROPS									
WYR	OCT-APR	MAY-SEPT	ANN TOTL	ALF ALFA 28. %	OTHER HAY 0. %	PAS TURE 20. %	SPRNG WHEAT 6. %	WINTER WHEAT 14. %	SPRING BARLEY 7. %	SUGAR BEET 13. %	CORN 10. %	PEAC HES 0. %	OTHER 2. %	WGHTD TOTAL
	-----INCHES-------			----------SEASONAL CONSUMPTIVE USE, INCHES----------									
1976	13.44	3.79	17.23	33.5		26.3	22.8	22.8	23.8	27.6	24.7		22.2	27.4
1977	2.82	12.27	15.09	33.1		26.0	22.5	22.6	23.5	27.4	24.5		22.2	27.1
1978	13.58	4.80	18.38	33.4		26.4	23.1	22.5	23.5	28.1	25.1		22.7	27.4
1979	10.61	5.04	15.65	34.2		26.7	23.1	23.1	24.1	28.1	25.2		22.6	27.9
1980	11.82	10.62	22.44	32.8		25.8	22.3	22.0	22.9	27.5	24.7		22.2	26.9
1981	7.93	4.52	12.45	34.1		26.8	22.7	22.3	23.3	28.9	26.0		23.1	27.9
1982	16.48	9.20	25.68	31.7		25.0	21.2	21.4	22.2	26.5	23.7		21.3	25.9
1983	14.51	12.92	27.43	30.6		24.0	20.6	20.0	21.0	25.8	23.2		20.7	25.0
1984	15.58	11.15	26.73	31.2		24.5	21.2	21.1	22.0	26.0	23.3		20.9	25.5
1985	9.02	8.29	17.31	33.6		26.5	23.0	23.3	24.2	27.7	24.7		22.4	27.6
1986	16.52	8.90	25.42	32.8		25.9	22.5	22.8	23.6	27.3	24.1		22.1	27.0
1987	4.40	8.85	13.25	34.0		26.6	22.4	23.4	24.0	27.4	24.7		22.2	27.6
AVG	11.39	8.36	19.75	32.9		25.9	22.3	22.3	23.2	27.3	24.5		22.1	26.9
AF/A				2.74		2.16	1.86	1.86	1.93	2.28	2.04		1.84	2.24

BEAR RIVER SUBBASIN TREMONTN NOAA WEATHER STATION TREMONTN 03-07-1989
ET EQUATION: SCS BLANEY-CRIDDLE

	PRECIPITATION			SUBBBASIN CROPS									
WYR	OCT-APR	MAY-SEPT	ANN TOTL	ALF ALFA 28. %	OTHER HAY 0. %	PAS TURE 20. %	SPRNG WHEAT 6. %	WINTER WHEAT 14. %	SPRING BARLEY 7. %	SUGAR BEET 13. %	CORN 10. %	PEAC HES 0. %	OTHER 2. %	WGHTD TOTAL
	-----INCHES-------			----------SEASONAL CONSUMPTIVE USE, INCHES----------									
1976	13.44	3.79	17.23	32.6		25.4	21.7	21.6	22.6	26.8	24.2		21.5	26.5
1977	2.82	12.27	15.09	34.4		27.0	23.8	23.4	24.5	28.8	25.6		23.3	28.2
1978	13.58	4.80	18.38	31.7		25.0	21.4	20.9	21.8	26.6	24.1		21.5	25.9
1979	10.61	5.04	15.65	33.5		26.2	22.1	22.0	22.9	27.7	25.1		22.3	27.2
1980	11.82	10.62	22.44	31.7		24.9	21.3	20.9	21.9	26.5	23.9		21.3	25.9
1981	7.93	4.52	12.45	34.4		27.0	22.6	22.1	23.1	29.2	26.4		23.4	28.0
1982	16.48	9.20	25.68	31.3		24.6	20.6	20.2	21.2	26.7	24.0		21.3	25.5
1983	14.51	12.92	27.43	30.6		24.0	19.9	19.3	20.2	26.1	23.8		20.9	24.9
1984	15.58	11.15	26.73	30.8		24.2	20.4	20.1	21.1	26.0	23.5		20.8	25.1
1985	9.02	8.29	17.31	33.3		26.3	23.1	23.4	24.3	27.4	24.3		22.2	27.4
1986	16.52	8.90	25.42	33.1		26.2	22.6	22.7	23.5	27.9	24.7		22.5	27.2
1987	4.40	8.85	13.25	34.1		26.6	22.3	23.6	24.1	27.2	24.5		22.1	27.6
AVG	11.39	8.36	19.75	32.6		25.6	21.8	21.7	22.6	27.3	24.5		21.9	26.6
AF/A				2.72		2.14	1.82	1.81	1.88	2.27	2.04		1.83	2.22

Appendix E continued. Calculated seasonal consumptive use for subbasins of the Bear River Basin (water years 1976-1987) using various ET equations.

BEAR RIVER SUBBASIN TREMONTN NOAA WEATHER STATION TREMONTN 03-07-1989
ET EQUATION: SCS BLANEY-CRIDDLE CALIBRATED Kt

	PRECIPITATION			SUBBBASIN CROPS									
WYR	OCT-APR	MAY-SEPT	ANN TOTL	ALF ALFA 28. %	OTHER HAY 0. %	PAS TURE 20. %	SPRNG WHEAT 6. %	WINTER WHEAT 14. %	SPRING BARLEY 7. %	SUGAR BEET 13. %	CORN 10. %	PEAC HES 0. %	OTHER 2. %	WGHTD TOTAL
	-----INCHES-------			----------SEASONAL CONSUMPTIVE USE, INCHES----------									
1976	13.44	3.79	17.23	32.8		25.7	22.0	22.1	23.0	27.0	24.3		21.7	26.7
1977	2.82	12.27	15.09	34.1		26.8	23.4	23.4	24.3	28.4	25.2		23.0	28.0
1978	13.58	4.80	18.38	32.2		25.4	21.8	21.6	22.5	26.8	24.2		21.7	26.3
1979	10.61	5.04	15.65	33.4		26.2	22.2	22.4	23.2	27.6	24.9		22.2	27.2
1980	11.82	10.62	22.44	32.2		25.3	21.7	21.6	22.5	26.8	24.1		21.6	26.3
1981	7.93	4.52	12.45	34.1		26.8	22.6	22.5	23.4	28.7	25.8		23.0	27.8
1982	16.48	9.20	25.68	32.0		25.2	21.3	21.2	22.1	26.9	24.2		21.6	26.1
1983	14.51	12.92	27.43	31.5		24.8	20.7	20.5	21.4	26.5	24.0		21.3	25.6
1984	15.58	11.15	26.73	31.6		24.9	21.1	21.1	22.0	26.4	23.8		21.2	25.8
1985	9.02	8.29	17.31	33.3		26.3	23.0	23.3	24.2	27.4	24.4		22.2	27.4
1986	16.52	8.90	25.42	33.2		26.2	22.6	22.9	23.6	27.8	24.7		22.4	27.3
1987	4.40	8.85	13.25	33.8		26.5	22.4	23.4	24.0	27.2	24.4		22.1	27.5
AVG	11.39	8.36	19.75	32.9		25.8	22.1	22.2	23.0	27.3	24.5		22.0	26.8
AF/A				2.74		2.15	1.84	1.85	1.92	2.27	2.04		1.83	2.24

BEAR RIVER SUBBASIN TREMONTN NOAA WEATHER STATION TREMONTN 03-07-1989
ET EQUATION: FAO BLANEY-CRIDDLE

	PRECIPITATION			SUBBBASIN CROPS									
WYR	OCT-APR	MAY-SEPT	ANN TOTL	ALF ALFA 28. %	OTHER HAY 0. %	PAS TURE 20. %	SPRNG WHEAT 6. %	WINTER WHEAT 14. %	SPRING BARLEY 7. %	SUGAR BEET 13. %	CORN 10. %	PEAC HES 0. %	OTHER 2. %	WGHTD TOTAL
	-----INCHES-------			----------SEASONAL CONSUMPTIVE USE, INCHES----------									
1976	13.44	3.79	17.23	32.4		25.2	21.7	21.7	22.8	26.7	24.0		21.4	26.3
1977	2.82	12.27	15.09	33.4		26.2	22.9	22.7	23.8	27.8	24.7		22.4	27.3
1978	13.58	4.80	18.38	31.6		24.8	21.4	21.1	22.2	26.5	23.8		21.3	25.9
1979	10.61	5.04	15.65	32.9		25.7	21.9	21.9	22.9	27.2	24.4		21.9	26.7
1980	11.82	10.62	22.44	31.8		24.9	21.4	21.2	22.3	26.5	23.7		21.3	25.9
1981	7.93	4.52	12.45	33.2		26.0	22.1	21.9	23.0	27.9	25.1		22.4	27.1
1982	16.48	9.20	25.68	31.5		24.6	21.0	20.8	21.8	26.5	23.7		21.2	25.7
1983	14.51	12.92	27.43	31.0		24.2	20.6	20.1	21.2	26.2	23.6		21.0	25.2
1984	15.58	11.15	26.73	31.2		24.4	20.9	20.8	21.8	26.2	23.5		20.9	25.5
1985	9.02	8.29	17.31	32.8		25.7	22.5	22.8	23.8	27.1	24.0		21.8	26.9
1986	16.52	8.90	25.42	32.3		25.4	22.0	22.0	23.0	27.1	24.0		21.8	26.5
1987	4.40	8.85	13.25	33.2		25.9	22.1	22.8	23.6	26.9	24.1		21.7	27.0
AVG	11.39	8.36	19.75	32.3		25.2	21.7	21.6	22.7	26.9	24.1		21.6	26.3
AF/A				2.69		2.10	1.81	1.80	1.89	2.24	2.00		1.80	2.20

Appendix E continued. Calculated seasonal consumptive use for subbasins of the Bear River Basin (water years 1976-1987) using various ET equations.

BEAR RIVER SUBBASIN BRIGHAM NOAA WEATHER STATION BRIGHAM 03-07-1989
ET EQUATION: HARGREAVES

	PRECIPITATION			SUBBBASIN CROPS										
WYR	OCT-APR	MAY-SEPT	ANN TOTL	ALF ALFA 25. %	OTHER HAY 0. %	PASTURE 21. %	SPRNG WHEAT 5. %	WINTER WHEAT 5. %	SPRING BARLEY 6. %	SUGAR BEET 15. %	CORN 12. %	PEACHES 9. %	OTHER 2. %	WGHTD TOTAL
	-----INCHES-------			----------SEASONAL CONSUMPTIVE USE, INCHES----------										
1976	15.40	5.69	21.09	32.7		25.6	22.4	22.5	23.5	26.8	23.9	37.0	21.6	27.9
1977	5.10	12.23	17.33	32.6		25.7	22.5	22.4	23.3	27.1	24.1	37.2	21.9	27.9
1978	14.37	6.60	20.97	32.4		25.6	22.7	22.2	23.2	27.2	24.2	37.3	22.0	27.9
1979	10.58	4.37	14.95	33.9		26.5	23.2	23.3	24.2	27.8	24.8	38.4	22.4	28.9
1980	15.05	10.58	25.63	33.0		26.0	22.5	22.1	23.1	27.8	24.9	37.9	22.4	28.4
1981	9.44	5.93	15.37	33.5		26.4	22.7	22.5	23.4	28.2	25.2	38.2	22.7	28.7
1982	16.88	13.81	30.69	31.2		24.5	21.0	21.1	21.9	26.0	23.3	35.4	20.9	26.7
1983	17.16	12.97	30.13	30.1		23.7	20.3	19.9	20.8	25.3	22.7	34.7	20.4	25.8
1984	18.53	8.97	27.50	30.9		24.2	20.8	20.6	21.6	25.8	23.2	35.1	20.7	26.4
1985	9.03	7.81	16.84	33.4		26.3	22.8	23.3	24.1	27.4	24.4	37.7	22.2	28.5
1986	19.39	6.64	26.03	32.7		25.8	22.4	22.6	23.4	27.3	24.2	37.2	22.0	28.0
1987	6.64	8.72	15.36	34.3		26.9	22.7	23.7	24.3	27.7	24.9	38.8	22.4	29.1
AVG	13.13	8.69	21.82	32.5		25.6	22.2	22.2	23.1	27.0	24.2	37.1	21.8	27.8
AF/A				2.71		2.13	1.85	1.85	1.92	2.25	2.01	3.09	1.82	2.32

BEAR RIVER SUBBASIN BRIGHAM NOAA WEATHER STATION BRIGHAM 03-07-1989
ET EQUATION: SCS BLANEY-CRIDDLE

	PRECIPITATION			SUBBBASIN CROPS										
WYR	OCT-APR	MAY-SEPT	ANN TOTL	ALF ALFA 25. %	OTHER HAY 0. %	PASTURE 21. %	SPRNG WHEAT 5. %	WINTER WHEAT 5. %	SPRING BARLEY 6. %	SUGAR BEET 15. %	CORN 12. %	PEACHES 9. %	OTHER 2. %	WGHTD TOTAL
	-----INCHES-------			----------SEASONAL CONSUMPTIVE USE, INCHES----------										
1976	15.40	5.69	21.09	33.8		26.4	22.7	22.7	23.8	27.8	25.0	38.2	22.3	28.7
1977	5.10	12.23	17.33	35.0		27.5	24.1	23.6	24.7	29.5	26.2	40.1	23.8	30.0
1978	14.37	6.60	20.97	32.8		26.0	22.2	21.4	22.5	27.9	25.2	38.1	22.5	28.3
1979	10.58	4.37	14.95	34.2		26.6	22.7	22.7	23.6	28.2	25.4	39.1	22.7	29.1
1980	15.05	10.58	25.63	30.7		24.1	20.5	20.2	21.1	25.7	23.2	35.1	20.7	26.2
1981	9.44	5.93	15.37	34.8		27.3	22.8	22.9	23.8	29.2	26.3	39.6	23.4	29.7
1982	16.88	13.81	30.69	31.7		24.9	21.0	20.6	21.6	27.1	24.3	36.4	21.6	27.2
1983	17.16	12.97	30.13	32.0		25.2	21.1	20.3	21.3	27.3	24.8	37.2	21.9	27.5
1984	18.53	8.97	27.50	31.8		24.9	21.1	20.7	21.7	26.9	24.3	36.3	21.5	27.2
1985	9.03	7.81	16.84	33.5		26.4	23.3	23.4	24.4	27.7	24.6	37.8	22.4	28.7
1986	19.39	6.64	26.03	32.8		26.0	22.1	22.4	23.1	27.5	24.5	37.5	22.2	28.1
1987	6.64	8.72	15.36	34.0		26.6	22.6	23.8	24.4	27.2	24.4	38.3	22.1	28.8
AVG	13.13	8.69	21.82	33.1		26.0	22.2	22.1	23.0	27.7	24.8	37.8	22.2	28.3
AF/A				2.76		2.17	1.85	1.84	1.92	2.31	2.07	3.15	1.85	2.36

Appendix E continued. Calculated seasonal consumptive use for subbasins of the Bear River Basin (water years 1976-1987) using various ET equations.

BEAR RIVER SUBBASIN BRIGHAM NOAA WEATHER STATION BRIGHAM 03-07-1989
ET EQUATION: SCS BLANEY-CRIDDLE CALIBRATED Kt

	PRECIPITATION			SUBBBASIN CROPS										
WYR	OCT-APR	MAY-SEPT	ANN TOTL	ALF ALFA 25. %	OTHER HAY 0. %	PAS TURE 21. %	SPRNG WHEAT 5. %	WINTER WHEAT 5. %	SPRING BARLEY 6. %	SUGAR BEET 15. %	CORN 12. %	PEAC HES 9. %	OTHER 2. %	WGHTD TOTAL
	-----INCHES-------			----------SEASONAL CONSUMPTIVE USE, INCHES----------										
1976	15.40	5.69	21.09	33.6		26.3	22.7	22.8	23.8	27.6	24.8	38.1	22.2	28.6
1977	5.10	12.23	17.33	34.5		27.1	23.7	23.5	24.5	28.8	25.7	39.4	23.3	29.6
1978	14.37	6.60	20.97	33.0		26.1	22.3	22.0	22.9	27.7	24.9	38.0	22.4	28.3
1979	10.58	4.37	14.95	33.9		26.5	22.7	22.9	23.7	27.9	25.1	38.7	22.5	28.9
1980	15.05	10.58	25.63	31.5		24.8	21.2	21.1	22.0	26.2	23.6	36.0	21.1	26.9
1981	9.44	5.93	15.37	34.4		27.0	22.8	23.0	23.8	28.6	25.7	39.1	23.0	29.3
1982	16.88	13.81	30.69	32.3		25.4	21.5	21.4	22.3	27.2	24.4	36.9	21.8	27.7
1983	17.16	12.97	30.13	32.4		25.5	21.6	21.2	22.2	27.3	24.7	37.4	22.0	27.8
1984	18.53	8.97	27.50	32.3		25.4	21.6	21.5	22.4	27.1	24.4	36.8	21.7	27.7
1985	9.03	7.81	16.84	33.5		26.4	23.1	23.3	24.2	27.6	24.6	37.8	22.3	28.6
1986	19.39	6.64	26.03	33.0		26.1	22.2	22.7	23.4	27.4	24.5	37.6	22.2	28.3
1987	6.64	8.72	15.36	33.8		26.5	22.6	23.6	24.2	27.2	24.4	38.1	22.1	28.6
AVG	13.13	8.69	21.82	33.2		26.1	22.3	22.4	23.3	27.6	24.7	37.8	22.2	28.4
AF/A				2.77		2.17	1.86	1.87	1.94	2.30	2.06	3.15	1.85	2.36

BEAR RIVER SUBBASIN BRIGHAM NOAA WEATHER STATION BRIGHAM 03-07-1989
ET EQUATION: FAO BLANEY-CRIDDLE

	PRECIPITATION			SUBBBASIN CROPS										
WYR	OCT-APR	MAY-SEPT	ANN TOTL	ALF ALFA 25. %	OTHER HAY 0. %	PAS TURE 21. %	SPRNG WHEAT 5. %	WINTER WHEAT 5. %	SPRING BARLEY 6. %	SUGAR BEET 15. %	CORN 12. %	PEAC HES 9. %	OTHER 2. %	WGHTD TOTAL
	-----INCHES-------			----------SEASONAL CONSUMPTIVE USE, INCHES----------										
1976	15.40	5.69	21.09	33.1		25.8	22.3	22.4	23.5	27.3	24.4	37.5	21.9	28.2
1977	5.10	12.23	17.33	33.8		26.4	23.0	22.9	24.0	28.2	25.1	38.6	22.7	28.9
1978	14.37	6.60	20.97	32.3		25.4	21.8	21.4	22.6	27.1	24.4	37.3	21.8	27.7
1979	10.58	4.37	14.95	33.3		25.9	22.3	22.3	23.3	27.4	24.6	38.0	22.1	28.3
1980	15.05	10.58	25.63	31.2		24.4	21.0	20.8	21.9	26.0	23.3	35.6	20.9	26.7
1981	9.44	5.93	15.37	33.5		26.2	22.3	22.3	23.4	27.9	25.0	38.1	22.4	28.6
1982	16.88	13.81	30.69	31.7		24.8	21.2	21.0	22.0	26.7	23.9	36.2	21.4	27.1
1983	17.16	12.97	30.13	31.8		24.9	21.2	20.7	21.9	26.9	24.1	36.7	21.5	27.2
1984	18.53	8.97	27.50	31.8		24.9	21.3	21.1	22.2	26.7	23.9	36.3	21.4	27.2
1985	9.03	7.81	16.84	33.0		25.8	22.6	22.8	23.8	27.2	24.2	37.2	21.9	28.1
1986	19.39	6.64	26.03	32.2		25.3	21.8	21.9	22.9	26.9	23.9	36.8	21.6	27.6
1987	6.64	8.72	15.36	33.2		25.9	22.2	22.9	23.8	26.9	24.0	37.6	21.7	28.1
AVG	13.13	8.69	21.82	32.6		25.5	21.9	21.9	22.9	27.1	24.2	37.2	21.8	27.8
AF/A				2.71		2.12	1.83	1.82	1.91	2.26	2.02	3.10	1.82	2.32