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Title: Crop Evapotranspiration of Winter Wheat under Deficit Irrigation

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A field experiment involving deficit irrigation was designed, installed and operated during the 1981 irrigation season. The experiment investigated the effects of high and low frequency deficit irrigation on yields and consumptive use of water by winter wheat. This thesis deals with that portion of the experiment concerned with consumptive use of water.

Deficit irrigation is the practice of deliberately under-irrigating a crop. The effects of low soil moisture on crop evapotranspiration (ET) become significant under deficit irrigation. Reliable estimates of crop ET are needed to adequately design irrigation systems. Obtaining these estimates when soil moisture levels are low is the central issue in this thesis.

Three models were analyzed for their ability to predict ET response to low soil moisture. These were the logarithmic, combination, and power models. Daily ET was measured in the treatment plots using a neutron probe and a daily water balance calculation. These data were compared to predicted model estimates of ET through the use of cumulative double mass curve analysis.

The power model was shown to consistently under-predict crop ET in this experiment. Both the logarithmic and combination models were shown to satisfactorily predict crop ET. Under conditions of relatively high soil moisture these models did not significantly improve upon the ET estimate obtained using a Penman equation without correction for soil moisture conditions.

Considerable data variability was observed for daily measured ET. This was attributed to a lag time in the redistribution of applied water throughout the soil profile. The instrumentation and methodology did not allow exact quantification of daily ET.

The results show that considerable uncertainty exists in determining the crop water requirement for deficit irrigation. The irrigation engineer should exercise caution and fully appreciate the implications of the uncertainty when designing for deficit irrigation.

Crop Evapotranspiration of Winter Wheat under Deficit Irrigation

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INTRODUCTION

Agriculture in the western United States is faced with a water problem of increasing magnitude. Water use and development are becoming limited, due to availability and quality of supplies. Increased demands by industrial, municipal and recreational users have added additional constraints. The promised development of synthetic fuel production in the west will require enormous quantities of water (Stansbury and Patten, 1981). Ground water reservoirs are being depleted at alarming rates in some areas and the effects of over exploitation are felt in others. Irrigated agriculture is being scrutinized by the public with regard to its water management performance. Many farmers are faced with uncertain supply and increased costs of water.

The applicability of deficit irrigation is currently being investigated within this western water scenario. Deficit irrigation is the practice of deliberately under-irrigating a crop. This method of irrigation would be employed to maximize the net economic return from irrigation water use and/or conserve limited supplies of energy and capital.

Deficit irrigation implies that some degree of crop stress will be incurred and evapotranspiration (ET) will be reduced. Quantitative knowledge of the reduction in ET will be required to adequately design systems for deficit irrigation. Pipeline and pump capacities, irrigation intervals, and capital costs are all specified to a degree by the estimated ET. Much of the research on estimation of ET has been under fully irrigated conditions. Under such conditions, ET is not limited by soil moisture. The practice of deficit irrigation significantly digresses from this assumption.

The effect of low soil moisture on evapotranspiration is investigated here. Three models of this effect were analyzed. These were the logarithmic (Jensen et al., 1971), combination (Slabbers, 1980) and power models (Boonyatharokul and Walker, 1979). Irrigation intervals and depths were varied to impose low, moderate, and severe levels of moisture stress on the crop. Daily ET was measured using a water balance calculation with neutron probe data. Predicted values of ET were compared to measured data using cumulative double mass curve analysis.

This experiment dealt with a specific crop (winter wheat) in a specific location (the Butter Creek area near Hermiston, Oregon). The objective of this research was to evaluate methods for predicting crop ET under deficit irrigation.

LITERATURE REVIEW

The phenomenon of evapotranspiration has been studied for over 200 years (Jensen, 1973). Early studies were primarily concerned with determination of seasonal crop use of water. The phrase "consumptive use" probably emerged during this early research. The term evapotranspiration (commonly referred to simply as ET) was used to signify the combined water loss from a soil surface (evaporation) and a plant surface (transpiration). Evapotranspiration is defined today as "the combined processes by which water is transferred from the earth surface to the atmosphere; evaporation of liquid or solid water plus transpiration from plants" (Jensen, 1973).

The study of evapotranspiration has many applications, most notable being the estimation of crop water requirements for irrigation system design. Various computational techniques are now available to the irrigation engineer to aid in determination of crop water requirements (Doorenbos and Pruitt, 1977; Jensen, 1973). Other applications of ET research can be found in the areas of crop production functions (Feddes et al., 1978), modelling of mass transport through the soil matrix (Bressler, 1973), and hydrologic analysis using a water budget approach (Viessman et al., 1977).

Of particular importance to this thesis is research into the decline of evapotranspiration with limiting soil moisture. "Limiting soil moisture" refers to conditions when the amount of water available to the crop is low enough to adversely affect the crop. This research is particularly important to deficit irrigation. To specify the water requirements, and subsequently to design an irrigation system for deficit irrigation, the process of ET under low soil moisture conditions must be understood.

Potential Evapotranspiration

The term "potential evapotranspiration" appears frequently in the literature. However, this term is ambiguous. As defined by Penman (1956), potential evapotranspiration is "the amount of water transpired in unit time by a short green crop, completely shading the ground, of uniform height and never short of water." Alfalfa has been cited as a practical reference crop that satisfies the definition of a short green crop (Jensen and Haise, 1963). For this purpose, alfalfa is usually specified to be well watered and clipped to a height of 30 to 50 cm of top growth (Jensen, 1973). Penman (1948) used a clipped grass crop to define potential ET. As pointed out by Jensen (1973), the height of the grass has been historically uncertain. Doorenbos and Pruitt (1977) developed their ET relations with a reference crop of "actively growing grass completely shading the ground and not short of water."

Crop ET is related to the "potential" evapotranspiration rate of the reference crop through the use of a crop coefficient. However, Cuenca and Nicholson (1981) note that "since many crops can have coefficients greater than one, ..., the term 'potential' is of questionable meaning and significance." Because of this ambiguity, the term "reference crop evapotranspiration" (ETr) is gaining increased acceptance (Cuenca and Nicholson, 1981).

Evapotranspiration Decline

Extensive research has been done on the effect of soil moisture on crop evapotranspiration. As pointed out by Chang:

> When soil moisture is plentiful, the evapotranspiration rate is maintained at the potential rate, determined largely by the prevailing weather conditions. As the soil dries out, the actual evapotranspiration will, at some stage, fall below the potential rate. Considerable controversy exists as to the effect of the soil moisture tension on the depletion rate. (Chang, 1974)

As a case in point, Ritchie (1973) reported results of an investigation into ET from corn grown under declining soil moisture conditions in a large weighing lysimeter.

He pointed out that "recent studies of evaporation using weighing lysimeters have shown for cotton, grain sorghum, and alfalfa that about 80 percent of the extractable water from a deep field soil profile can be used before stomatal regulation of evaporation begins" (Ritchie, 1973). His results with corn tend to correspond to this 80 percent value. Ritchie then goes on to compare his research to the widely referenced work of Denmead and Shaw (1962). Denmead and Shaw also investigated the ET from a corn crop; however, their work was done in 75.7 ℓ (20 gal.) containers. Their results show that approximately 20 percent of the extractable soil water can be effectively used before ET decline occurs, and that "... this decline will be evident at higher and higher soil moisture contents as the potential transpiration rate increases" (Denmead and Shaw, 1962). In comparing the results of the two previously mentioned studies, Ritchie states:

> ... the most probable reason for the difference between the results of these two tests on corn was the root system differences. Because of the limited rooting volume in the study of Denmead and Shaw, the root density was likely to be greater than would be expected for field plant-root systems. Another important reason for discrepancies between studies in containers and in field conditions is the possibility of upward water movement into the root zone from soil that is not or only slightly permeated with roots. (Ritchie, 1973)

An entirely different response of crop ET to soil moisture decline was presented by Chang (1974) in his review of work by Viehmeyer, Pruitt, and McMillan (1960). For perennial ryegrass at Davis, California, it was shown that ET did not decline until the soil moisture tension neared the permanent wilting point (13-15 bars). Chang (1974) also points out that this result was reached separately by two other investigators using similar crops.

A study by Thornthwaite and Mather (1955) presents still another response of ET to soil moisture decline. They noted that when one-half of the soil water is gone, the rate of ET falls to one-half of its potential rate. These researchers also make a brief reference to the effects of soil differences on evapotranspiration rates (Thornthwaite and Mather, 1955).

Finally, in research conducted over the years at the Snake River Conservation Research Center at Kimberely, Idaho, another view of ET response to soil moisture has emerged. This response can be termed logarithmic in nature (Boonyatharokul and Walker, 1979). A semi-empirical equation developed for estimating soil moisture depletion with the Penman equation uses a logarithmic coefficient to describe the ET decline with declining soil moisture (Jensen et al., 1971; Wright and Jensen, 1977). This particular method of determining the ET decline will be presented in more detail later in this thesis.

As illustrated by the above mentioned investigations, several empirical relationships have been developed with regard to the expected ET decline due to soil moisture stress. Many other such studies exist (van Bavel, 1967; Boonyatharokul and Walker, 1979; Ritchie et al., 1972b; Meyer and Green, 1979; Nimah and Hanks, 1973; Musick et al., 1976; and Noreno et al., 1972), but these have been omitted here in the interest of brevity. However, it is clear that extensive research has led to conflicting results in this area.

What is evident is that an extremely complex physiological response is governing the relationship between evapotranspiration and soil moisture. Chang (1974) notes that "evapotranspiration rate and the soil moisture tension depends upon a number of factors, such as soil texture, moisture tension characteristics, hydraulic conductivity of the soil, rooting depth, crop density, and atmospheric conditions." Other researchers have also made reference to the integrated effect of soil, plant, and atmosphere on evapotranspiration (Ritchie et al., 1972; Jensen et al., 1971; and Noreno et al., 1972).

The generalized effects of rooting density on crop ET can be shown in Figure 1 (Chang, 1974). This figure represents some of the expected changes in ET response to declining soil moisture as the rooting depth increases.

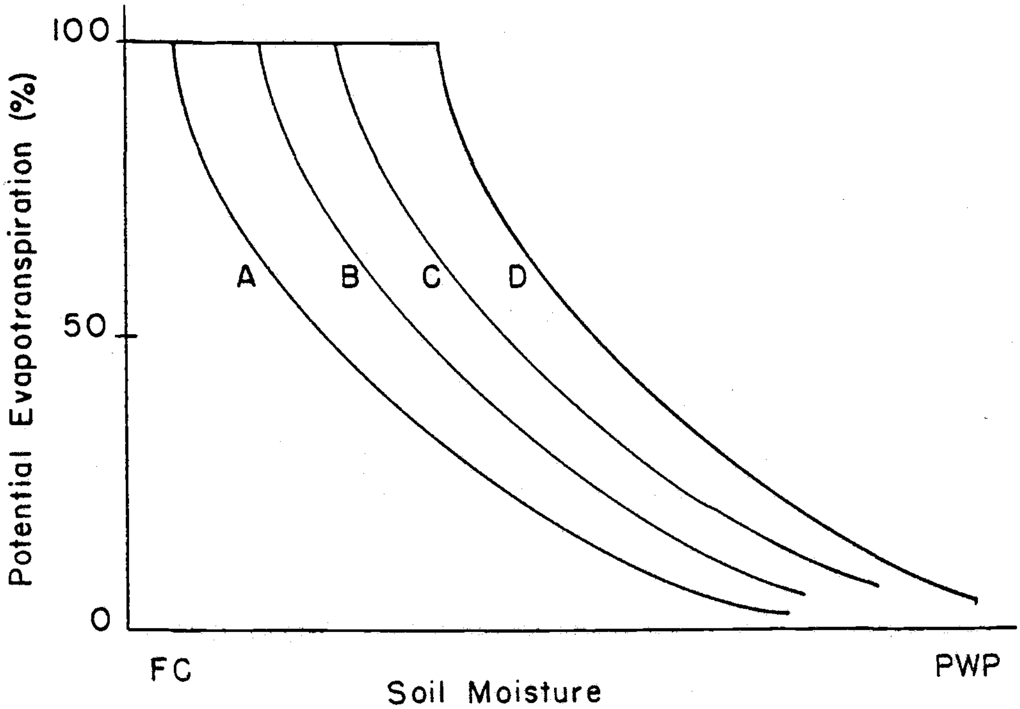

Figure 1: Adjustment of potential evapotranspiration for soil dryness and rooting depth of crops. Curves A to D correspond to increases in rooting depth of crop (from Chang, 1974).

It is also evident in Figure 1 that the ET decline occurs sooner with a less developed rooting system. This illustrates the transient nature of the ET response (due to root zone development throughout the season), which complicates any study into this response.

Atmospheric effects on crop evapotranspiration are illustrated in Figure 2. Denmead and Shaw (1962) pointed out that the decline in ET due to soil moisture effects will occur sooner under conditions of high evaporative demand.

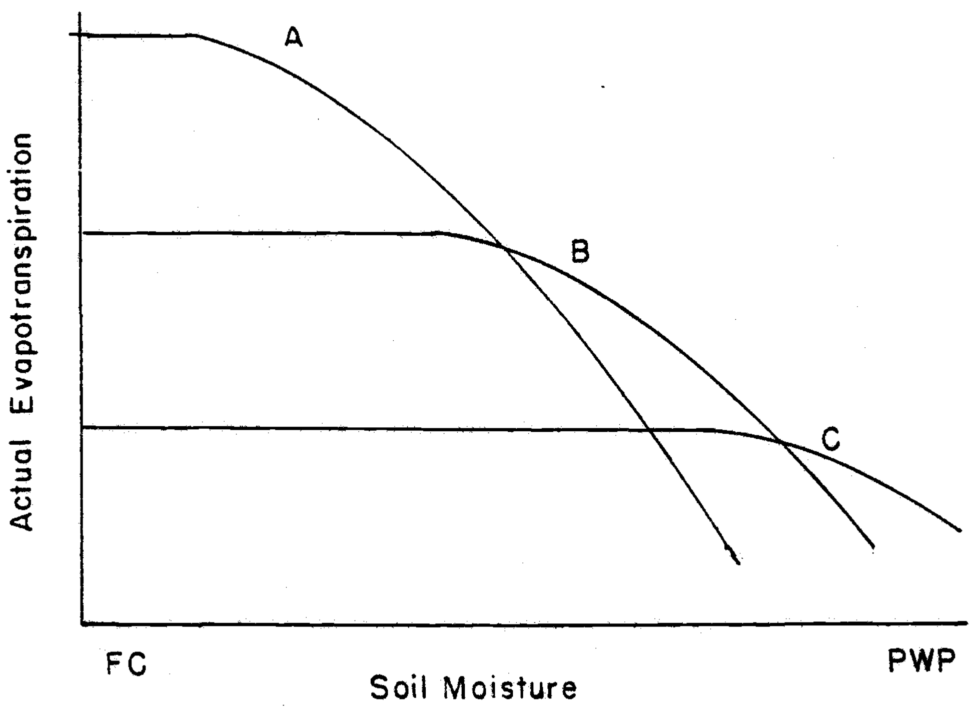

Figure 2: Generalization of effects of evaporative demand on ET and the threshold level. Curves A to C correspond to decreased levels of evaporative demand (adapted from Denmead and Shaw, 1962).

Soil effects on crop ET have been eloquently presented by Salter and Goode (1967) in a comprehensive treatment crop response to water. Summarizing their comments:

> As a soil dries out from field capacity towards permanent wilting percentage there is an increase in the force resisting withdrawal, which is referred to as the soil moisture stress and is composed of two main components, namely the soil moisture tension and the osmotic pressure of the soil solution. Thus the salt content of the soil can influence the water relations of crops especially on saline soil through its effect on the osmotic pressure of the soil solution. Under normal, non-saline conditions, however, soil texture, structure, and depth have a much bigger effect, as they determine, not only the capacity of the soil to store available water for the plants, but also the ease with which the soil water may be reached and absorbed by roots.

Existing Models of ET Decline

Early research by Viehmeyer and Hendrickson developed what might be classified as the "on-off" relationship between soil moisture and transpiration (Hanks, 1974). This relationship is typified in Equation 1.

$$T = T_p \qquad SWS/AW>0 \tag{1}$$

$$T = 0 \qquad SWS/AW=0$$

where

T = transpiration rate
T_p = transpiration rate when soil moisture is not limiting
SWS = remaining available soil water
AW = maximum available soil water.

Viehmeyer and Hendrickson (1955) developed this relationship through research on pine and prune trees. Their experiments were conducted in suspended containers of soil and plants, capable of being weighed (Viehmeyer and Hendrickson, 1955).

A second ET response to limiting soil moisture is called a "linear relationship" (Hanks, 1974) defined by Equation 2.

$$T = T_p(SWS/AW) \qquad 2$$

In Equation 2, the transpiration rate decreases linearly as the soil moisture level declines. This relationship was used initially by Thornthwaite and Mather in 1955 (Hanks, 1974).

Another form of ET response has been postulated by various researchers. This response has been termed the "combination" model, because it combines the "on-off" and "linear" models (Hanks, 1974). The combination model is defined by Equation 3.

$$T = T_p \qquad \text{if } SWS/AW \geq b \qquad 3$$

$$T = \frac{T_p \cdot (SWS)}{b \cdot (AW)} \qquad \text{if } SWS/AW < b$$

where

b = fraction of available soil water at which ET decline begins.

This particular model indicates that a level of soil moisture exists above which the ET rate will be maximum. This level is expressed as a fraction of available soil moisture which has been termed the "threshold level" (Ritchie et al., 1972a). As soil water is depleted beyond the threshold level, the evapotranspiration rate will fall below the maximum rate. As presented in a detailed study of the threshold level concept:

> "the actual evaporation rates after the threshold was reached became practically independent of potential evaporation and were apparently dependant on the root density, soil water transmission characteristics of the soil, and the reduction in turgid leaf area" (Ritchie et al., 1972a).

The combination model has gained increased popularity in recent years. A number of researchers have used this model to explain the ET response of a crop to depleting soil moisture (Meyer and Green, 1979; Slabbers, 1980; English and Nuss, 1980; Feddes et al., 1980).

Figure 3 illustrates the differences between the three previously discussed general models for ET response. Relative evapotranspiration is used to signify the ratio of actual evapotranspiration (ETa) to maximum evapotranspiration (ETm). Relative soil moisture is the ratio of maximum available water (Mo) following an irrigation to field capacity and the soil moisture remaining after some consumptive use (M). The threshold level in the combination model is shown as relative soil moisture at b.

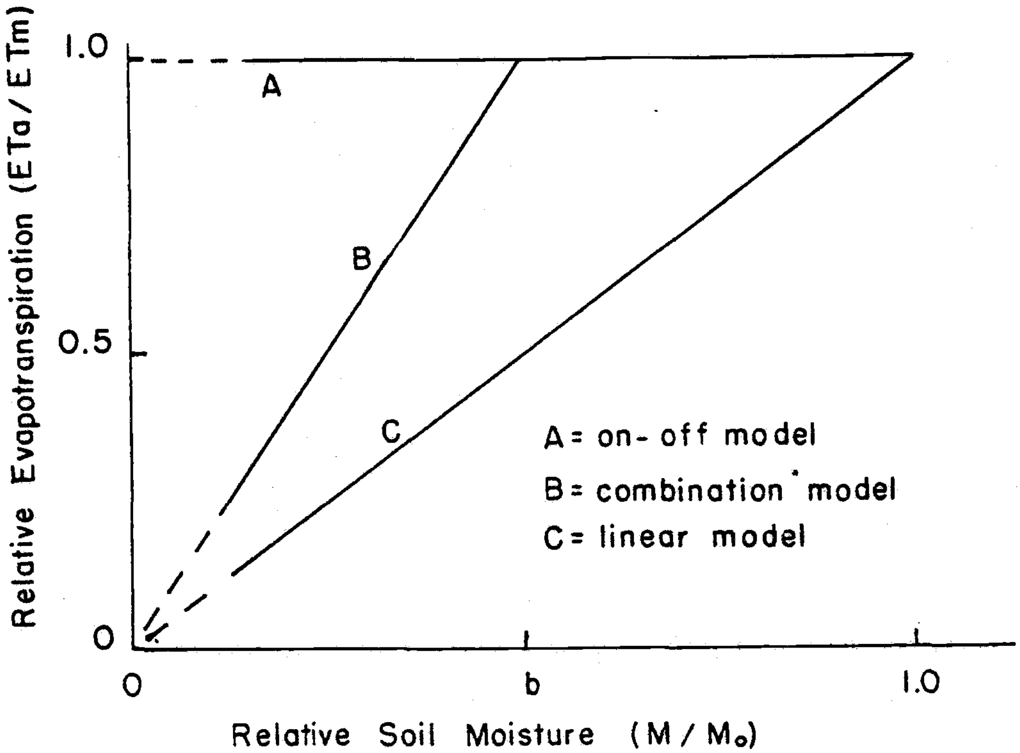

Figure 3: Comparative effects of the on-off, combination, and linear models for ET response to decreasing soil moisture.

Through experimentation, each of the above models has been shown to be applicable to certain conditions. More complex, but not necessarily more exact, models do exist. Three of these models will be described in detail below.

As mentioned earlier, a logarithmic response of ET to soil moisture decline has been postulated by researchers at Kimberly, Idaho (Jensen et al., 1971). Their model was developed from lysimeter measured data, weather data, and cropping pattern and growth information collected over a number of years.

The method of predicting crop evapotranspiration is outlined below (Jensen et al., 1971).

$$ETa = Kc \cdot ETr \qquad 4$$

$$Kc = Kco \cdot Ka + Ks \qquad 5$$

where

ETa = actual crop evapotranspiration
ETr = reference crop evapotranspiration
Kc = crop coefficient
Kco = crop coefficient resulting when soil moisture is not limiting
Ka = coefficient to account for the effects of limiting soil moisture
Ks = coefficient to account for increased evaporation from a wet surface.

This model calculates ET for alfalfa (the reference crop) by Equation 6.

$$ETr = \left[\frac{\Delta}{\Delta+\gamma}(Rn + G) + \frac{\gamma}{\Delta+\gamma} \cdot 15.36 \cdot f(u) \cdot (ea - ed)\right] \Big/ L \qquad 6$$

where

Δ = slope of the saturated vapor pressure-temperature curve $mb \cdot c^{-1}$
γ = psychrometric constant $mb \cdot c^{-1}$
Rn = net radiant solar energy $cal \cdot cm^{-2} \cdot dy^{-1}$
G = soil heat flux $cal \cdot cm^{-2} \cdot dy^{-1}$
f(u) = wind function
= aw + bw Uz
aw, bw = empirical coefficients dependent upon the aerodynamic characteristics of the crop surface and general nature of the location
Uz = 24 hour wind run at 2 meter height $Km \cdot dy^{-1}$
(ea-ed) = vapor pressure deficit mb
L = latent heat of evaporation $cal \cdot cm^{-3}$

Equation 6 has since been modified to account for the seasonal variability in albedo, wind coefficients, and long wave radiation coefficient (Wright, 1981).

The reference ET is then adjusted to account for the effects of a particular crop and cropping environment. This adjustment is accomplished through the use of a "crop coefficient". The crop coefficient consists of three components. First, there is a correction for increased evaporation from a wet soil surface (Ks) as indicated by Equation 7.

$$Ks = (K_1 - Kci)\, e^{-\lambda t} \qquad K_1 > Kci \qquad (7)$$

where

t = days after rain or irrigation
λ = coefficient for the effect of environmental conditions
Kci = average value of Kc at the time rain occurred
K_1 = coefficient related to soil effects.

However, the values of Ks are approximated for the first, second, and third days following a rain or irrigation respectively by: (0.9 - Kc) 0.8; (0.9 - Kc) 0.5; (0.9 - Kc) 0.3.

The second component of the overall crop coefficient is the coefficient for conditions of no moisture stress (Kco). This component must be determined experimentally, and is usually published in the form of a "crop coefficient curve" (Jensen, 1973; Dorrenbos and Pruitt, 1977; SCS, 1970). Caution must be exercised to insure the crop coefficient used was developed for the same reference crop used to calculate ETr (Cuenca and Nicholson, 1981). A crop coefficient curve for winter wheat referenced to alfalfa without moisture stress is presented in Figure 4.[1]

The final component of the overall crop coefficient is related to the effects of limiting soil moisture (Ka) as shown by Equation 8.

$$Ka = \frac{\log\ (AW + 1)}{\log\ 101} \qquad 8$$

where

AW = percentage of available water remaining within the profile.

The logarithmic response of ET to declining soil moisture is reflected in this equation. Figure 5 illustrates the relationship of Ka to the percentage of available water in the soil profile.

This model (Equation 8) has received extensive use in the field of scientific irrigation scheduling (English et al., 1980; Kincaid and Heerman, 1974). Because of its widespread use, the model will be tested with the measured ET data obtained from the field experiment.

Boonytharokul and Walker (1979) have proposed a second ET response model. This model is termed a "power function"

[1]Communication from Dr. James Wright; Snake River Conservation Research Center, Kimberly, Idaho.

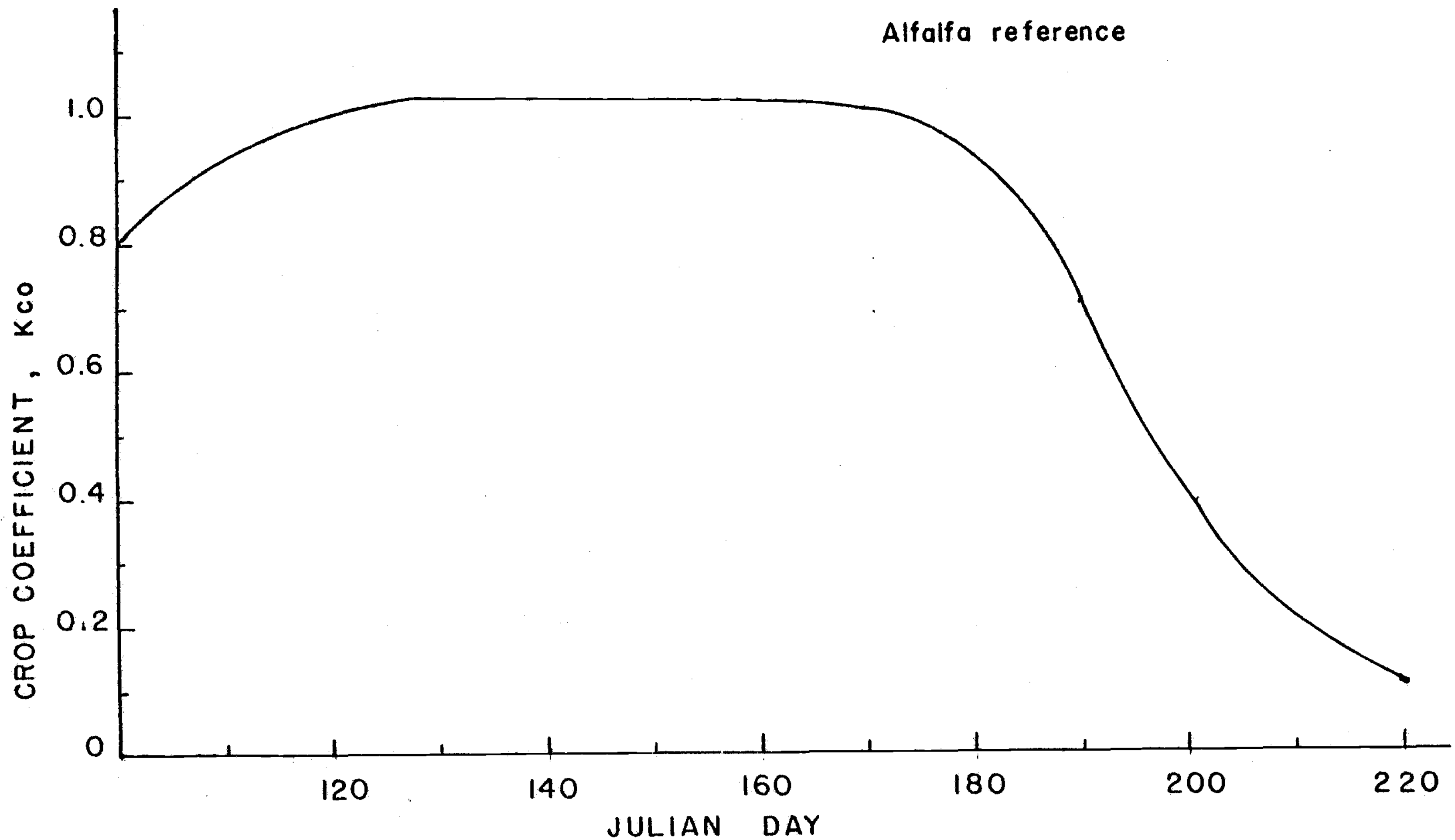

Figure 4: Crop coefficient curve for winter wheat with an alfalfa reference crop.

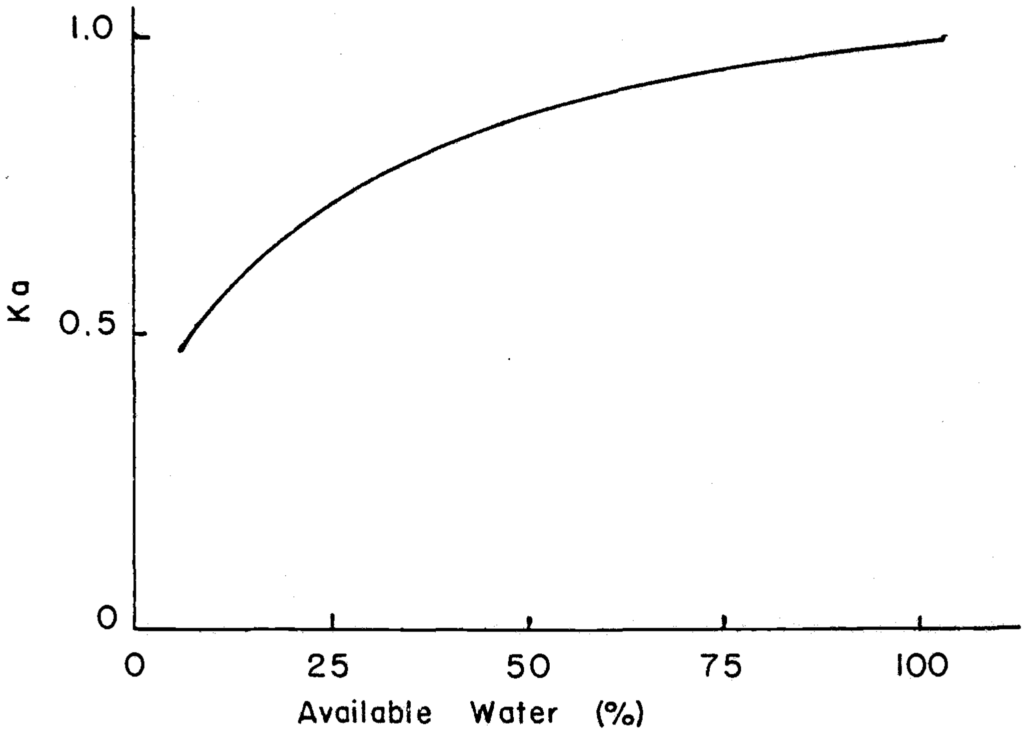

Figure 5: Available water effects on Ka factor from the logarithmic model.

response (Boonyatharokul and Walker, 1979), as presented in Equation 9.

$$Ks = \left[1.0 - \left(\frac{\bar{D}_p}{\bar{D}_t} \right)^m \right]^n \qquad m,n \geq 0 \tag{9}$$

where

Ks = ETa/ETm
ETm = maximum crop evapotranspiration (under non-limiting conditions)
m,n = empirical constants related to climate, soil, and crop factors

$\bar{D}_p$ = depleted available soil moisture from root zone
$\bar{D}_t$ = total available soil moisture from root zone.

Evaluation of the exponents, m and n, indicated that they were highly correlated with the ratio of saturated hydraulic conductivity and potential evapotranspiration rate. Also, the relationship was shown to be highly dependent on the water uptake distribution (Boonyatharokul and Walker, 1979). This led them to develop the parameters needed for generalized regression equations of m and n. Table 1 presents these parameters for water uptake distribution as determined by Boonyatharokul and Walker.

Based on the root zone parameters, saturated hydraulic conductivity, and potential ET rate, regression equations were developed for m and n as shown in Equations 10 and 11.

$$m = 0.02841 + \frac{4.316}{Ro} + \frac{0.07592\ Ksat}{Ro \cdot ETp} \qquad 10$$

$$n = 8.777 - 32.40\ Rm + \frac{8.709}{Ro} + \frac{0.028\ Ksat}{Ro \cdot ETp} \qquad 11$$

where

Ro, Rm = root zone parameters from Table 1
Ksat = saturated hydraulic conductivity
ETp = "potential" evapotranspiration.

In Equations 10 and 11, the term ETp is ambiguous. Although not directly pointed out, Boonyatharokul and Walker used alfalfa reference evapotranspiration for their estimate of ETp. This reference ET was measured by a lysimeter.

Table 1. Water uptake distributions, corresponding percentages of total extraction in each quarter layer of root depth from top and parameters representing water uptake distribution (from Boonyatharoukul and Walker, 1979).

Water Uptake Distribution Function ($0<z'<1$)	Total extraction in ith quarter from top, as a percentage				Water uptake distribution parameters	
	1st	2nd	3rd	4th	Ro	Rm
$R_1(z')=1.582\ \exp(z')$	35.0	27.3	21.1	16.5	1.582	0.4180
$R_2(z')=1.473-1.418(z')^2$	36.1	31.6	22.8	9.5	1.473	0.3819
$R_3(z')=1.80-1.60z'$	40.0	30.0	20.0	10.0	1.800	0.3667
$R_4(z')=1.972\ \exp(-1.6z')$	40.8	27.7	18.8	12.7	1.927	0.3752
$R_5(z')=2.313\ \exp(-2.0z')$	45.5	27.6	16.7	10.2	2.313	0.3435
$R_6(z')=2.724\ \exp(-2.5z')$	50.6	27.1	14.5	7.8	2.724	0.3127

Note: z' = depth as a fraction of total root depth from top

$Ro = R(0)$

$$Rm = \int_0^1 R(z')dz'$$

Slabbers has adopted a different approach to modeling the ET response to water stress than those previously discussed. He has quantified the average ET for a specific length of irrigation interval (Slabbers, 1980). The longer the interval the greater will be the effect of soil moisture decline on the total ET. This approach to the problem of quantifying the ET decline of a crop may be useful to the field of irrigation engineering. Typically, the design ET rate for an irrigation system is determined with a particular irrigation interval in mind. This design rate is, in effect, an average expected ET for the design interval (although in some instances the design is based on ET for some recurrence interval). Slabbers' work appears consistent with this current method of design.

Slabbers uses a form of the combination model to represent the ET response to limiting soil moisture (Slabbers, 1980). Using his notation, Equations 12 and 13 are presented.

$$E = Ep \qquad \text{for } ASMt \geq f \cdot ASMo \qquad (12)$$

$$E = \frac{ASMt}{f \cdot ASMo} Ep \qquad \text{for } ASMt < f \cdot ASMo \qquad (13)$$

where

ASMo and ASMt = maximum and actual (at time t) available soil moisture

Ep = rate of evapotranspiration for crop and soil with ample water supply

E = rate of evapotranspiration
f = fraction of available soil moisture at which the reduction starts (previously mentioned threshold level).

To derive Slabbers' equation to predict average ET, we must first conceptualize a water balance control volume. In the absence of drainage flow or water input, Equation 14 holds.

$$\frac{dASM}{dt} = -E \qquad 14$$

where

ASM = available soil moisture.

Separation of variables leads to:

$$dASM = -Edt \qquad 15$$

Dividing both sides by ASM gives Equation 16.

$$\frac{dASM}{ASM} = \frac{-E}{ASM}\, dt \qquad 16$$

Integrating over the range of moisture involved (M) and the time interval (T),

$$\int^{M} \frac{dASM}{ASM} = \int^{T} \frac{-E}{ASM}\, dt \qquad 17$$

Substitution of Equations 12 and 13, followed by separating the limits of integration over time, yields Equation 18.

$$\int_{Mo}^{M} \frac{dASM}{ASM} = -\int_{0}^{T^*} \frac{Ep}{ASM}\, dt \; - \int_{T^*}^{T} \frac{Ep \cdot ASM}{ASM \cdot fASMo}\, dt \qquad 18$$

where

$$T^* = \frac{(1 - f)ASMo}{Ep}$$

= the time required to reach the threshold level of soil moisture.

Further algebraic manipulation leaves us with Equation 19.

$$\int_{Mo}^{M} \frac{dASM}{ASM} = -Ep\left[\int_{0}^{T^*} \frac{dt}{ASM} + \int_{T^*}^{T} \frac{dt}{fASMo}\right] \quad 19$$

Recognizing that during the time interval 0 to T*, ASM is defined by Equation 20,

$$ASM = ASMo - Ep \cdot t \quad 20$$

we can rewrite Equation 19 to remove the variable ASM on the right hand side.

$$\int_{Mo}^{M} \frac{dASM}{ASM} = -Ep\left[\int_{0}^{T^*} \frac{dt}{(ASMo - Ept)} + \int_{T^*}^{T} \frac{dt}{fASMo}\right] \quad 21$$

Integration yields Equation 22.

$$\ln\left(\frac{ASMt}{ASMo}\right) = -Ep\left\{\frac{-1}{Ep}\left[\ln(ASMo - Ept)\Big|_{0}^{T^*}\right] + \left(\frac{T - T^*}{fASMo}\right)\right\} \quad 22$$

Substituting for T* and reducing yields Equation 23.

$$\ln \frac{ASMt}{ASMo} = \left[\ln(f) - \frac{Ept}{fASMo} + \frac{(1 - f)}{f}\right] \quad 23$$

Simplifing Equation 23 to remove the logarithms leaves Equation 24.

$$\frac{ASMt}{ASMo} = f \exp -\left[\frac{Ep \cdot t}{fASMo} - \frac{(1 - f)}{f}\right] \qquad 24$$

By definition, average ET ($\bar{E}$) is:

$$\bar{E} = \frac{ASMo - ASMt}{t} \qquad 25$$

Substituting Equation 24 into 25 for ASMt and simplifying yields Slabbers' model for average ET (Slabbers, 1980).

$$\bar{E} = \frac{ASMo}{t}\left\{1 - f \exp -\left[\frac{Ep \cdot t}{fASMo} - \frac{(1 - f)}{f}\right]\right\} \qquad 26$$

Deficit Irrigation

"Deficit irrigation" is the practice of purposely under-irrigating a crop. This method of irrigation would be employed to increase the net economic benefits to the farmer. As pointed out by English and Nuss (1980):

> It is widely recognized that partial irrigation of a crop can sometimes yield a greater net economic return than full irrigation. In fact, optimum irrigation practice will always be to apply less water than a crop is capable of utilizing.

A soil moisture deficit usually implies a decline in expected crop yields (Doorenbos and Kassam, 1979). However, certain crops do exist for which a moisture deficit is desirable (example, sugar beets). Improved crop quality is usually attributed to moisture stress in these instances (Kramer, 1962).

Currently, two basic approaches to deficit irrigation are encountered: (1) high irrigation frequency with reduced application depth and (2) low irrigation frequency with a full application depth. The fundamental difference between these two approaches is the length of irrigation interval.

A study into the effects of high frequency deficit irrigation was conducted for sugar beets, winter wheat, and beans by Miller (1977). His results for sugar beets show that sugar percentages were significantly increased and yields remained similar by decreasing irrigation rates from 100 to 50 percent of "potential" evapotranspiration (Miller, 1977). The results for winter wheat showed no significant difference between the driest and wettest irrigation treatment. Dry bean yields also showed no significant difference between various water treatments. Irrigation levels were based upon potential ET rates calculated from Class A evaporation pan data. The results from Miller's study tends to favor high frequency deficit irrigation. However, efforts at duplicating his results at Davis, California were unsuccessful (Faci and Fereres, 1980). The use of large weighing lysimeters at Davis should reflect the actual

ET rates. The method employed by Miller (evaporation pan) is of questionable accuracy for short time intervals (Doorenbos and Pruitt, 1977).

Rawlins and Raats (1975) point out that "irrigation should supply water at a sufficient rate to satisfy the evaporative demand and, at the same time, maintain a high matric potential and osmotic potential of the soil water." In order to satisfy these constraints, the soil moisture must be kept high, but not at such a level to impede the gaseous diffusion of oxygen and carbon dioxide through the soil profile (Rawlins and Raats, 1975). According to Hobbs and Krogman (1978), "deep percolation can be minimized by applying less water than is required to replenish the profile, but applying it frequently enough that moisture stress does not occur." Electing to not completely refill the soil profile also allows seasonal precipitation to be used more effectively (Rawlins and Raats, 1975; Hobbs and Krogman, 1978). Hobbs and Krogman also discuss related advantages inherent in frequent irrigations:

> Soil variability and moisture holding characteristics become less important because it is only necessary to irrigate within the infiltration rate and to maintain a downward moisture flux. Variations in wind velocity and direction affect application uniformity differently for individual irrigations, but overall uniformity improves as the number of irrigations increases. Leaching of plant nutrients is minimized and drought tolerance of crops becomes less

> important. From an operational standpoint, frequent light irrigations minimize the problems of poor traction of mechanical irrigation equipment in saturated soils.

Systems meeting the requirement for high frequency irrigation range from solid-set or traveling sprinklers to drip or trickle to small basins periodically filled with water (Rawlins and Raats, 1975). The application of some of these systems requires considerable capital investment. This capital investment cost, however, is not the only economic factor in deficit irrigation. "Optimal irrigation management will generally consider cost for purchasing and delivering water to the land where irrigation is needed, and the economic losses suffered due to inadequate or over-irrigation" (Wu and Liang, 1972).

Low frequency deficit irrigation has not been the subject of extensive research. Bordovsky and Hay (1975) showed that less frequent irrigations had no significant effect on yield and substantially increased the water-use efficiency of a grain sorghum crop. A case study into the merits of low frequency deficit irrigation was conducted for winter wheat grown in the Columbia River Basin (English and Nuss, 1980). It focused on the economic feasibility of adopting a low frequency approach for irrigation management on an individual farm. The results of this study indicated that it was possible to reduce energy use by 40 percent and consumptive use of water by 24 percent without reducing farm income (English and Nuss, 1980). When viewed from the standpoint of economics, low frequency irrigation appears to offer significant advantages over high frequency irrigation. Wu and Liang (1972) point out that lower labor costs per unit water delivered will be accomplished by irrigating less frequently. In defense of higher frequencies, Rawlins and Raats (1975) state "because it costs no more to use a system once it is permanently installed, the best use is almost continuous irrigation during the period of peak water use." Pressurized irrigation systems are required for high frequency deficit irrigation. Rawlins' and Raats' statement may be justified if center pivot and solid set irrigation systems were in wide spread use. However, these systems are often limited by capital investment costs, soil types, field topography, and crop economic return. Instead, hand move and side roll systems are readily adapted in many situations. One must wonder if labor and power costs have been considered with high frequency deficit irrigation. These additional costs have been shown to be significant. One important conclusion was derived from the case study of English and Nuss (1980), "a complete economic analysis, including marginal production costs, capital, labor, maintenance, and opportunity costs, is required to accurately assess deficit irrigation benefits."

Irrigation engineers face serious difficulties when designing for deficit irrigation. Design engineers need economic information on the expected effects of water stress or deficit on crop yields (Hagan and Stewart, 1972). Also, the difficult question of determining the crop water requirement under deficit irrigation must be addressed. Hagan and Stewart (1972) have compiled the results of various research into a table of "threshold levels" for crop ET response to soil moisture decline. This table would fulfill some initial data requirements for deficit irrigation design, but additional study is needed to quantify the ET response under declining soil moisture conditions.

EXPERIMENTAL METHODS

A field experiment was designed to investigate the effects of increased irrigation interval on crop evapotranspiration. This experiment was part of a larger investigation into the effects of irrigation interval on crop yields.[2]

The experimental plots were located approximately ten miles south of Hermiston, Oregon on the John Madison farm. This area is known as Butter Creek. Mr. Madison became interested in this research following an earlier feasibility study in which deficit irrigation was considered for his operation (English and Nuss, 1980).

Site Characteristics

Climate

The climate at the experimental site is mild and semi-arid. Average annual precipitation in the area is 9.4 in (24 cm) (Pacific Northwest River Basins Commission, 1968).

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[2]The results obtained from the crop yield experiment will be used to develop production functions for variable irrigation intervals. These production functions will in turn be compared to more traditional results from "line source" experiments in the literature. Results of this investigation are available elsewhere (Nakamura, 1982).

Most of this precipitation occurs during the winter and spring months. The number of frost free days is reported to vary from 158 to 184 days (Bartholomew, 1975).

Table 2 presents the distribution of pan evaporation (class A weather bureau pan) over the growing season at the Hermiston Experiment Station for the years 1967 to 1979.

Table 2. Monthly average pan evaporation (class A pan) from Hermiston Experiment Station (1967-79).

Month	Pan Evaporation	
	in	cm
April	5.1	13.0
May	8.0	20.3
June	9.7	24.6
July	11.3	28.7
August	9.8	24.9
September	6.1	15.5
Seasonal	50.0	126.9

Maximum, mean, and minimum air temperature data from the Hermiston station, for the same years, are presented in Table 3.

Winds in the area have a significant effect on crop evapotranspiration and sprinkler application uniformity.

Table 3. Monthly maximum, mean, and minimum air temperatures at Hermiston Experiment Station (1931-60).

Month	Maximum	Mean °F (°C)	Minimum
January	39.6 (4.2)	31.3 (-0.4)	22.8 (-5.1)
February	46.8 (8.2)	36.9 (2.7)	27.0 (-2.8)
March	58.1 (14.5)	45.3 (7.4)	32.6 (0.3)
April	68.2 (20.1)	53.6 (12.0)	38.9 (3.8)
May	76.8 (24.9)	61.4 (16.3)	46.1 (7.8)
June	82.9 (28.3)	67.7 (19.8)	52.4 (11.3)
July	92.1 (33.4)	74.6 (23.7)	57.4 (14.1)
August	89.3 (31.8)	72.0 (22.2)	54.8 (12.7)
September	81.2 (27.3)	64.2 (17.9)	47.2 (8.4)
October	67.5 (19.7)	53.2 (11.8)	39.0 (3.9)
November	50.6 (10.3)	40.5 (4.7)	30.4 (-0.9)
December	43.1 (6.2)	35.4 (1.9)	27.7 (-2.4)

Soils

The soil at the experimental site is Koehler loamy fine sand.[3] The mineral material from which these soils have developed originally consisted largely of wind-laid deposits (SCS, 1948). A water holding capacity of 1.5 in/ft (12.5 cm/m) with an effective rooting depth of 2 ft (6.6 cm) is reported for this soil and crop (SCS, 1973). The intake rate under sprinkler irrigation is given by the

[3] Personal communication; Mr. John Madison, private landowner, Hermiston, Oregon.

SCS (1973) as 0.80 in/hr (20.3 mm/hr). This intake rate was questioned by other researchers, but confirmed by extension specialists working in the area.[4,5]

A cemented gravel layer exists in this soil at depths of six to ten feet. Through the use of a Geddings auger, the cemented layer was located at selected points within the site. Based on neutron probe observations and the hydraulic characteristics of the soil, the effect of the cemented layer on root zone development, water extraction, and localized perched water tables was deemed negligible.

Experiment Design

Crop Selection

The crop selected for this experiment was winter wheat (*triticum aestevium* var. Stephens). As presented by Rohde (1981):

> Stephens is a bearded, white-chaffed, semi-dwarf wheat released in 1977. Heads are distinctly course in appearance with beards which tend to flare. Winter hardiness and seedling emergence is good. Stephens wheat is about one inch taller than Hyslop and resistant to lodging. Stephens is resistant to stripe rust, leaf rust,

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[4] Personal communication; Mr. Marvin Shearer, Extension Irrigation Engineer, Oregon State University.

[5] Personal communication; Dr. Jim Vomocil, Extension Soil Scientist, Oregon State University.

> and smut and appears to have some tolerance to *Cercosporella* foot rot. It has an outstanding yield record as evidenced by its yield superiority across environmentally diverse locations for several years. Milling and baking quality is good.

Stephens variety winter wheat has been cultivated with success in the research area for a number of years.

The selection of winter wheat for the experiment was based on many factors. Wheat is the world's most important crop (Martin et al., 1976). Furthermore, wheat is cultivated extensively in the research area, signifying its adaptability to this particular climate. There exists an extensive data base and research results for wheat in the literature. Finally, the private landowner involved in the research has a personal preference for wheat. This preference comes from a desire to apply the research results to his farm operation.

Plot Layout

The research plot area is approximately three acres. The irrigated portion of the plots was 150 ft in length by 502 ft in width (45.7 m x 158.5 m). The dimensions of the adjacent dryland plots were 190 ft in length by 200 ft in width (57.9 m x 61.0 m). The topographic slope of the research area was determined by a survey. Results of this survey, along with an overall plot view, are presented in Figures 6 and 7.

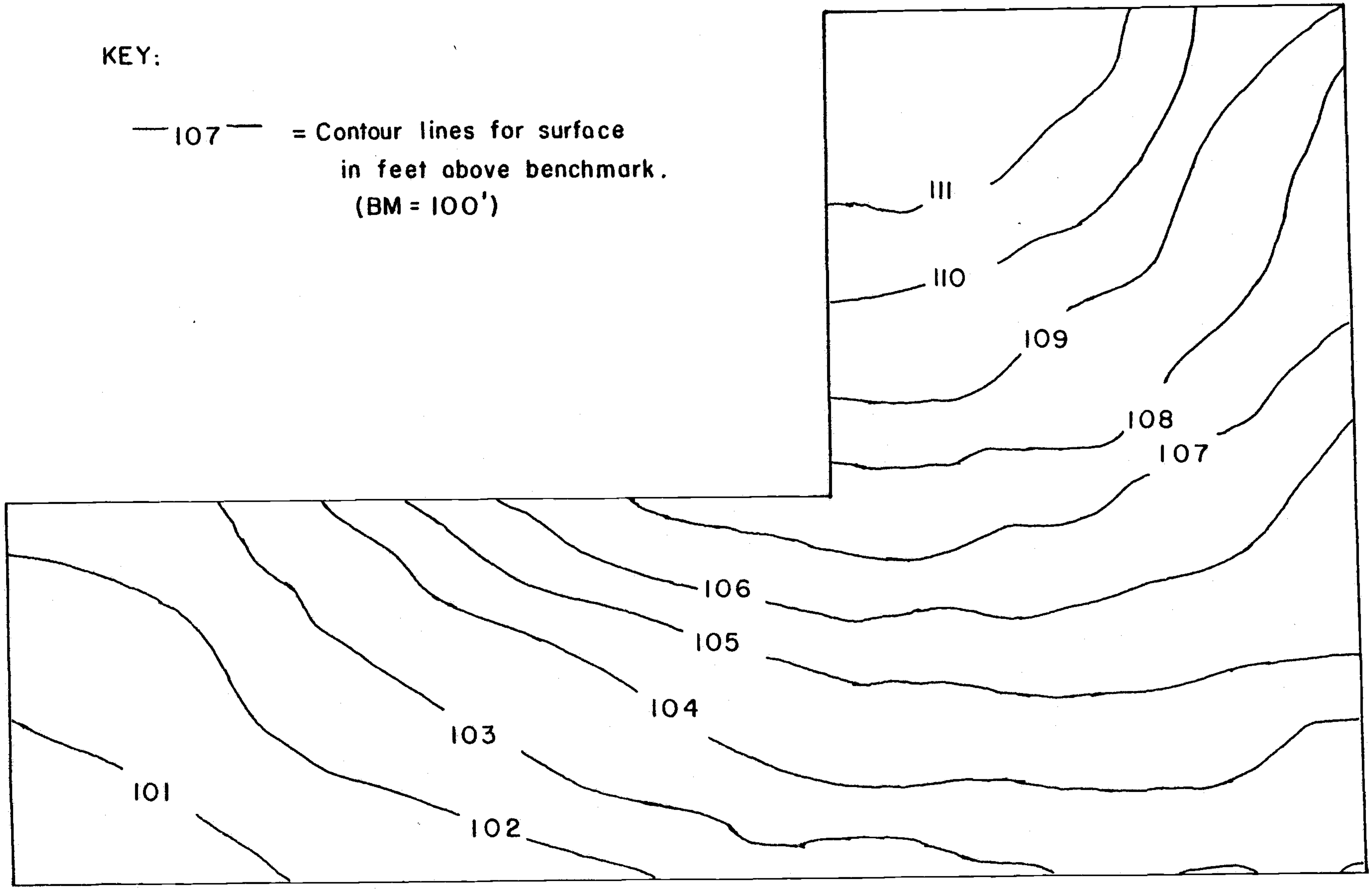

Figure 6: Topographic survey for experimental site.

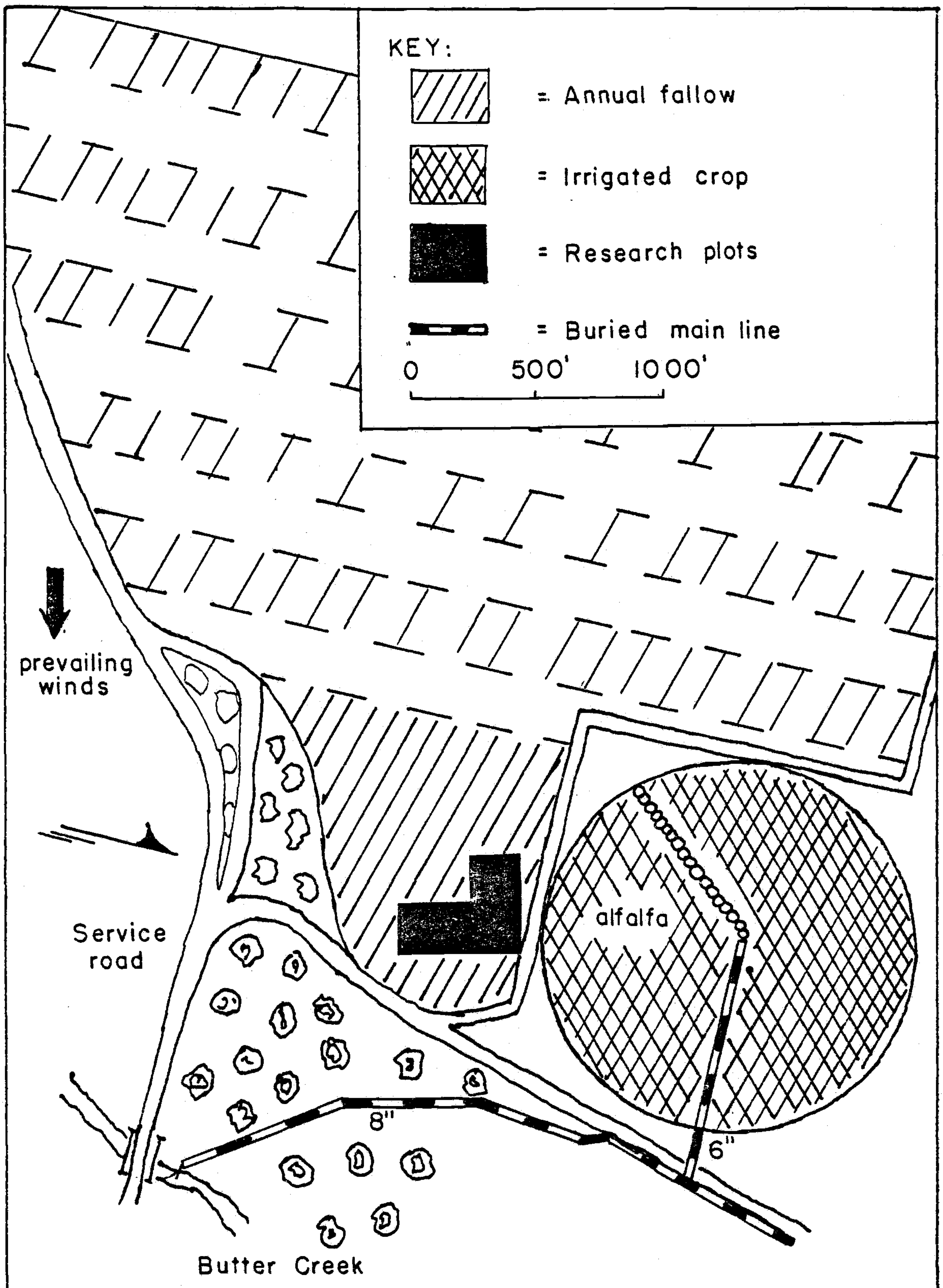

Figure 7: Localized view of project area on the J. Madison farm.

As can be noted from Figure 6, severe surface slope was not a concern. Runoff was essentially eliminated by drilling wheat approximately perpendicular to the predominant surface slope and selecting a sprinkler application rate well below the soil intake rate.

A total of eighteen separate treatment plots were used. These plots received fifteen different water treatment levels. They included five plots which were irrigated daily, and five plots irrigated weekly, with varying percentages of nominal ET requirements being applied. Of the remaining five plots, one was irrigated at intervals somewhat in excess of one week, to induce mild crop stress, two were irrigated at longer intervals to induce moderate crop stress, and three were irrigated at very long intervals to induce severe stress. In addition to the irrigated plots, two dryland plots were included in the experiment. Both of these plots received a fall irrigation to aid seedling emergence, and one also received an early spring irrigation to refill the soil profile. These water stress levels were designed to span a broad range of evapotranspiration requirements.

The fixed interval plots (weekly and daily) were designed to investigate high frequency and moderate frequency deficit irrigation. The long interval treatments were used to investigate low frequency deficit irrigation. A summary of the water application levels, along with the plot designations, is presented in Table 4.

Treatments T2 (A and B) were not exact replicas of each other. Instead, irrigations of these two treatments were staggered to compensate for the effect of water timing on crop yields. One estimate of the critical growth stage for water application to irrigated wheat is the booting/heading period (Singh, 1981). By staggering the water applications, one plot in each major treatment would receive water during the critical growth stage while the other treatment would be irrigated at a less favorable time. Irrigations of treatments T3 (A, B and C) were staggered for the same reason. The treatment layout is illustrated by Figure 8.

Those treatments irrigated weekly (W1-W5) and daily (D1-D5) were designed to minimize pipe requirements. Sprinkler laterals in these treatments were operated on variable time intervals to apply the required amount of water to each plot. Each lateral was spaced 20 ft (6.1 m) apart to prevent inadvertent water applications. Spacing of sprinklers on the lateral was 20 ft (6.1 m) in a rectangular spacing to fit existing equipment.

The longer interval treatments (T1, T2 and T3) each had two laterals applying water simultaneously. These

Table 4. Water application levels and plot designations.

Plot Designation	Irrigation Treatment
D1	Daily irrigation at 100% of ET demand
D2	Daily irrigation at 80% of ET demand
D3	Daily irrigation at 60% of ET demand
D4	Daily irrigation at 40% of ET demand
D5	Daily irrigation at 20% of ET demand
W1	Weekly irrigation at 100% of ET demand
W2	Weekly irrigation at 80% of ET demand
W3	Weekly irrigation at 60% of ET demand
W4	Weekly irrigation at 40% of ET demand
W5	Weekly irrigation at 20% of ET demand
T1	Approximately two week interval between irrigations; 100% of depletion applied
T2A, T2B	Approximately three week interval between irrigations; 100% of depletion applied; staggered
T3A, T3B, T3C	Approximately four week interval between irrigations; 100% of depletion applied; staggered
SD	Pre-planting irrigation in fall, no further irrigation
ND	Pre-planting irrigation in fall, pre-irrigation in March, no further irrigation

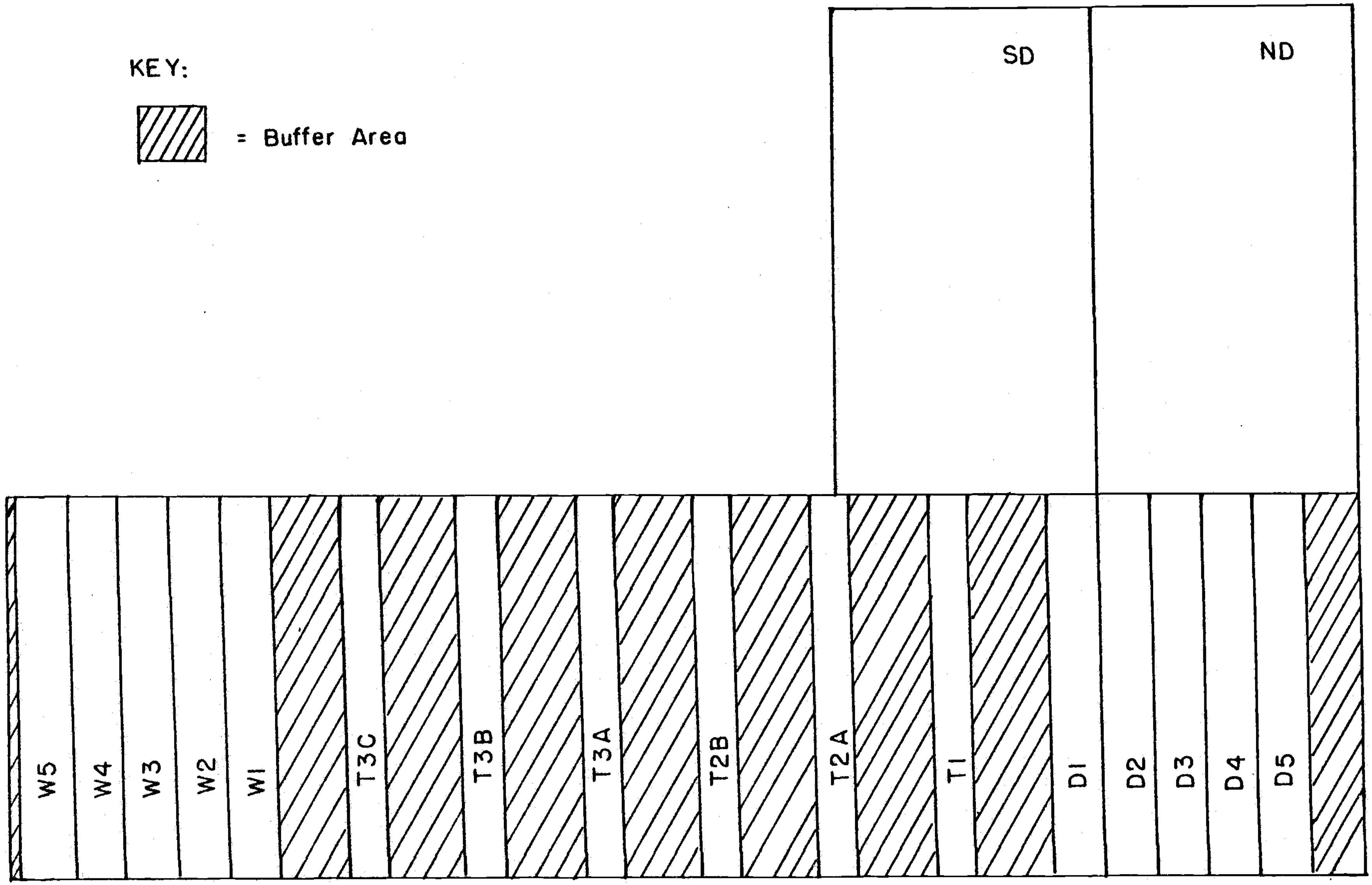

Figure 8: Overall plot layout for experiment.

laterals were spaced 15 ft (4.6 m) apart within each plot. Sprinkler spacing on the lateral was 20 ft (6.1 m). Spacing of sprinklers on the two lines was staggered. This spacing and increased overlap between adjacent laterals was designed to increase the uniformity of water application in these treatments (Jensen, 1980). A buffer strip of 30 ft (9.1 m) was used to separate the long interval treatments.

Six neutron probe access tubes, spaced 20 ft (6.1 m) apart were installed along the center line of each plot. A catch can was designed to fit on each access tube and was adjusted to canopy height throughout the season. In this way, the location of each access tube became a data acquisition site for which the water balance could be calculated. Each dryland plot was equipped with three access tubes spaced 40 ft (12.2 m) apart. The configurations of the daily, variable, and weekly frequency irrigated treatments are shown in detail in Figures 9, 10, and 11, respectively.

Plot Preparation

The plots were prepared in the fall of 1980. Previous dry-farming of barley (horedeum vulgare var. Steptoe) had left the soil profile relatively dry. A pre-irrigation of approximately 4 in (10.2 cm) was applied on September 20th

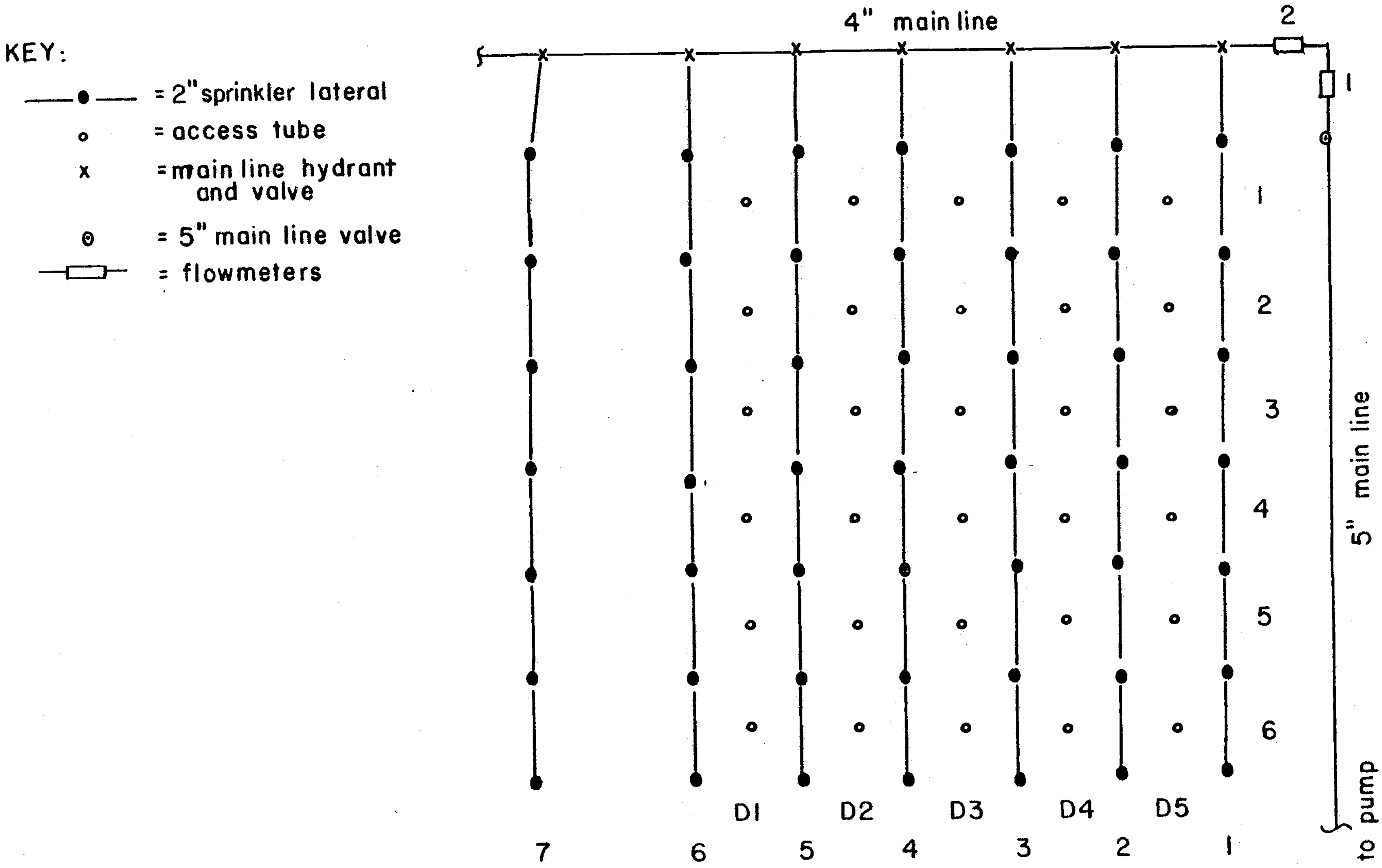

Figure 9: Irrigation pipe and individual plot layout for daily interval treatments.

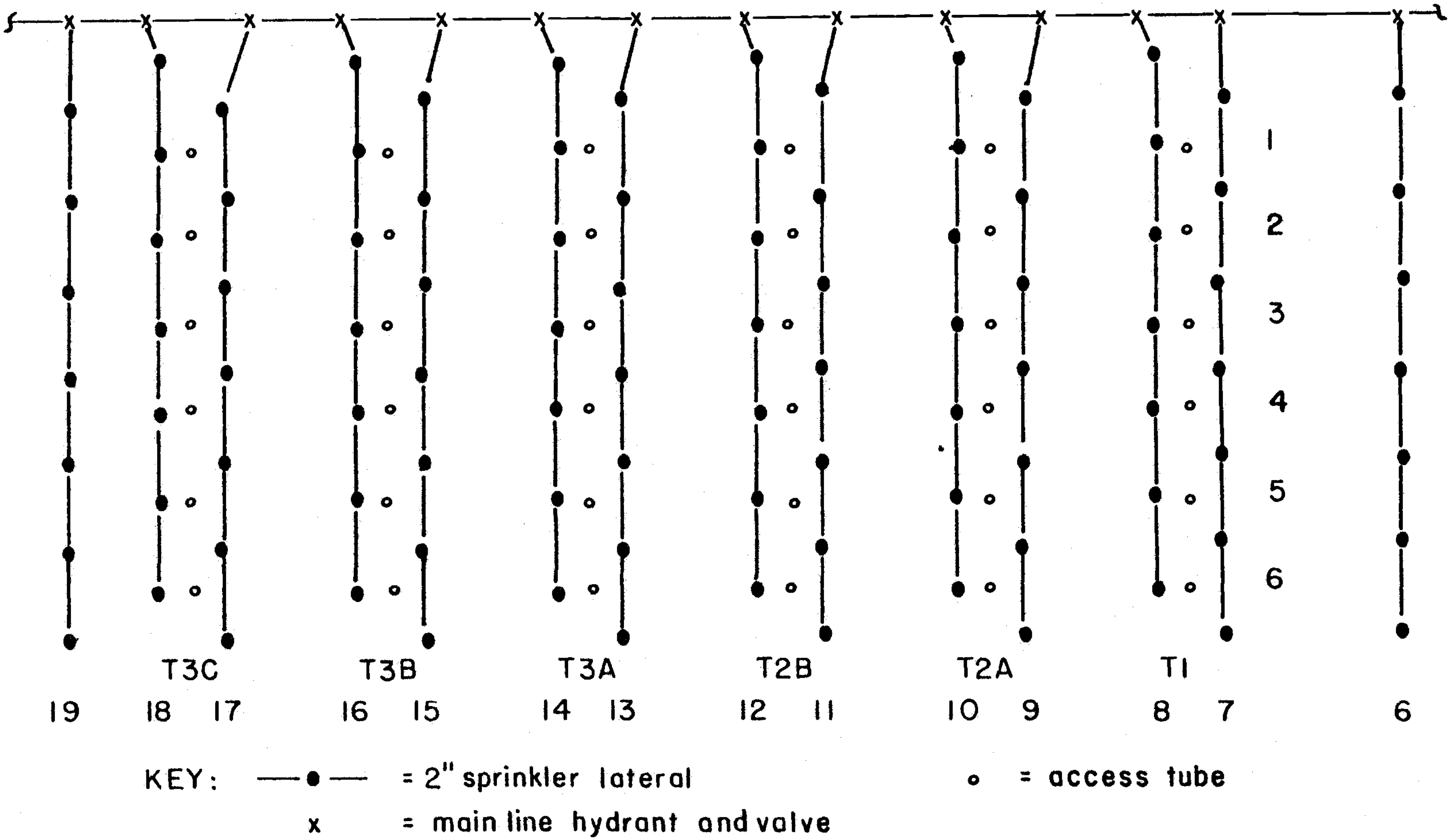

Figure 10: Irrigation pipe and individual plot layout for daily interval treatments.

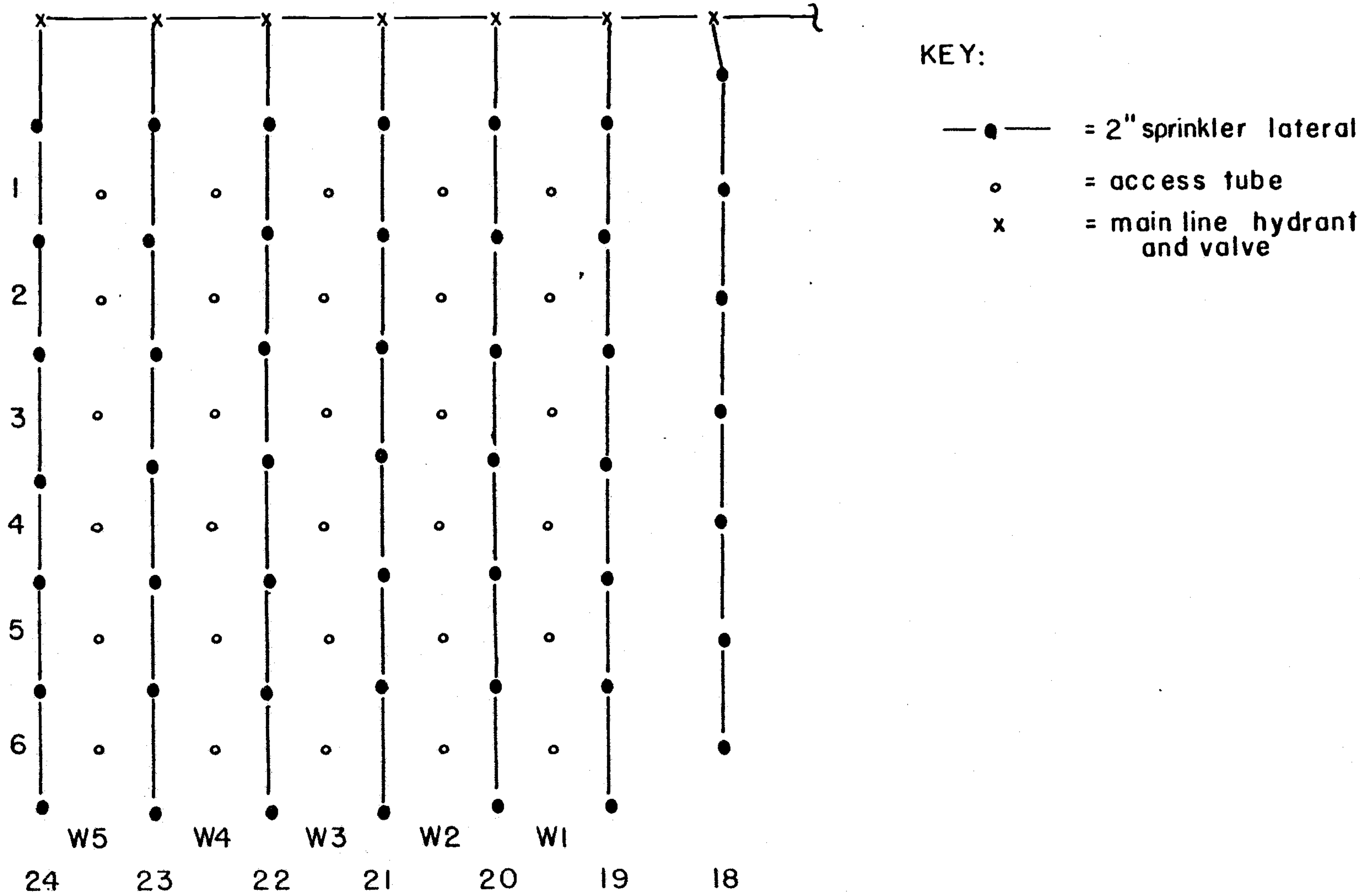

Figure 11: Irrigation pipe and plot layout for weekly interval treatments.

to aid emergence. The three acre tract was then fertilized with 300 lbs. of 16-16-16 fertilizer and 40 lbs. of sulfur per acre. The tract was sprayed with Roundup herbicide prior to planting to eliminate volunteer barley. On October 7th and 8th the plots were seeded with Stephens winter wheat at a rate of 18 seeds/ft. A dryland planter was used with a drill spacing of 12 in (30 cm). The seed was placed at a depth of 3 in (7.6 cm). Shortly after planting and prior to wheat emergence, the plots were again sprayed with Roundup herbicide. A good stand of wheat was established before winter dormancy.

Neutron probe access tubes were installed at the plots in late February, 1981. A hydraulically driven Geddings auger was used to install the 2 in (5.1 cm) irrigation tubing to a depth of 6 to 10 ft (1.8 to 3.1 m). The depth was variable due to the occurrence of the cemented gravel layer. The irrigation system was installed at the site during the week of March 23rd through 29th. A pre-irrigation of approximately 2.5 in (6.4 cm) of water was applied to all plots except one (SD) to refill the soil profile. Neutron probe readings were taken to establish the initial soil water content following this irrigation. A top dressing of nitrogen was also applied to the plots during this week. The amount of nitrogen applied to the plots was calculated on the basis of anticipated yield from that plot and residual soil nitrogen (estimated to be 50 lbs/acre). The nitrogen was applied in a dry granular form and leached into the root zone with the pre-irrigation mentioned above. Table 5 presents a summary of the top dressing applications to each plot.

Table 5. March 1981 top dressing fertilizer applications.

Plot	Nitrogen (lbs/acre)
D1, W1	250
D2, W2	250
D3, W3	196
D4, W4	125
D5, W5	71
T1	196
T2A, T2B	125
T3A, T3B, T3C	71
ND	57
SD	0

A weather station was established at the research plots. The weather station consisted of a Class A evaporation pan, a maximum and minimum temperature recorder, a hygrothermograph, a sling psychrometer, a precipitation can, and two anemometers. One anemometer was located at the height of the pan, the other at a height of 6.6 ft (2 m). In addition, data were also collected at a weather station maintained and operated by the Hermiston Agricultural Experiment Station, ten miles north of the site.

Upon installation of the irrigation system and weather station, the irrigation season began on April 1st. The wheat was beginning to grow, following winter dormancy, and there was no evidence of winter kill. A good stand was developing. Scattered occurrences of volunteer barley were observed, but the amount of barley present was not considered enough to warrant concern.

Field Operations

Data Collection

A data link was established between Hermiston and Corvallis through the OSU computer. Information was transmitted daily between a technician at the experiment site and research personnel in Corvallis.

Weather data was to be collected daily at the research site. However, equipment malfunction throughout the season caused this data to be incomplete. Due to this poor site weather data, the data from the Hermiston Experiment Station was substituted. The weather data collected there has a high level of reliability. Weather data used in this experiment consisted of minimum, maximum, and dew point temperatures, solar radiation, 24-hour wind run and pan evaporation. These data were used to estimate ET for both grass and alfalfa reference crops. The weather data collected during the 1981 growing season for this research is presented in Appendix A.

Pan evaporation at the research site was measured daily. Care was taken to maintain the pan throughout the season, since it was used to schedule irrigations in the daily interval treatments. A cumulative double-mass balance comparing the pan evaporation at the research site to that at the Hermiston Experiment Station is shown in Figure 12. The slope of best fit through the mass balance line is 1.08.

Irrigation water was measured with catch cans at the crop canopy height. The catch cans were constructed of white PVC pipe, 4 in (10.2 cm) in diameter and 6 in (15.2 cm) in height. Each pipe segment was fitted with a square plastic base and a 1 in (2.5 cm) diameter PVC stem. The stem was inserted into another PVC pipe acting as an internal sleeve to the access tube. This sleeve could be extended as the crop grew, thus maintaining the catch cans at canopy height. Figure 13 illustrates the catch can apparatus in place on an access tube.

The volume of water caught was converted to equivalent irrigation depth using Equation 26.

$$I = 0.00725 \times Vcc \qquad (26)$$

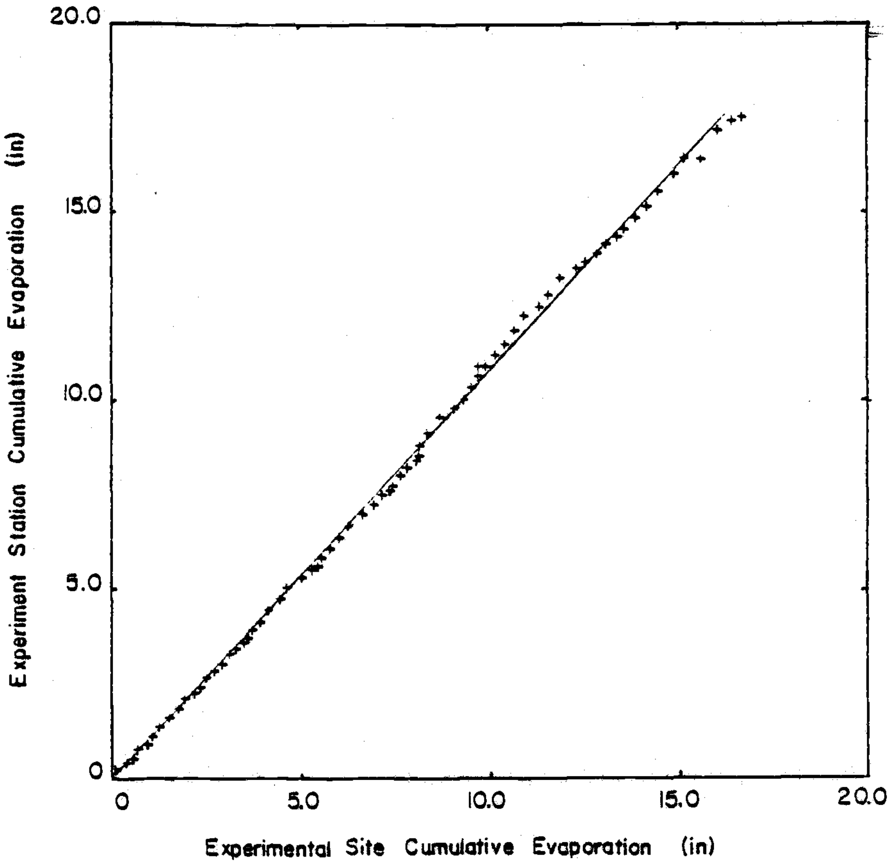

Figure 12: Cumulative double mass analysis for pan evaporation at the Hermiston Experiment Station verses the experimental site.

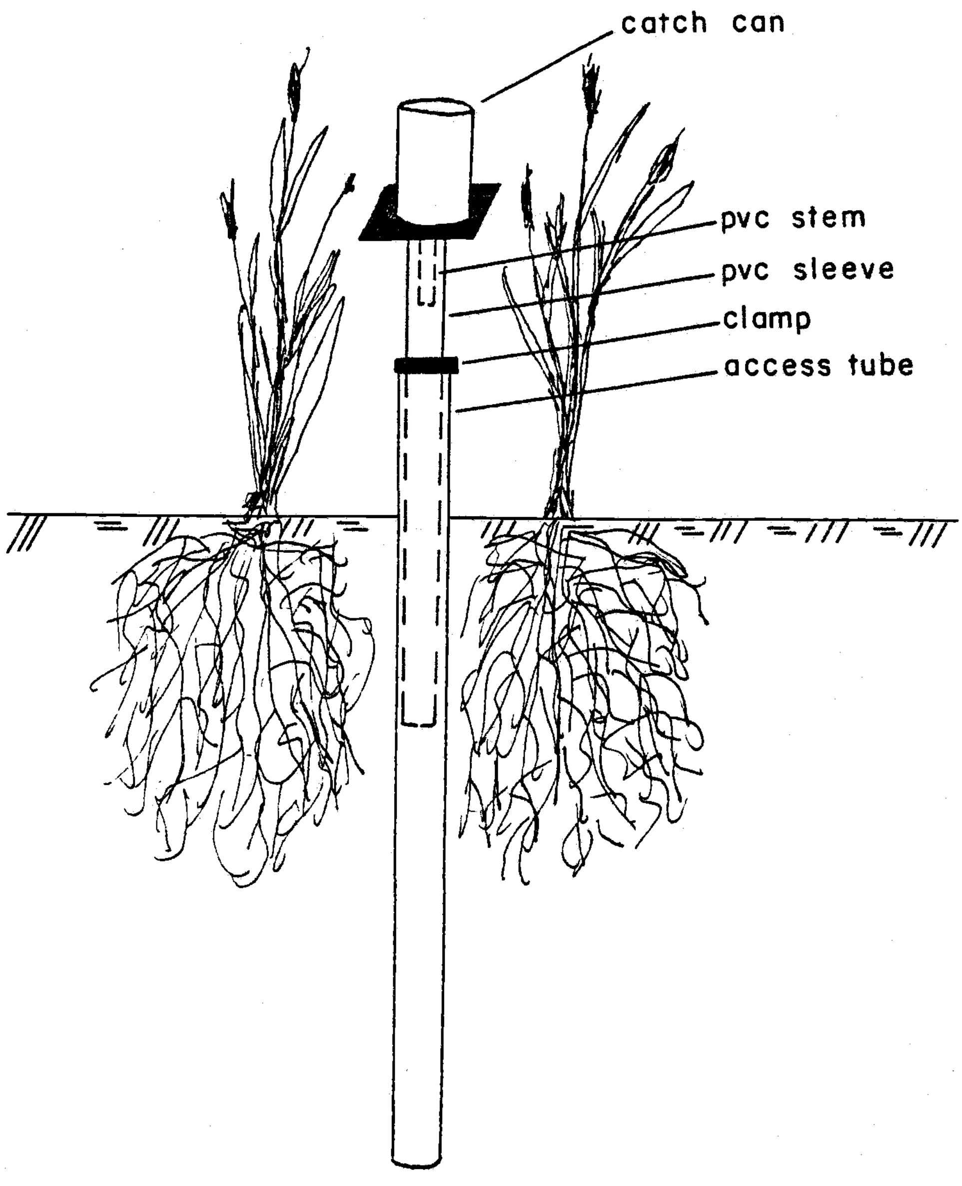

Figure 13: Apparatus for measuring applied irrigation water in place on an access tube.

where

I = depth of irrigation, inches
Vcc = volume of water caught in catch can, milliliters.

Rainfall caught in the precipitation can was converted to equivalent rainfall depth using Equation 27.

$$R = 0.001215 \times Vpc \quad (27)$$

where

R = depth of rainfall, inches
Vpc = volume of water caught in precipitation can, milliliters

A low level neutron scattering device (neutron probe) was used to monitor the soil water levels and schedule irrigations for the weekly and long interval treatments. The neutron probe used for this experiment was a Campbell Pacific Nuclear model no. 503 HYDROPROBE. The HYDROPROBE measures the amount of hydrogen contained within roughly a one foot diameter sphere (Campbell Pacific Nuclear Corporation, 1978). Fast neutrons are emitted from the Americium 241/Beryllium source which are then reflected through collisions with hydrogen atoms. The slowed neutrons are then counted by the detector tube for a specific time interval. One minute was selected as the counting time for the probe. A paraffin shield was used at the soil surface for all probe measurements to fix the surface boundary condition between data sites. Figure 14 shows the neutron probe in place on access tube.

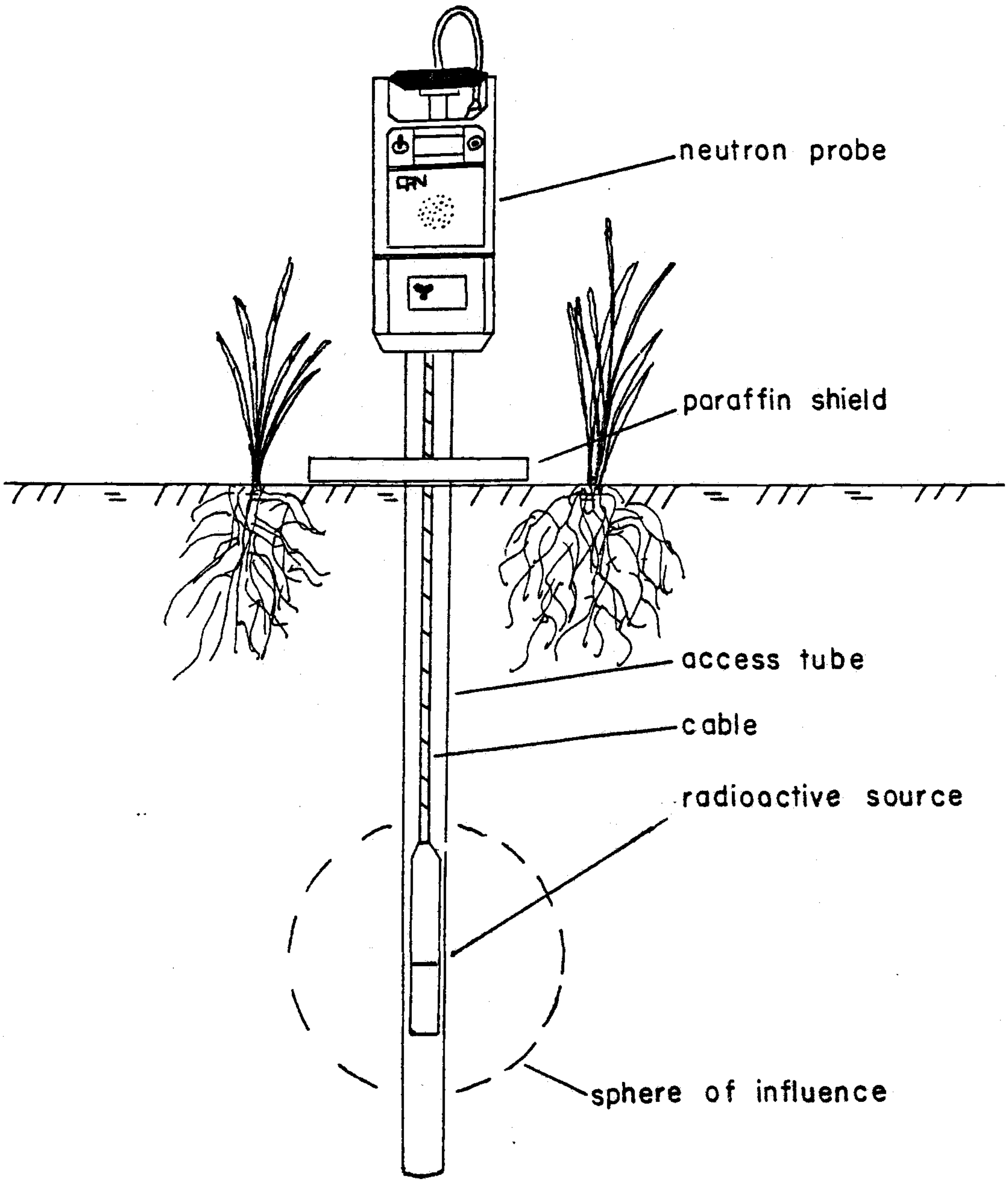

Figure 14: Representation of the neutron probe in operation on an access tube.

The neutron probe was calibrated with gravimetric soil samples to a depth of four feet. Soil bulk density was experimentally determined to be 1.2 gm/cm^3. Because of the varying probe response in the upper foot of the profile, two separate calibration curves were developed. Equation 28 is the calibration curve for the zero to one foot (30 cm) depth.

$$\Theta w = (20.736 \times CR) - 2.0575 \quad (R^2 = 0.99) \tag{28}$$

Equation 29 is the calibration curve for the remainder of the soil profile.

$$\Theta w = (19.563 \times CR) - 2.288 \quad (R^2 = 0.97) \tag{29}$$

where

Θw = soil water content, percent by weight
CR = ratio of neutron probe measurement count to standard count
R^2 = coefficient of correlation

Figures 15 and 16 illustrate the calibration results for the 0 to 1 foot depth and the remainder of the profile, respectively.

The standard count used to calculate the count ratio (CR) in Equations 28 and 29 is the average of ten probe counts taken with the probe resting on the paraffin shield. The use of a count ratio, as opposed to the direct probe reading, is recommended to eliminate the day to day "drift" of the neutron probe response. As will be shown later, a

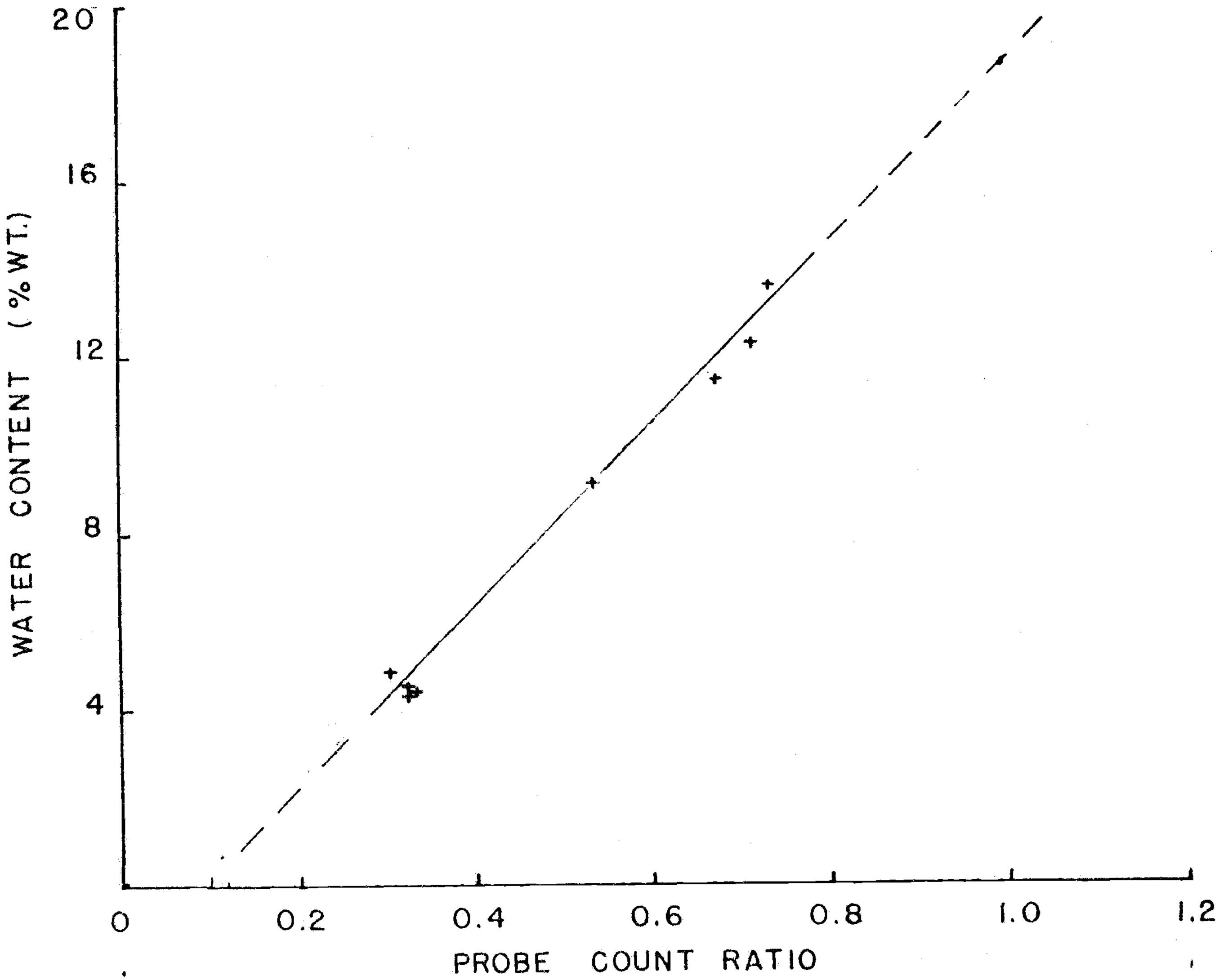

Figure 15: Calibration curve of the neutron probe for a depth of 0-1 foot.

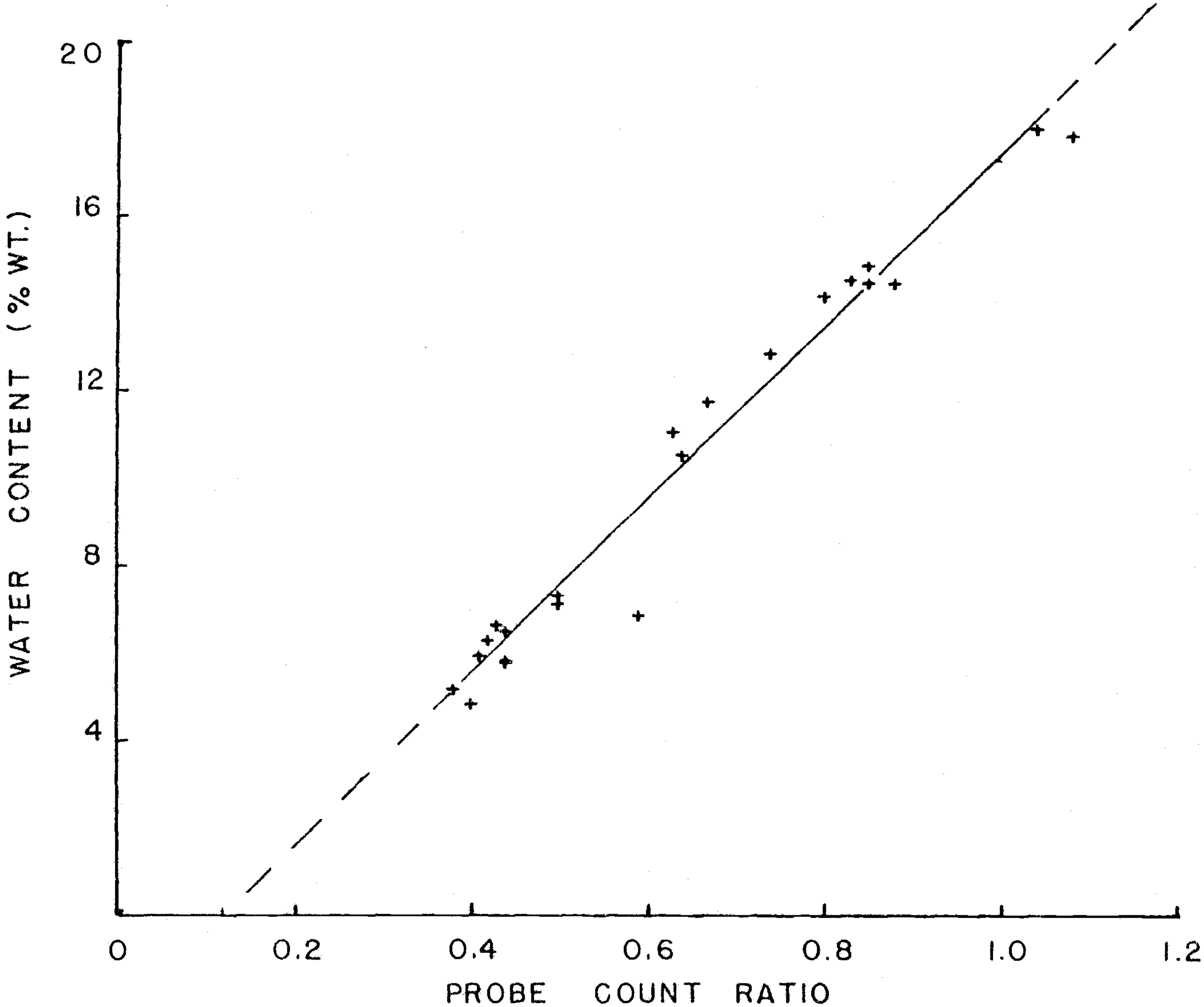

Figure 16: Calibration curve of the neutron probe for a depth of 1-4 feet.

substantial amount of variability, or "noise" is present in neutron probe data. Various smoothing or filtering techniques can be used to compensate for this noise in the data. One such technique will be presented in the results section of this thesis.

Soil moisture data were obtained to a depth of 8 ft (2.4 m) whenever possible. Measurements were made at 1 ft (30 cm) depth increments between 6 in (15 cm) depth and 90 in (228.6 cm) depth. Each access tube in a plot to be irrigated was read the day before an irrigation. This information was used to determine the amount of irrigation water to be applied. Ten representative access tubes were monitored every other day throughout the experiment. These access tubes were: W1-3, W1-4, T1-3, T1-5, T2A-3, T2A-5, T3A-3, T3A-4, D4-3 and D4-4. Soil moisture data obtained from these access tubes were used to observe the ET decline as a function of soil water depletion.

Yield data were obtained from the experiment in mid-July. These data, along with water balance determinations, were used to generate various crop production functions for winter wheat (see Nakamura, 1982).

All data were transmitted daily to Corvallis via the telephone link with the Cyber NOS computing system at Oregon State University. The transmitted data were then reduced by the computer.

Daily Operation

A brief synopsis of the daily operating routine follows.

Each morning, weather data were measured at the site. Pan evaporation was used to calculate daily irrigation requirements. Then the daily irrigation was run and catch can readings were taken. Following that, neutron probe readings were made in those access tubes that were monitored on a regular basis. In addition, if an irrigation was scheduled for the next day in one of the longer interval treatments, all of the tubes in that plot were read. Once each week, all the tubes in the weekly interval treatments (W1-W5) were read to schedule the weekly irrigation. The data collected each day were then transmitted to Corvallis. Irrigations of weekly and longer interval treatments were scheduled by research personnel in Corvallis. Weekly and longer interval irrigations usually began early in the morning to avoid the higher winds that frequently come up later in the day.

Timing of the lateral on-time for the daily irrigation deserves further elaboration. (The same method was also used to time irrigations of the weekly irrigation treatments, W1-W5.) Table 6 presents design information for the sprinkler head used in this experiment (Rain Bird 14VH, 5^{o} head, 5/64 in nozzle). The amounts of water to be

Table 6. Design information for Rain Bird 14VH 5°, 5/64 in nozzle sprinkler (Rain Bird Corp., 1979).

Pressure psi	Wetted Diameter ft	Output Capacity gpm	Application Rate (1) in/hr
25	39	0.81	0.20
30	40	0.88	0.21
35	41	0.92	0.22
40	42	0.99	0.24
45	43	1.06	0.26
50	44	1.11	0.27

(1) Application rate calculated using the following formula:

$$S_r = \frac{96.3 \times q}{s_l \times s_m}$$

where

S_r = application rate, in/hr
q = output capacity, gpm
s_l = lateral spacing, ft (20 ft)
s_m = main line spacing, ft (20 ft)

This table is developed using the sprinkler spacings for daily and weekly treatments.

applied in treatments D1 to D5 were 100, 80, 60, 40, and 20 percent of consumptive use, respectively. Irrigation system pressure was measured with a pressure gauge at the lateral valve. Using the operating pressure measured that day, the fixed sprinkler spacing, the Table 6, the sprinkler application rate is obtained. The time required to apply 100 percent of the daily ET is easily calculated using Equation 30.

$$t_{100\%} = \frac{60 \cdot ET}{Sr} \qquad 30$$

where

$t_{100\%}$ = time required to apply 100% of daily ET requirement, minutes
ET = daily ET requirement, inches
Sr = sprinkler application rate; in/hr

Factors used to correct the operating time for laterals 1 to 6 (the laterals used for daily irrigations; see Figure 9) are given in Table 7. Factors in this table reflect the designed overlap of applied water in the daily plots. The overlaps were designed so that the total applied depth for each plot would be the average of the depths applied by the two laterals bordering the plots.

For illustrative purposes, assume that the previous day's ET estimate is 0.25 in (6.4 mm). This value is obtained by multiplying the daily pan evaporation by a pan coefficient and then a crop coefficient. Also assume that the current operating pressure is 45 psi. From Table 6, the sprinkler application rate is found to be 0.26 inches per hour. Using Equation 30, the time required to apply 100 percent of the daily ET is 57.7 minutes. Finally, the operating time required for each lateral is summarized in Table 8.

Table 7. On-time correction factors for laterals No. 1 to 6. (1)

Lateral No.	Correction Factor
1	0.10
2	0.30
3	0.50
4	0.70
5	0.90
6	1.10

(1) These factors can be used for the weekly treatment as well. Laterals 1 through 6 correspond to laterals 24 to 19, respectively.

Table 8. Example calculations for scheduling daily irrigations. (1)

Lateral No.	100% on time min.	Correction Factor	Actual on time min.
1	57.7	0.10	5.8
2	57.7	0.30	17.3
3	57.7	0.50	28.9
4	57.7	0.70	40.4
5	57.7	0.90	51.9
6	57.7	1.10	63.5

(1) Design data: 100% ET requirement = 0.25 inches
operating pressure = 45 psi
application rate = 0.26 in/hr

ANALYSIS

Collected Data

Weather Data

Weather data obtained from the Hermiston Experiment Station (Appendix A) were used to calculate reference crop evapotranspiration using the Penman model as modified by Wright (1981). The reference crop is alfalfa, and results of the calculations are tabulated in Appendix B.

In addition to estimating reference ET, the collected weather data were compared to long term averages at the Hermiston Experiment Station. As shown in Table 9, the 1981 season was an average year for evaporative demand and each monthly value closely approximated the long term monthly evaporation.

Measured rainfall was compared to the average for the area in Table 10. May, June and July of 1981 were significantly wetter than the long term average conditions in Hermiston and this had important implications for the experiment. The distribution of precipitation was fairly uniform throughout the season. The 1981 season experienced 67% more precipitation than the average condition and much of this precipitation occurred at times when it would be most beneficial to the crop.

Table 9. Comparison of 1981 season pan evaporation to long term record at Hermiston Experiment Station.

Month	Long Term Evaporation in	1981 Evaporation in
April	5.1	5.9
May	8.0	8.0
June	9.7	8.9
July	11.3	11.0
Total	34.1	33.8

Table 10. Comparison of long term monthly precipitation (1931-60) to 1981 precipitation at the Hermiston Experiment Station.

Month	Long Term Precipitation in	1981 Precipitation in
April	0.62	0.09
May	0.66	1.58
June	0.75	1.46
July	0.19	0.57
Total	2.22	3.70

Note: This year was a 67% increase over the long term average.

Neutron Probe Data

Measured soil moisture data are tabulated in Appendix C for all eight data sites.

Since experiment logistics did not allow for daily monitoring of soil moisture, estimates were generated for the days when no measurements were made. These estimates were calculated by assuming a linear decrease (or increase) in soil moisture between dates of measurement. Equation 31 is the functional relationship used to estimate soil moisture.

$$SMi = SM(i-1) - \frac{(SMi-1) - (SMn)}{n} \qquad 31$$

where

SMi = estimated soil moisture value, inches
SMi-1 = last measured soil moisture value, inches
SMn = next measured soil moisture value, inches
n = days between SMi and SMn.

The dates on which soil moisture were generated are indicated by an asterisk in Appendix C.

The neutron probe data were usually collected at two or three day intervals for each monitor site. However, no readings were taken during one week in early May. This gap in the data was caused by failed batteries in the neutron probe and personnel illness.

The daily ET was calculated by using the water balance equation, as shown in Equation 32.

$$ET_n = (SM_n - SM_{n+1}) + I_n + R_n \quad (32)$$

where

ET_n = calculated ET for day n, inches/dy
SM_n = measured or estimated soil moisture on day n, inches
SM_{n+1} = measured or estimated soil moisture on day n+1, inches
I_n = irrigation water measured in catch can on day n, inches
R_n = rainfall measured on day n, inches.

An assumption of negligible drainage beyond the probe monitoring depth is implicit in Equation 32. This assumption was affirmed by inspection of the incremental soil moisture estimates at various rooting depths. Daily calculated values of ET are shown in Appendix C.

The initial estimate of daily ET is labeled "raw ET" in Appendix C. These data show an extreme amount of variability, with severe positive/negative fluctuations evident. This variation can be in part attributed to a time lag in distribution of water through the profile. Daily water balance calculation will also cause fluctuation in evapotranspiration data as a result of small errors in soil moisture measurements. Measurements with the neutron probe will reflect some amount of intrinsic variability due to the random nature of neutron emmissions and other sources of measurement noise. To mitigate this daily variability, a three day moving mean smoothing technique was applied to the measured soil water data. Equation 33 was used to calculate the smoothed values of soil water in Appendix C.

$$SMn = \frac{(SMn-1) + (SMn) + (SMn+1)}{3} \qquad 33$$

where

SMn = measured or estimated soil water on day n, inches

Daily evapotranspiration rates were calculated using the water balance method (Equation 32) and the smoothed soil water data. The results of these calculations are also tabulated in Appendix C under the column "smooth ET." Once again these data show extreme variability. The ET data were smoothed for the purpose of presentation and analysis because daily ET variations were of no particular interest.

The results of this smoothing procedure are shown under the column of "second smooth ET" in Appendix C. Although some fluctuation still remains, it is not as severe as before and is generally limited to dates near water application. The data obtained from the last smoothing procedure was assumed to be the best estimate of measured crop ET during the experiment for all sites.

Estimates of available soil water were required for all of the tested evapotranspiration models. To obtain the amount of daily available soil water, estimates of field capacity, permanent wilting point, and root zone depth were required. Soil water measurements at each site were investigated throughout the season to estimate these parameters. Periods of extremely wet and extremely dry soil moisture conditions were analyzed to estimate the field capacity and permanent wilting point of the soil. Field capacity was estimated to be 2.0 in/ft (16.67 cm/m) and the permanent wilting point was estimated to be 0.5 in/ft (4.17 cm/m). The available water for this soil was therefore 1.5 in/ft (12.5 cm/m), which corresponds to SCS estimates (SCS, 1973).

Soil water measurements were also used to estimate crop rooting depth. The data showed clearly that depletion did not occur below four feet (1.2 m) in the profile. The four foot rooting depth implies that six inches of water is available to the crop.

The amount of available water in the profile is plotted against julian date for each site in Figures 17 through 24. Data shown in Figures 17 through 24 are only representative of the days when neutron probe measurements were taken.

Catch Can Data

Catch can data for each site were recorded whenever an irrigation occurred (see Appendix C, irrigation water applied).

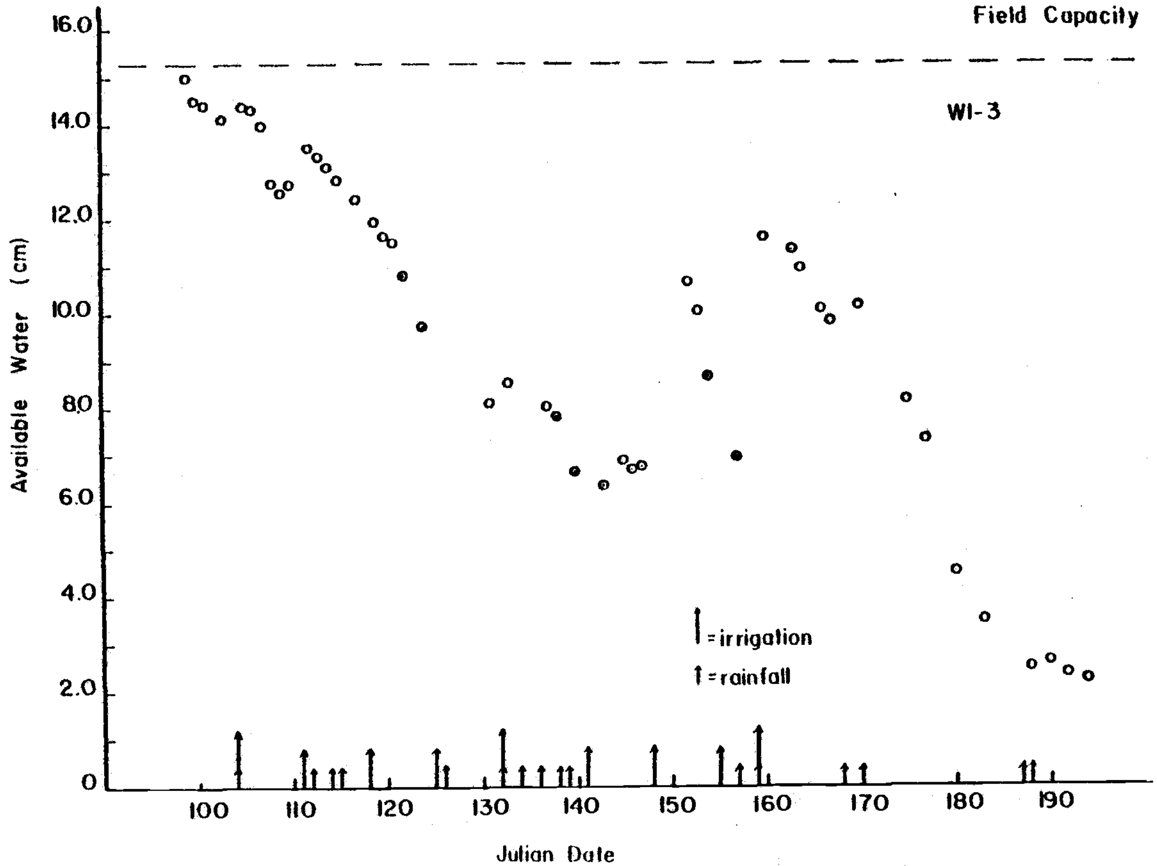

Figure 17: Available soil water verses julian date for site W1-3 as measured with the neutron probe.

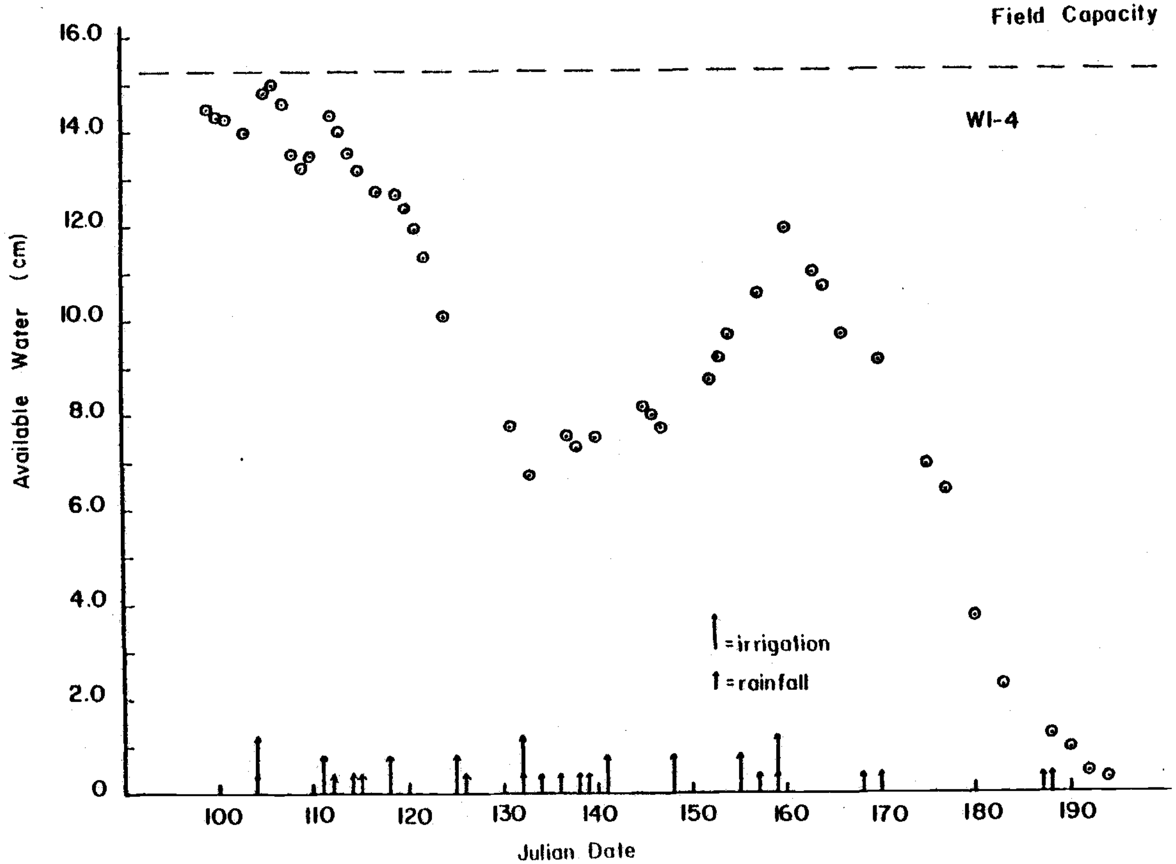

Figure 18: Available soil water verses julian date for site Wl-4 as measured with the neutron probe.

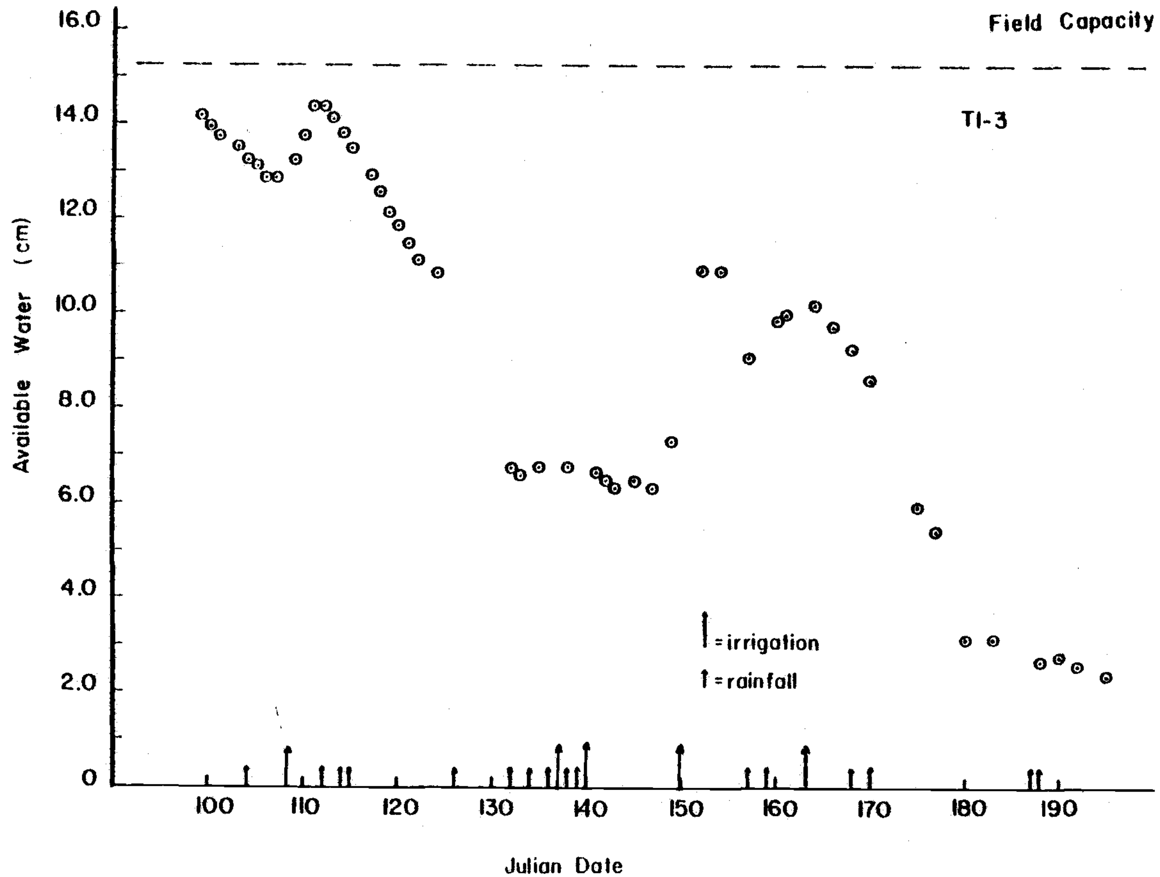

Figure 19: Available soil water verses julian date for site Tl-3 as measured with the neutron probe.

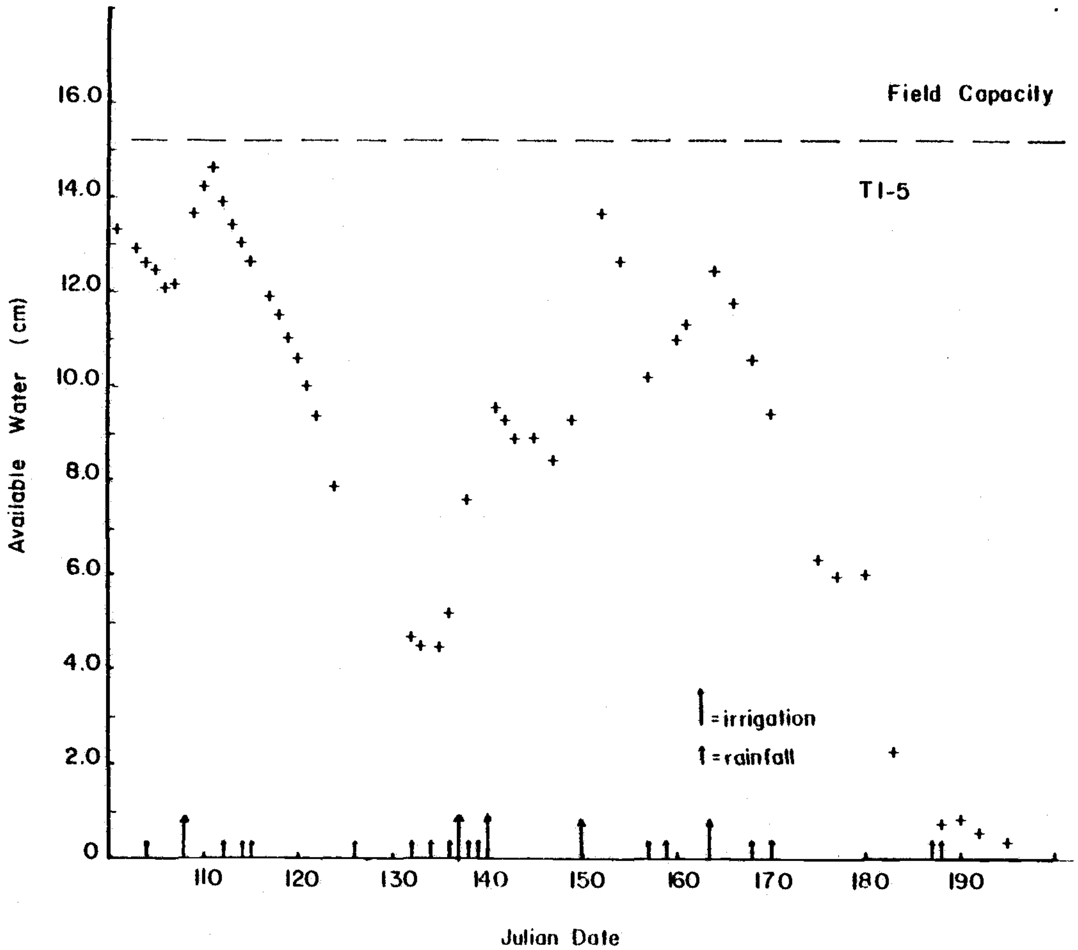

Figure 20: Available soil water verses julian date for site T1-5 as measured with the neutron probe.

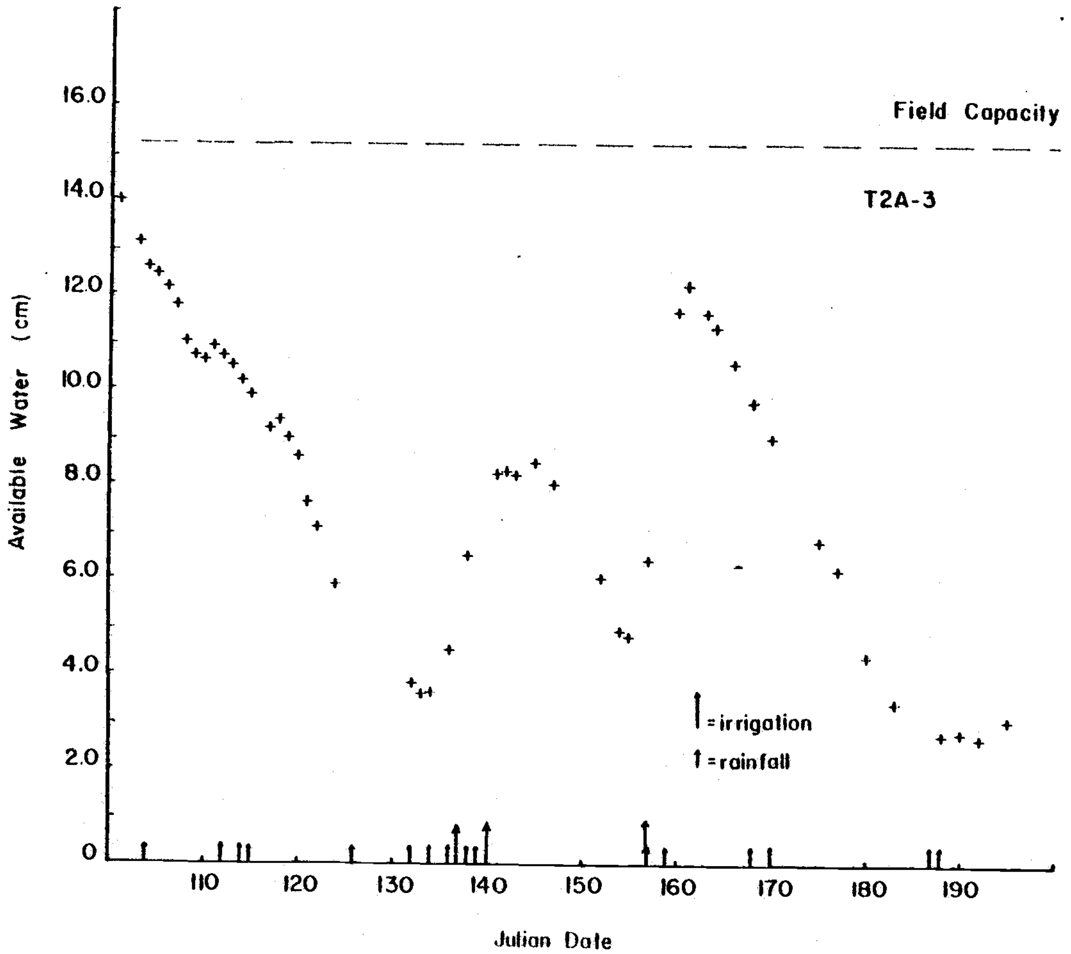

Figure 21: Available soil water verses julian date for site T2A-3 as measured with the neutron probe.

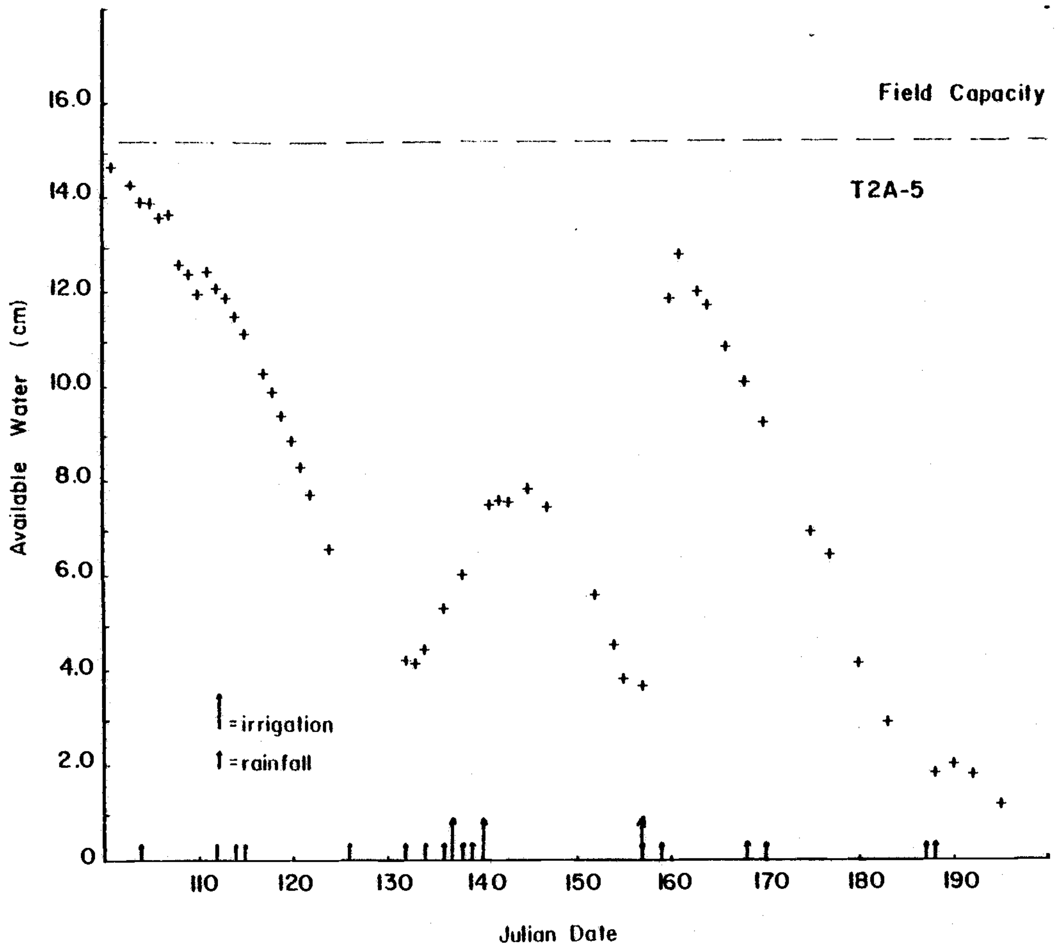

Figure 22: Available soil water verses julian date for site T2A-5 as measured with the neutron probe.

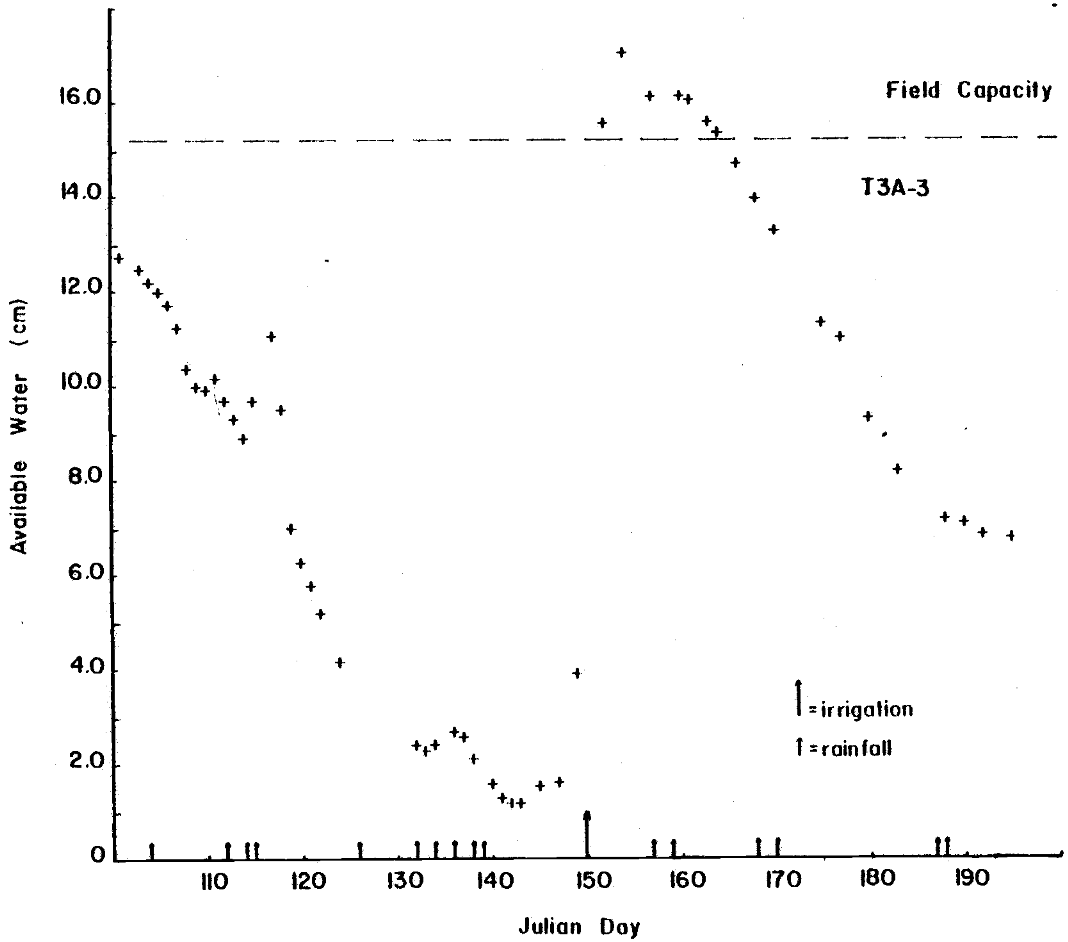

Figure 23: Available soil water verses julian date for site T3A-3 as measured with the neutron probe.

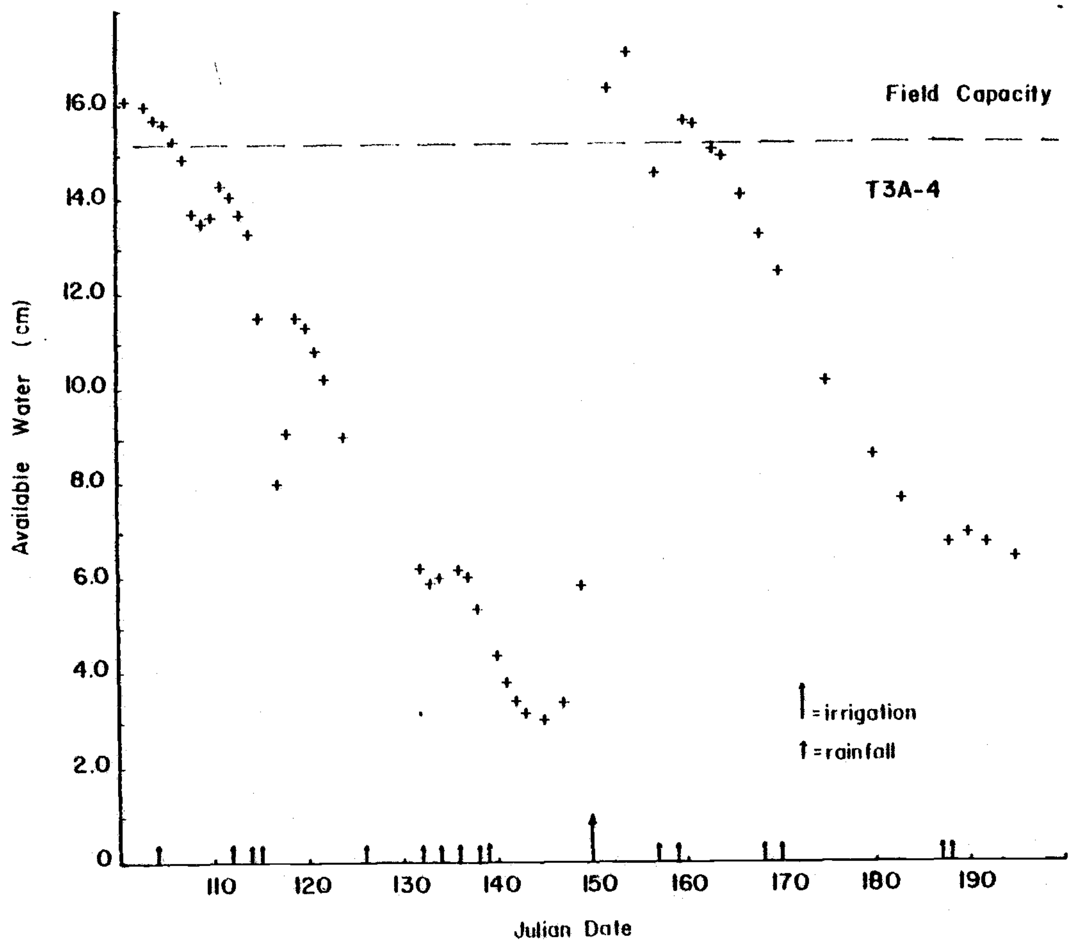

Figure 24: Available soil water verses julian date for site T3A-4 as measured with the neutron probe.

Maximum Crop Evapotranspiration

Estimates of maximum crop ET were required for this experiment. The values of maximum crop ET were adjusted by the test models to estimate actual crop ET.

Evapotranspiration calculations for a reference crop (alfalfa) were used, along with an appropriate crop curve, to estimate maximum crop ET. The crop curve for winter wheat was derived by Wright as discussed earlier (Figure 4).

Model Analyses

Three models were selected to analyze the ET response to depleting soil water. These were the logarithmic model (Jensen et al., 1973), the power model (Boonyatharokul and Walker, 1979) and the combination model (Slabbers, 1980) which were discussed in the literature review section. Each of these models represents a unique response function of ET to declining soil moisture.

Analysis of each model included the following procedures:

1. Model estimates of actual crop ET for each data site (W1-3, W1-4, T1-3, T1-5, T2A-3, T2A-5, T3A-3 and T3A-4) were generated.

2. The ratio of predicted values of crop ET to measured values was calculated and cumulative mass curves were plotted for measured ET, predicted ET and maximum ET.

3. A linear function was derived for each cumulative mass curve by linear regression. For each regression, the ordinate represents the dependent variable while the abscissa represents the independent variable.

4. The linear regression curve for each model was compared to the uncorrected ET estimate at that site.

5. A qualitative review of each cumulative mass curve, focusing on the effects of data anomalies was done.

After each individual model was analyzed, the season was separated into periods when available soil water was less than 50 percent. Three representative intervals were selected to analyze model responses under this soil moisture condition.

The cumulative mass curve approach was taken in this thesis because of the variability in measured ET data. The ratio of daily measured ET to predicted ET exhibits extreme fluctuation, and was not used in the model analysis. The cumulative mass curve of predicted versus measured ET helps smooth the daily variation in data. Linear regression analysis on these curves had two primary functions, (1) to give an unbiased estimate of the absolute deviation at the end of the season, and (2) to compare the model to uncorrected data at individual sites. Indirect "goodness of fit" can be inferred from the intercept and slope of regression curves (theoretically 0 and 1:1). The correlation coefficient (R^2) cannot be used as an indicator for a fit to measured data. It is presented only to illustrate the scatter of data points about the derived regression line.

Uncorrected ET

Maximum crop evapotranspiration was used to represent uncorrected ET values. A cumulative mass curve was used to compare these data to measured ET. A linear function was derived using regression techniques for this analysis. Results of the regression analysis (Table 11) can be used to compare the relative effect of each model.

These linear functions are shown with the cumulative mass curves for each site later in the thesis.

Table 11. Results of linear regression analysis for uncorrected ET estimates of crop evapotranspiration ($y = a + bx$).

Treatment	Data Pairs	a	b	R^2
W1-3	96	0.173	1.124	0.992
W1-4	96	0.759	1.105	0.995
T1-3	97	2.944	0.971	0.985
T1-5	96	2.369	0.965	0.993
T2A-3	97	2.201	1.169	0.991
T2A-5	97	1.240	1.187	0.995
T3A-3	97	0.922	1.376	0.989
T3A-4	97	1.336	1.275	0.990

RESULTS

Logarithmic Model

As developed in the literature review section, the logarithmic model of ET response to limiting soil moisture is given by Equation 8.

$$Ka = \frac{\log(AW+1)}{\log(101)} \qquad 8$$

where

Ka = coefficient relating maximum crop ET to soil moisture status (see Equation 5)
AW = percentage of available water remaining within the profile.

A computer program using the measured parameter of available water and the estimates of maximum crop ET (from weather data) was used to calculate predicted values of crop ET for each site.

Results of the logarithmic model are presented in Appendix D. Shown there are the measured available soil water, the moisture coefficient (Ka), the predicted crop ET, the measured crop ET, the ratio of measured to predicted ET, and a cumulative mass balance analysis.

Figures 25 through 32 present the cumulative mass curves for each site. The occassional sharp deviation in these curves are the result of negative ET measurements. These measurements can be attributed to the lag time

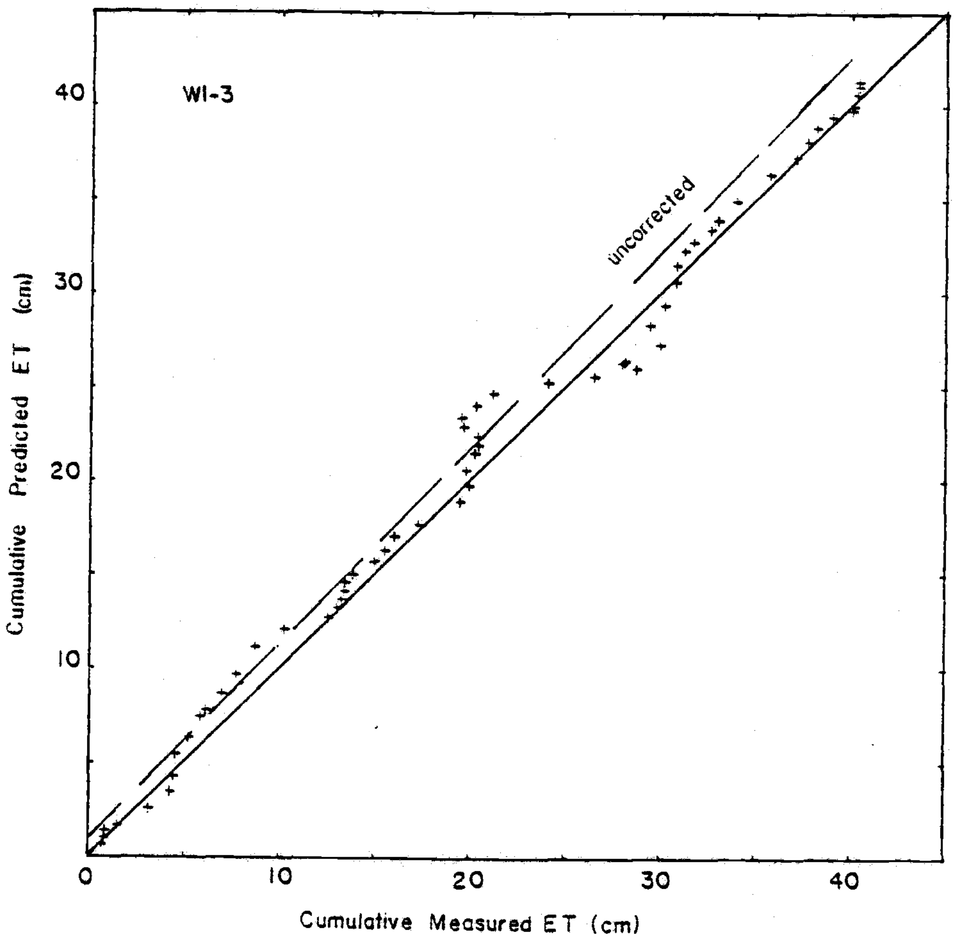

Figure 25: Cumulative double mass curve for site Wl-3 using the logarithmic model.

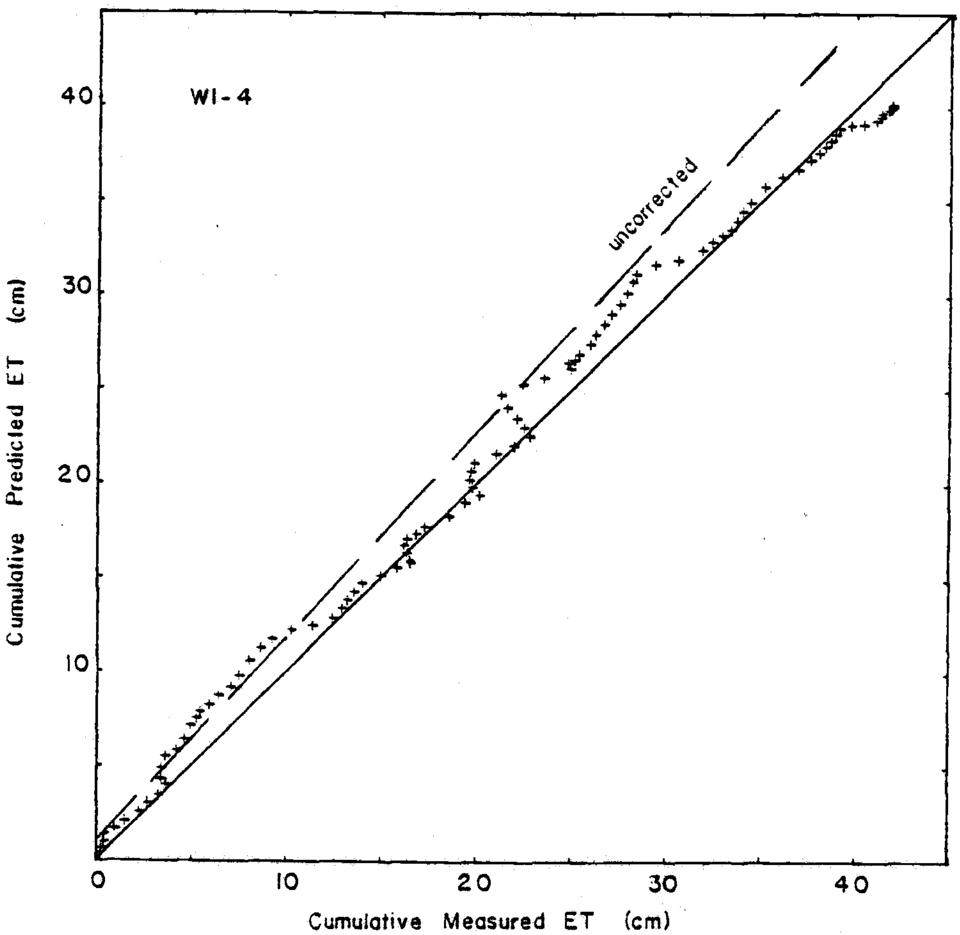

Figure 26: Cumulative double mass curve for site Wl-4 using the logarithmic model.

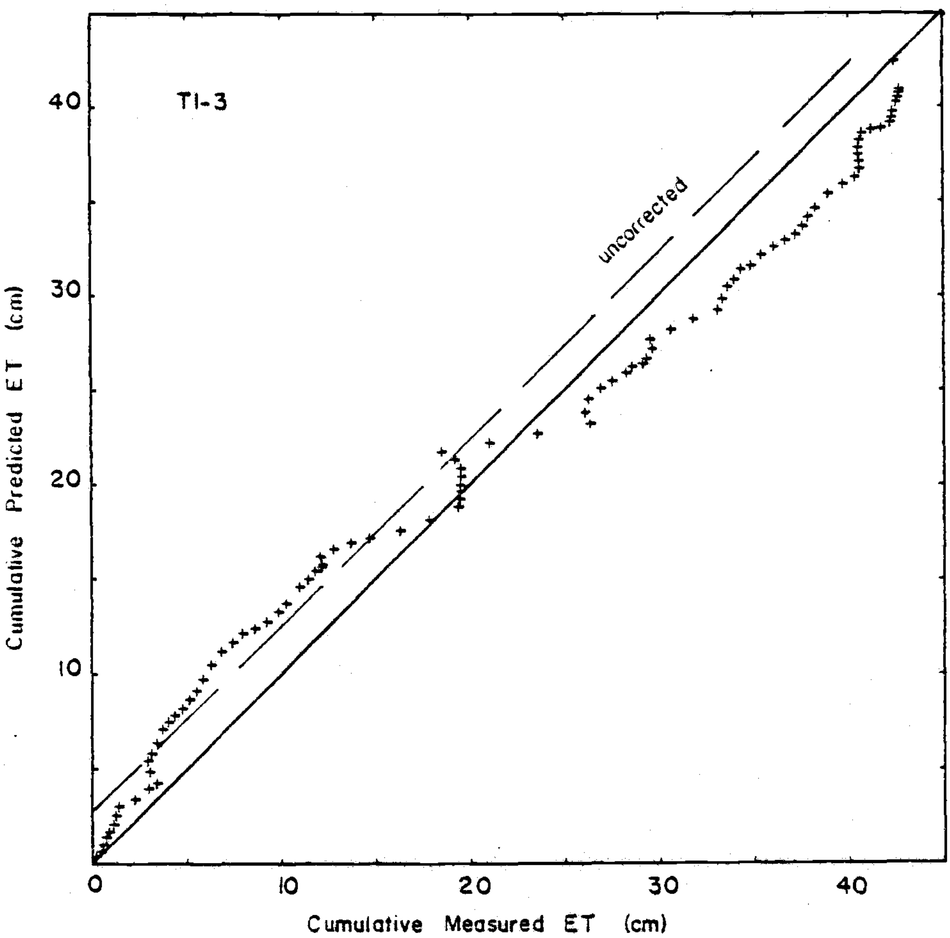

Figure 27: Cumulative double mass curve for site T1-3 using the logarithmic model.

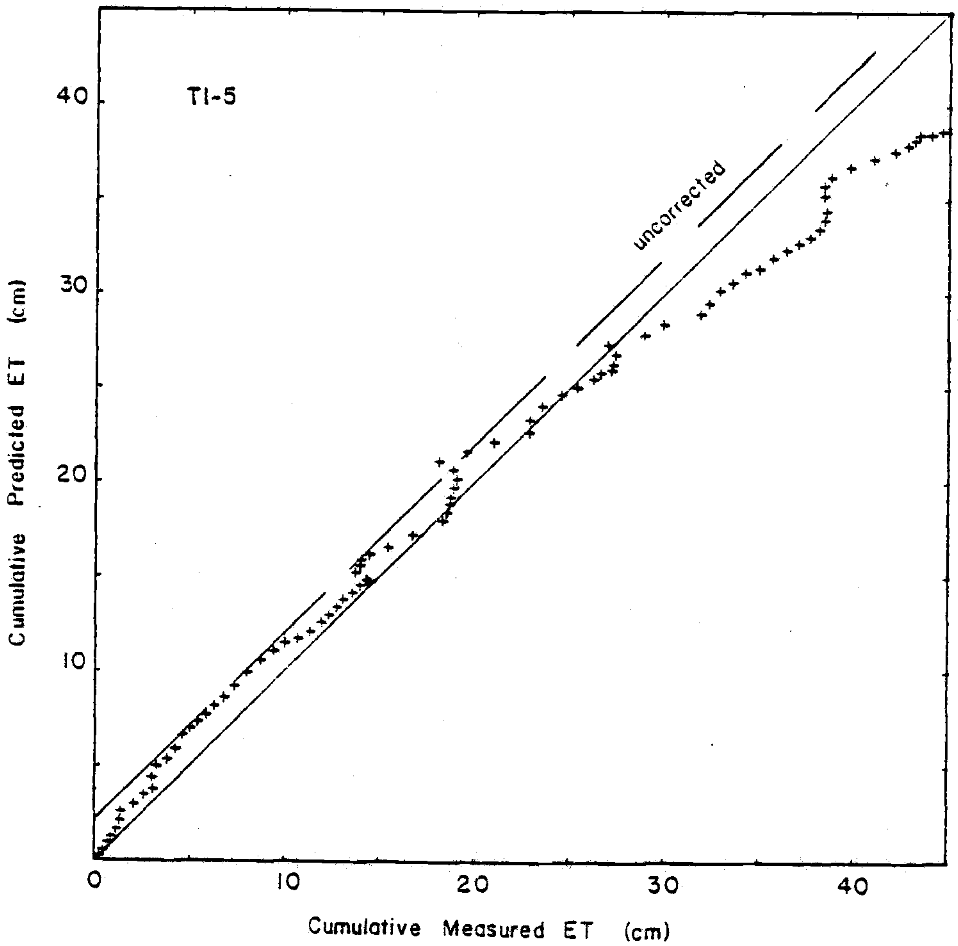

Figure 28: Cumulative double mass curve for site T1-5 using the logarithmic model.

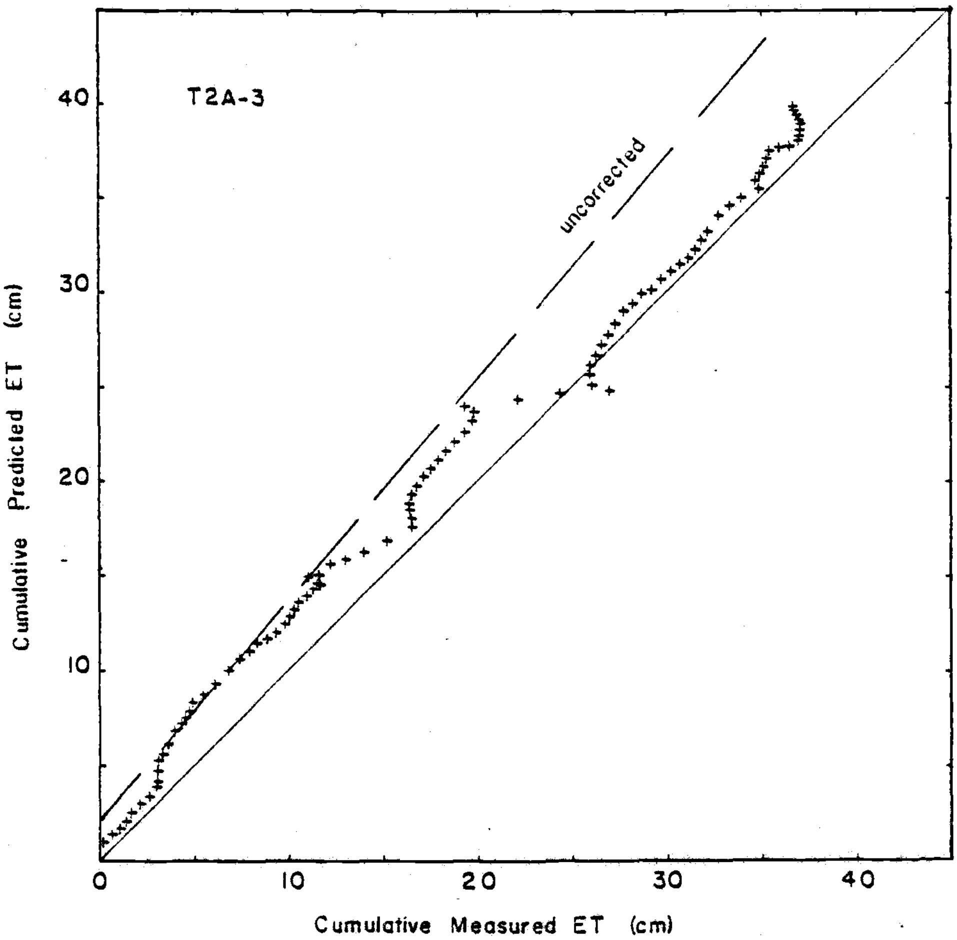

Figure 29: Cumulative double mass curve for site T2A-3 using the logarithmic model.

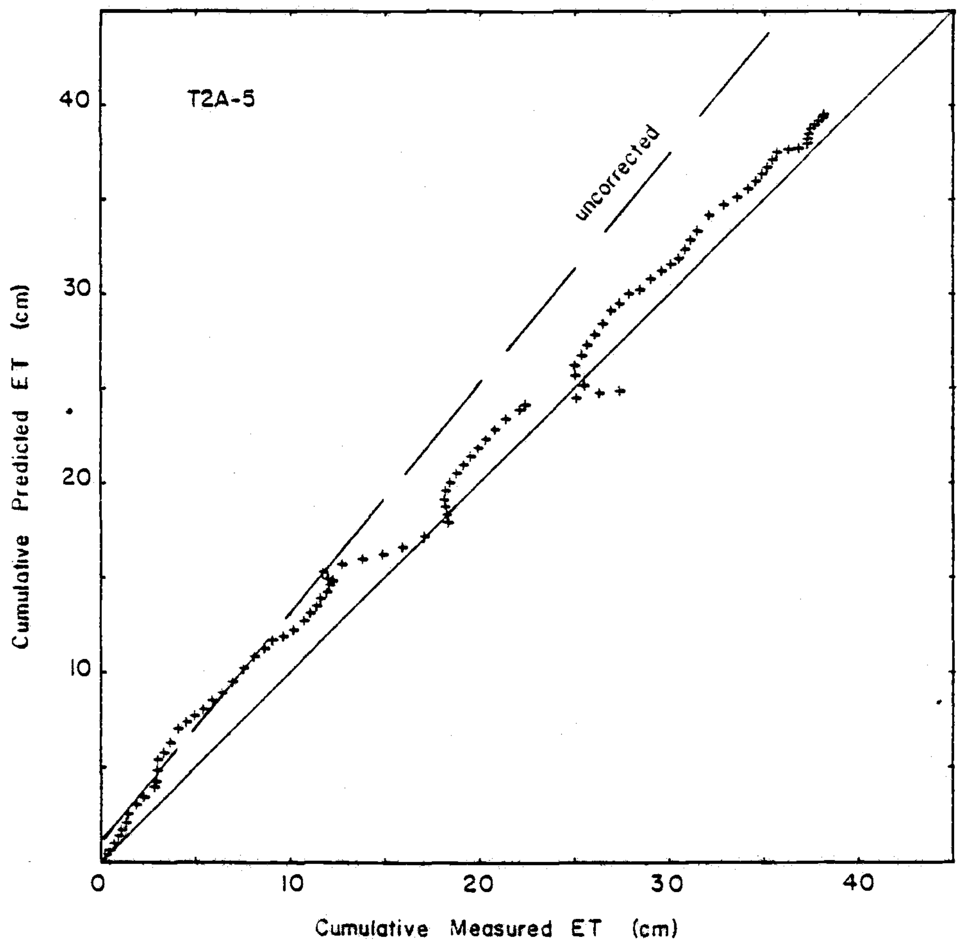

Figure 30: Cumulative double mass curve for site T2A-5 using the logarithmic model.

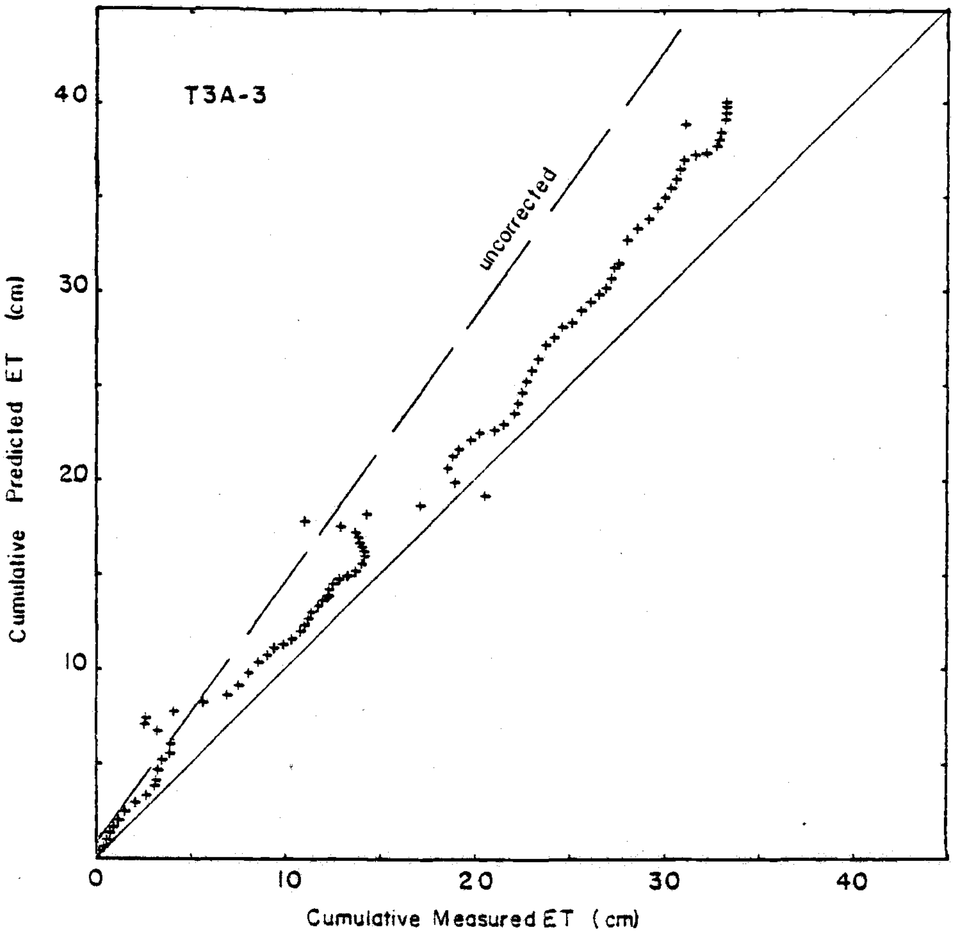

Figure 31: Cumulative double mass curve for site T3A-3 using the logarithmic model.

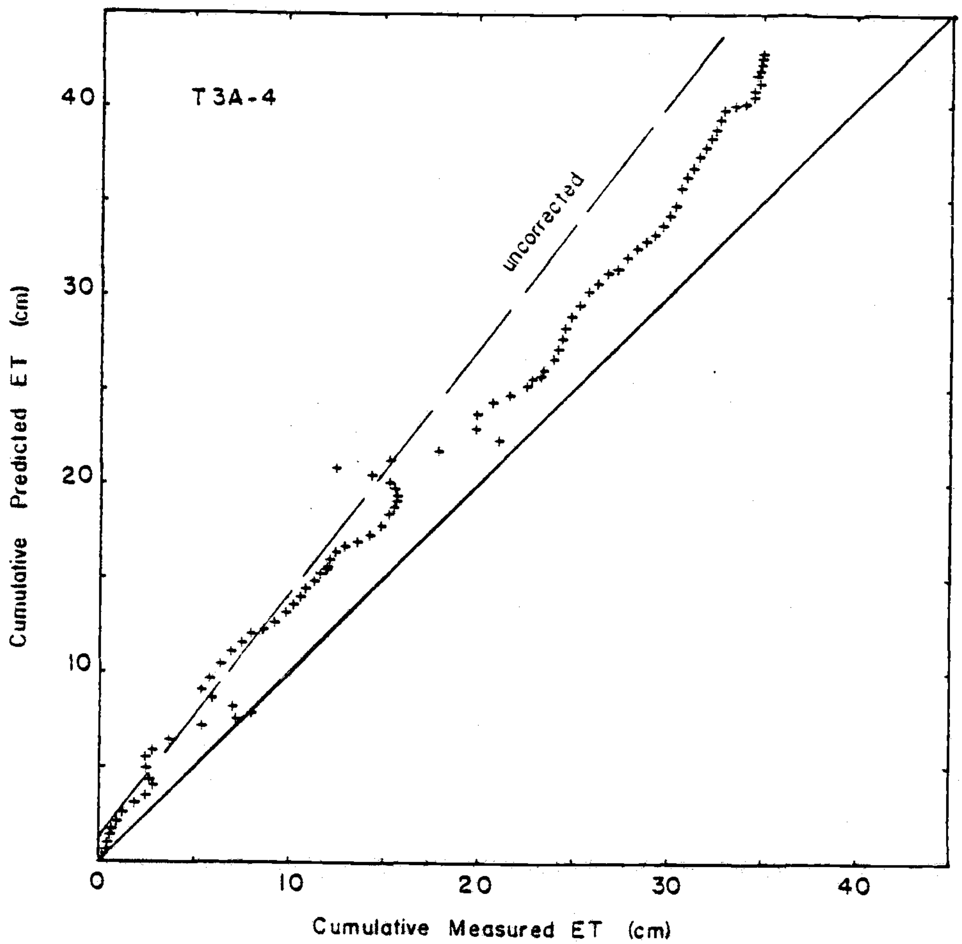

Figure 32: Cumulative double mass curve for site T3A-4 using the logarithmic model.

involved in redistribution of water through the profile. The application of water to a crop does not appear in the neutron probe measurements for one or two days. This time lag effect may be caused by the uncertainty in estimating soil water for the top foot with a neutron probe.

Table 12 gives results of the linear regression analysis for each cumulative mass curve. The final absolute deviation of predicted versus measured cumulative ET is also given in Table 12.

Table 12. Results of linear regression analysis for the logarithmic model cumulative mass curves (y = a + bx). e' is the deviation of predicted ET from measured ET at the end of the season.

Treatment	a	b	R^2	e' (cm)
W1-3	0.929	0.983	0.992	0.2
W1-4	1.631	0.956	0.993	-0.2
T1-3	3.457	0.835	0.986	-3.6
T1-5	2.739	0.835	0.991	-4.8
T2A-3	2.460	0.972	0.991	1.4
T2A-5	1.915	0.983	0.994	1.3
T3A-3	0.825	1.118	0.989	3.6
T3A-4	1.613	1.124	0.990	5.9

The logarithmic model does a good job of fitting the measured ET data at sites W1-3 and W1-4. This model was noticably better late in the season. However, compared to the uncorrected data analysis (see regression line on Figures 25 and 26), the amount of correction by this model is insignificant. In theory, the weekly treatment (W1) should not have experienced any water stress (since the design irrigation interval in this area is one week). One would expect any valid model to reflect a good fit for weekly interval irrigation. Comparing the results between sites W1-3 and W1-4 showed similar responses throughout the season.

The logarithmic model did not fit the treatment T1 data very well. The cumulative mass curve for site T1-3 indicates an under-prediction of ET. However, over-prediction in the early season shifts the mass curve upwards, giving the impression of over-prediction throughout the first half of the season. Results for site T1-5 do not begin to show this under-prediction until mid-season. A better fit of the data for treatment T1 could have been attained using the uncorrected ET data. This indicates that the desired level of stress in the T1 treatment may not have been met.

The logarithmic model shows a much better fit of the data for treatment T2A, especially past mid-season. This is encouraging since the water stress to the crop should have been more prevalent in this time interval. Both site T2A-3 and T2A-5 reflect a similar cumulative mass curve, and the correction of ET data is significant. This treatment also graphically displays the effect of the time lag between applied water and neutron probe readings on ET data (see Figure 29). Regression analysis on this model (Table 12) shows a very favorable slope of the linear function (0.97 and 0.98).

Results of the model for treatment T3A are not as encouraging. Significant correction of the ET data is achieved, but the model over-predicts from mid-season on. The occurrence of the over-prediction generally coincides with the time of severe water stress.

Combination Model

Recalling the defining equations for the combination model, we have:

$$Ea = Ep \qquad \text{for } ASMt \geq f \cdot ASMo \qquad (12)$$

$$Ea = \frac{ASMt}{f \cdot ASMo} Ep \qquad \text{for } ASMt < f \cdot ASMo$$

(Slabbers, 1980)

Slabbers assumed that potential evapotranspiration (Ep) was equivalent to maximum crop evapotranspiration. For this model, the threshold level (f) was assumed to be 50 percent of available water. This threshold level is typically used for wheat and other grains.

A computer program was used to calculate predicted daily ET and compare these predictions to the measured values of ET (see Appendix E).

Figures 33 through 40 show the cumulative mass curves for the combination model.

The results of regression analysis on each cumulative mass curve are given in Table 13.

Results of the combination model for treatment W1 are very closely approximated by the uncorrected ET data. This model is in theory exactly equivalent to maximum crop ET (uncorrected ET) for irrigation intervals where water stress would not be imposed. The weekly treatment was designed to reflect this situation.

Treatment level T1 indicates a somewhat poorer model approximation than shown in treatment W1. The data would have been better represented by not correcting the maximum crop ET for soil moisture conditions. Results for site T1-3 does show a better fit in late season than uncorrected data, but the model significantly under-predicts at site T1-5.

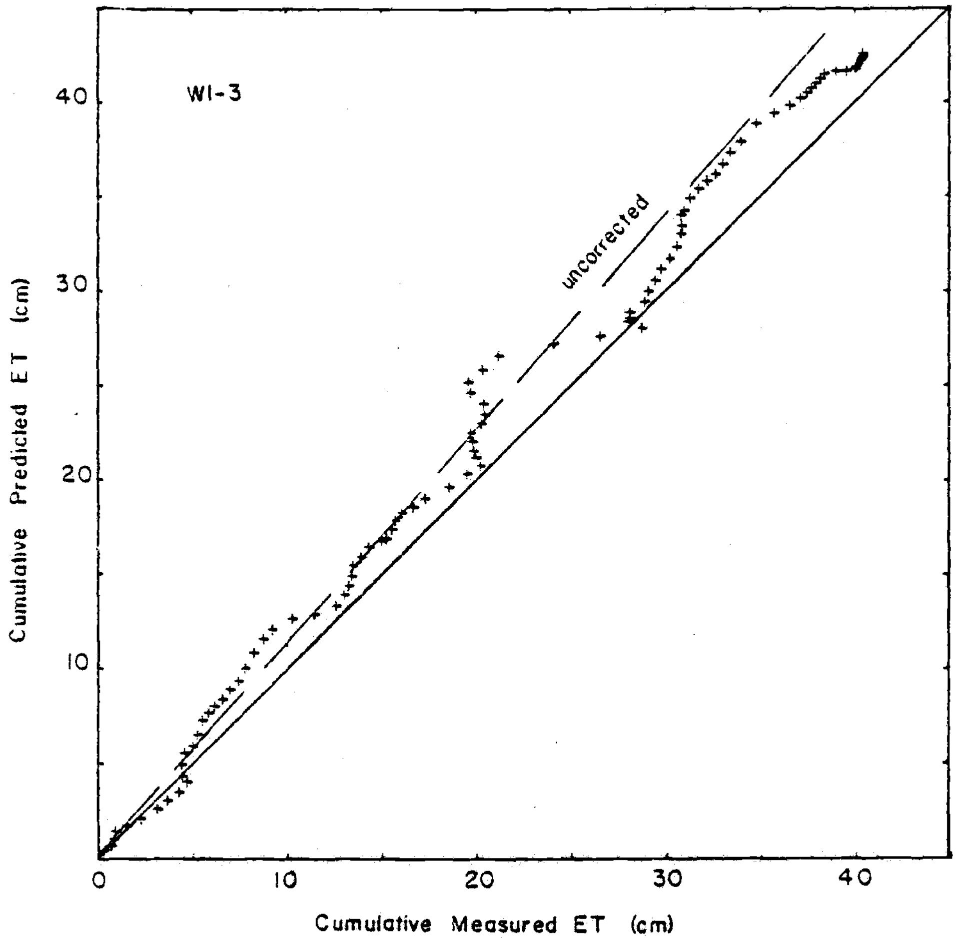

Figure 33: Cumulative double mass curve for site W1-3 using the combination model.

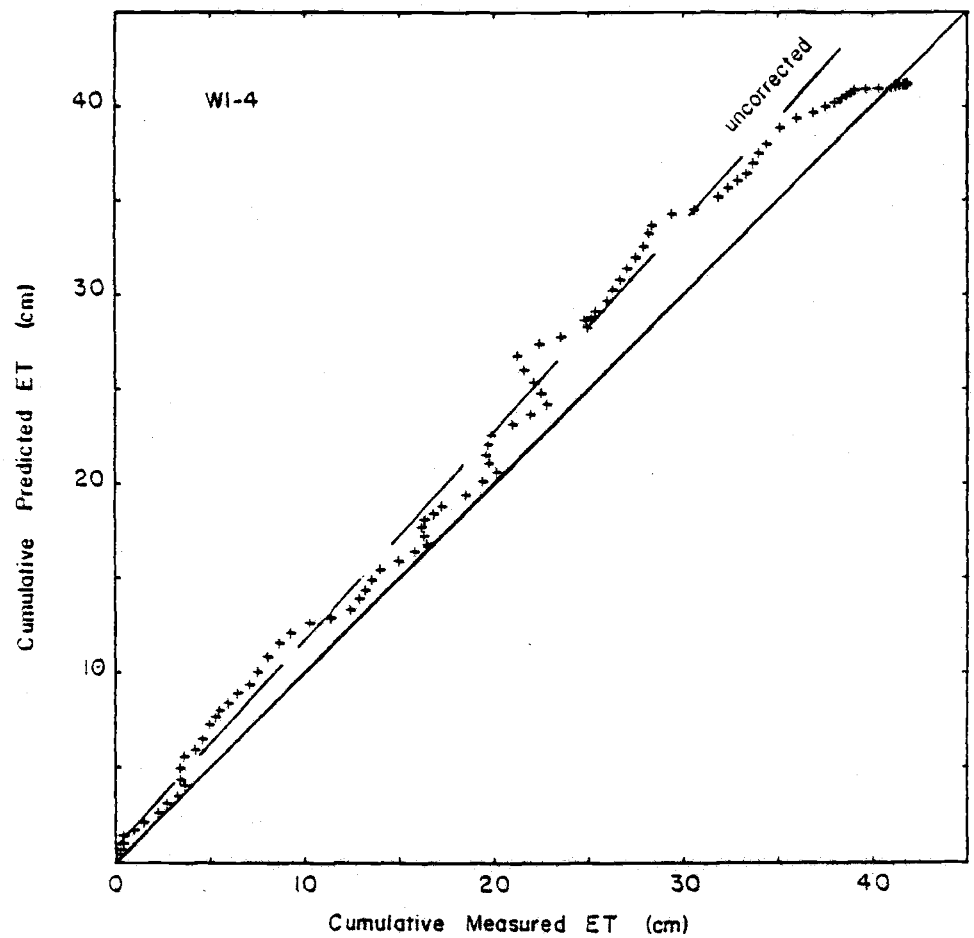

Figure 34: Cumulative double mass curve for site Wl-4 using the combination model.

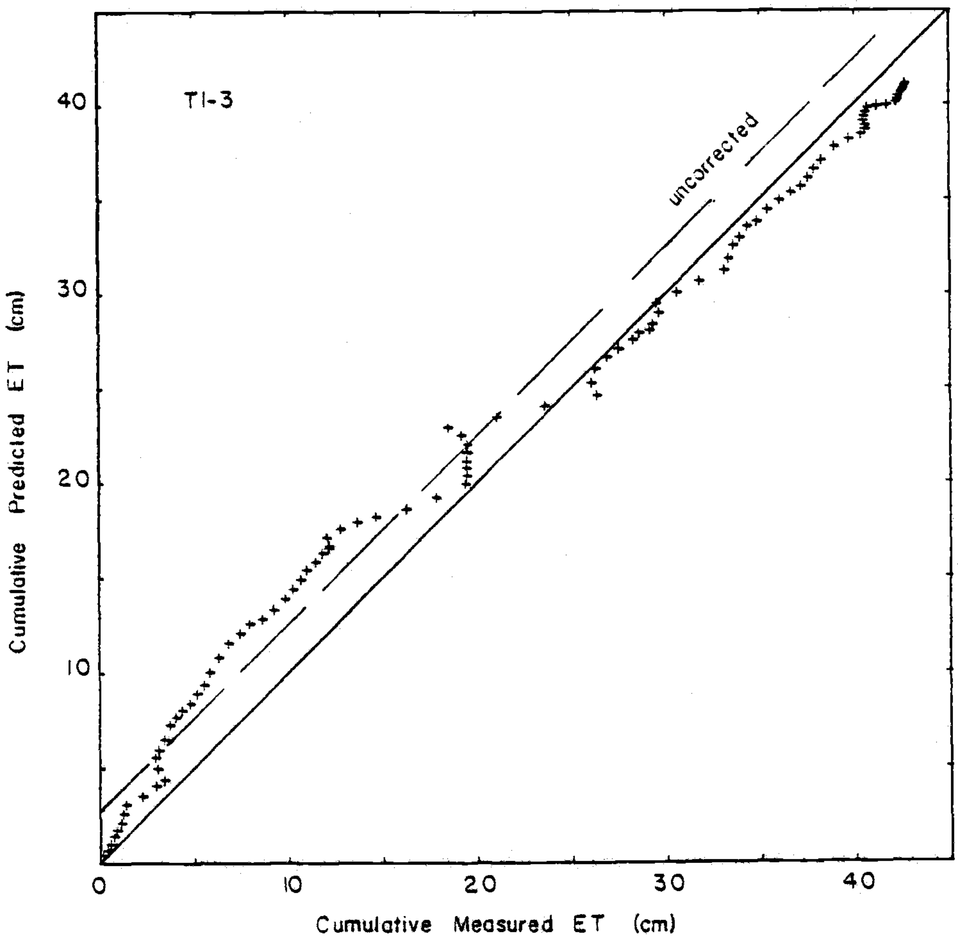

Figure 35: Cumulative double mass curve for site T1-3 using the combination model.

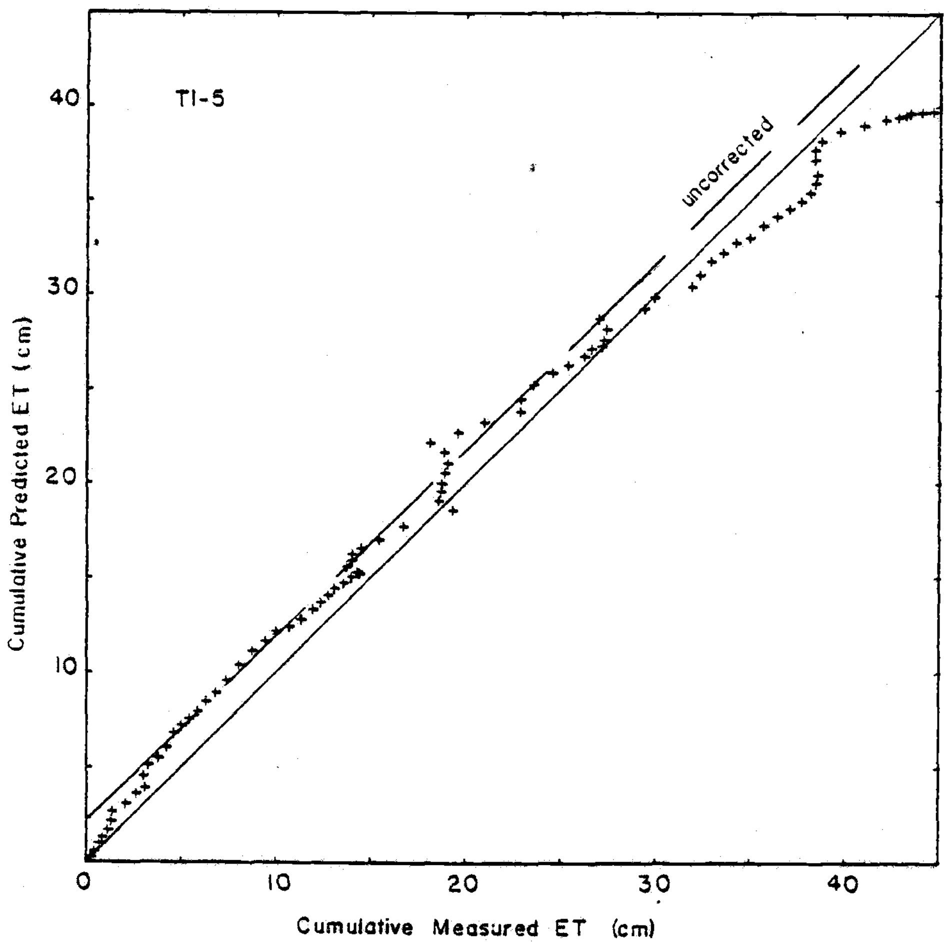

Figure 36: Cumulative double mass curve for site T1-5 using the combination model.

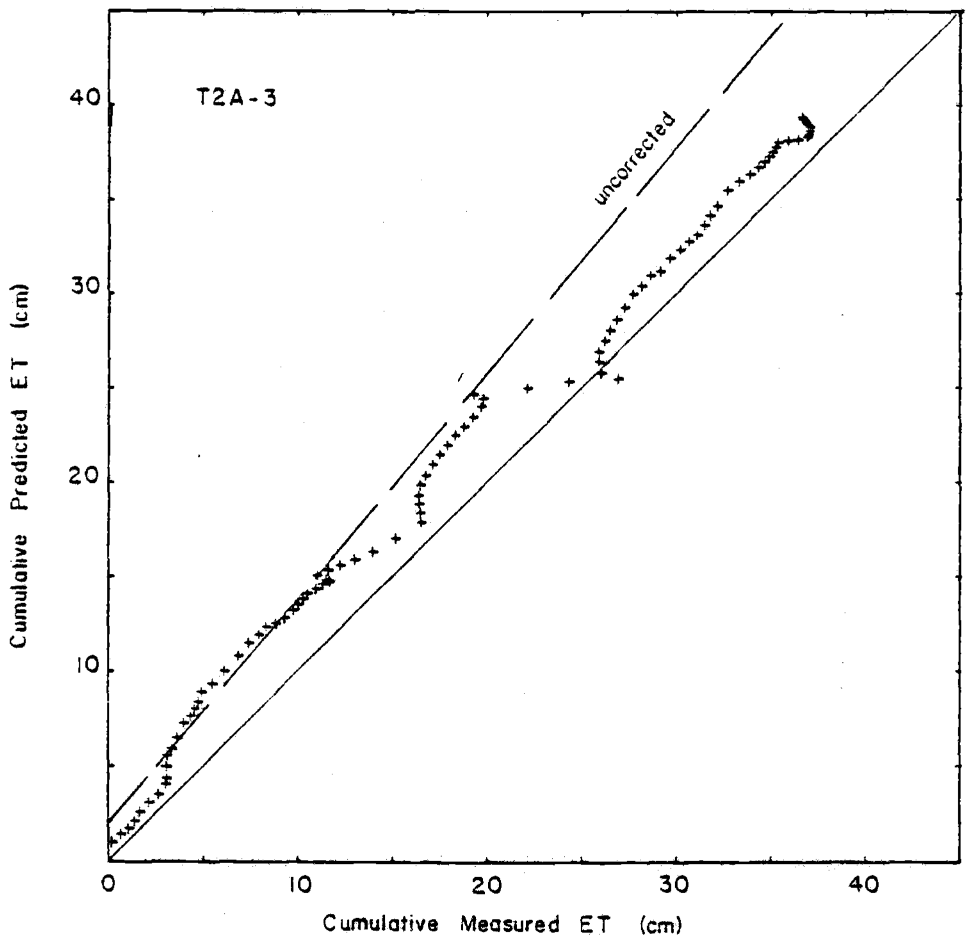

Figure 37: Cumulative double mass curve for site T2A-3 using the combination model.

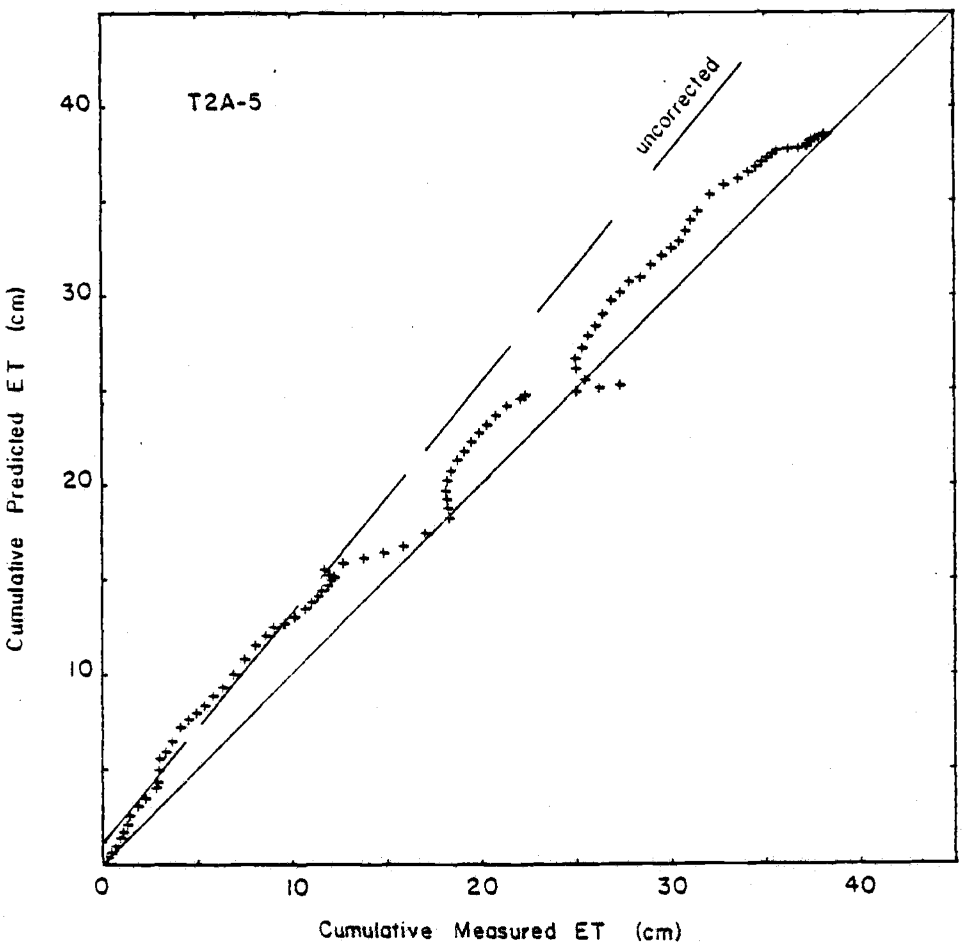

Figure 38: Cumulative double mass curve for site T2A-5 using the combination model.

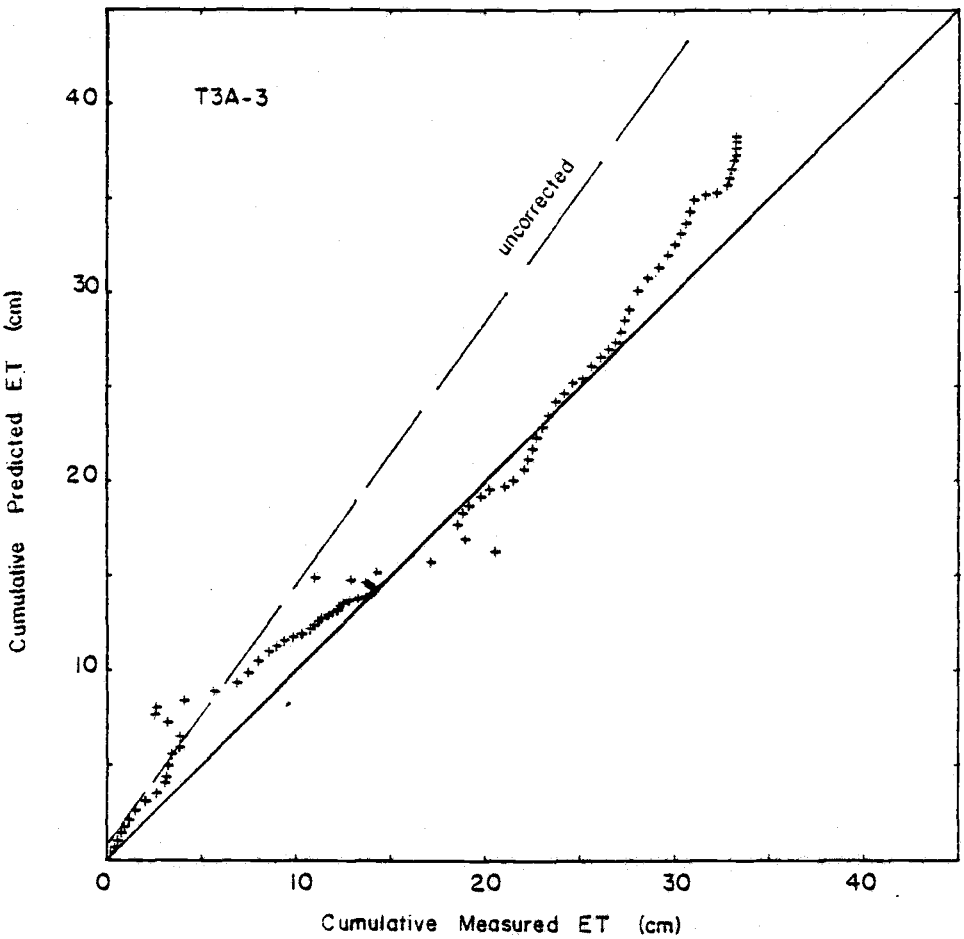

Figure 39: Cumulative double mass curve for site T3A-3 using the combination model.

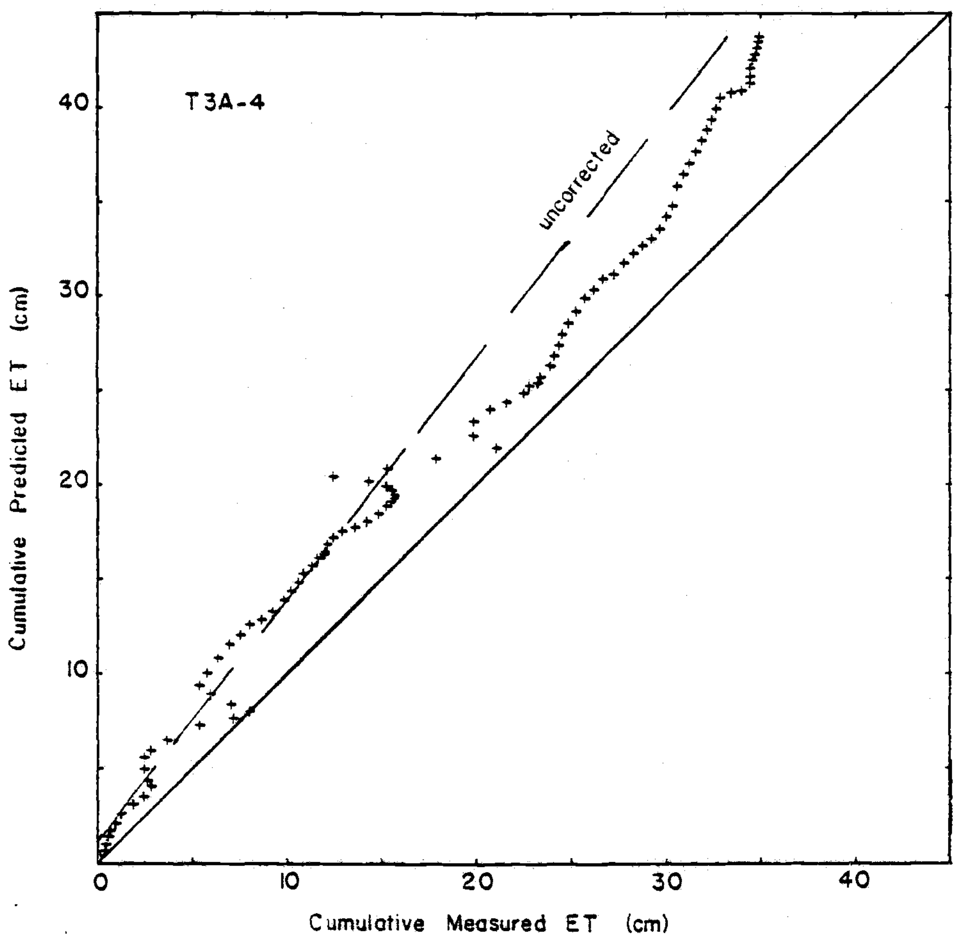

Figure 40: Cumulative double mass curve for site T3A-4 using the combination model.

Table 13. Results of linear regression analysis for combination model cumulative mass curves ($y = a + bx$). Ending deviation is e'.

Treatment	a	b	R^2	e' (cm)
W1-3	0.895	1.051	0.992	2.9
W1-4	1.657	1.021	0.987	2.5
T1-3	3.725	0.873	0.988	-1.7
T1-5	2.968	0.864	0.988	-3.2
T2A-3	2.797	0.986	0.990	2.3
T2A-5	2.282	0.984	0.991	1.7
T3A-3	1.091	1.061	0.974	3.1
T3A-4	1.791	1.126	0.986	6.2

Once again, the most encouraging results for model prediction occur at treatment T2A. This model significantly corrects the maximum ET data and shows a very good fit throughout the season. The slight over-prediction early in the season shifts the mass curves upwards, but this does not overshadow the seasonal model response.

Treatment level T3A reflects a generally good model approximation of measured data. This model does offer a significant correction to ET data. It also does not over-predict for as long a period late in the season as shown for the logarithmic model. However, the late season over-prediction is present.

Power Model

The final model analyzed was the power model presented by Boonyatharokul and Walker (1979). From the literature review section, the defining equations for this model are:

$$Ks = \left[1.0 - \left(\frac{Dp}{Dt}\right)^{m}\right]^{n} \qquad m,n>0 \qquad 9$$

$$m = 0.0281 + \frac{4.316}{Ro} + \frac{0.07592\ Ksat}{Ro \cdot ETp} \qquad 10$$

$$n = 8.777 - 32.4\ Rm + \frac{8.709}{Ro} + \frac{0.028\ Ksat}{Ro \cdot ETp} \qquad 11$$

Equations 10 and 11 were developed by the original authors (Boonyatharokul and Walker) to quantify the exponents used in the power model. These equations indicate that the exponents are dependent upon water uptake distribution in the root zone (Ro,Rm), saturated hydraulic conductivity (Ksat), and "potential" evapotranspiration (ETp). Aside from measurements for reference crop evapotranspiration, these parameters were not quantified in this research. Estimates of these parameters were made in the present analysis to implement the model for testing the ET response to declining soil moisture.

The water uptake distribution for irrigated winter wheat was approximated with functional relationship #3 (Table 1). This relationship is given by Equation 34.

$$R_3 = 1.800 - 1.60\ (z') \qquad 34$$

where

z' = depth as a fraction of total root zone depth.

Equation 34 reflects a relative water extraction pattern of 40, 30, 20, and 10 percent in each quarter layer of root depth from the top to bottom. This extraction pattern is commonly assumed for irrigated crops. The water uptake distribution parameters, Ro and Rm, are given by Boonyatharokul and Walker (1979) to be 1.80 and 0.3667, respectively.

Saturated hydraulic conductivity was more difficult to estimate for this experiment. Typically, this property exhibits a large degree of spatial variability on a field basis. The multitude of measurements required for a reliable estimate precluded field measurement of this property. The approach taken was to determine the range of expected saturated hydraulic conductivity for this soil from the literature and then perform a sensitivity analysis on the overall model with respect to this parameter.

Extreme values for saturated hydraulic conductivity in a sandy loam soil are 1.0 and 100 mm/dy (Freeze and Cherry, 1979; Brady, 1974). Values of 1.0, 10.0 and 100.0 mm/dy for saturated hydraulic conductivity were used for the sensitivity analysis.

The functional relationship for exponents m and n were investigated (Equations 10 and 11) with respect to water uptake function #3 (Table 1) and the variables, potential ET and saturated hydraulic conductivity. Results of this analysis are shown in Figure 41.

Figure 41 shows a noticeable sensitivity to saturated hydraulic conductivity between the values of 10.0 and 100.0 mm/dy. Also, the exponents become more sensitive to potential ET as this value approaches zero. This result is not surprising since in the last term Equations 10 and 11 go to infinity as ETp approaches zero. It is important to notice that the last terms in Equations 10 and 11 only become significant at high values of Ksat or low values of ETp. Otherwise, the exponents are predominately a function of water uptake distribution.

The power model was compared to measured ET data using the three previously selected values of saturated hydraulic conductivity (1.0, 10.0 and 100.0 mm/dy). Cumulative mass curves for each level of saturated hydraulic conductivity

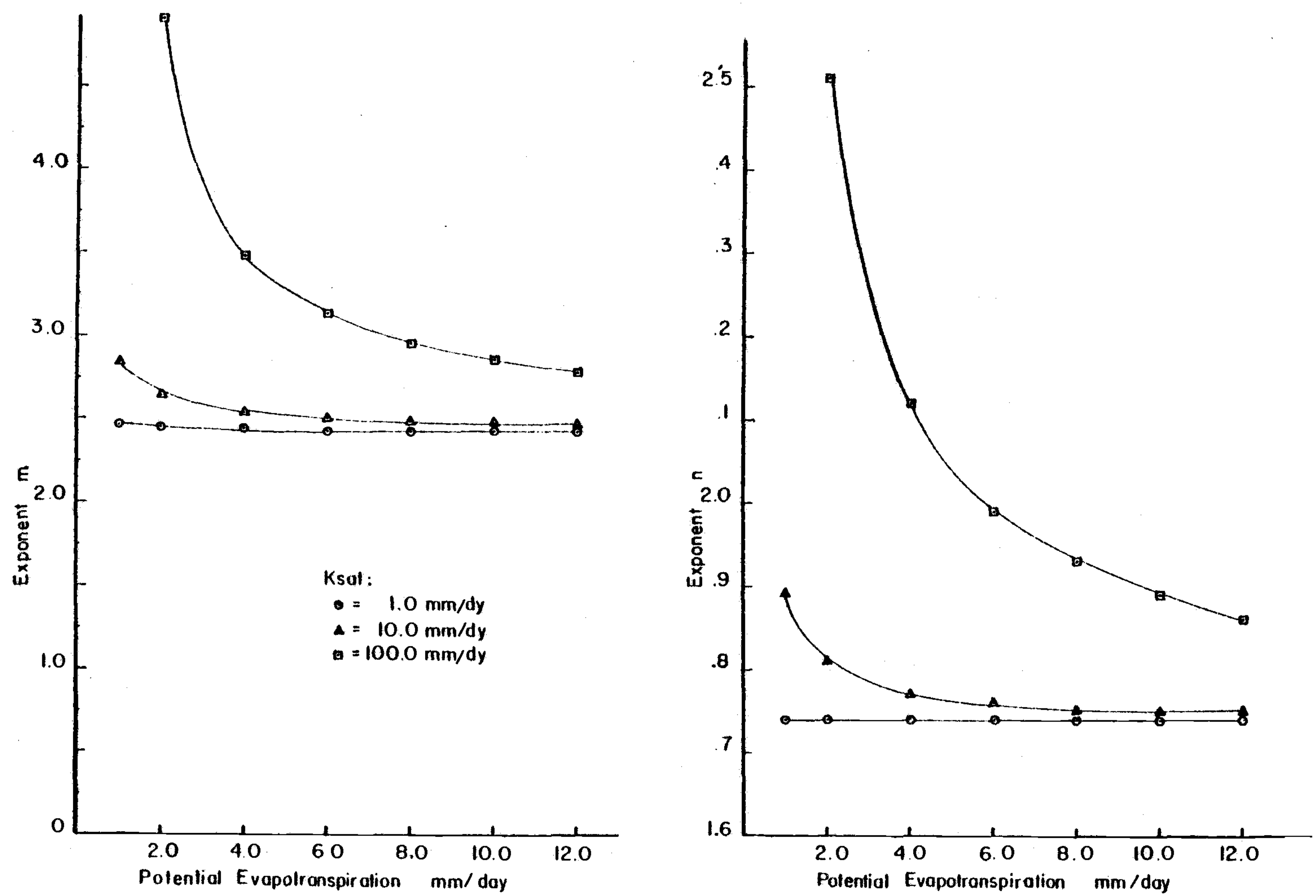

Figure 41: Functional relationships of power model exponents (m and n) for various levels of saturated hydraulic conductivity (Ksat).

were generated and regression analysis was performed in a similar manner as presented for the two previous models. Results of this regression analysis are presented in Table 14.

Table 14 can be used to compare the overall sensitivity of the power model ET predictions with respect to saturated hydraulic conductivity. The results show that from three distinct values of saturated hydraulic conductivity, the only appreciable difference in regression equations occurs between Ksat = 10.0 and 100.0 mm/dy. These differences, for all eight data sites, are small compared to the order of magnitude change in saturated hydraulic conductivity. These results indicate that the power model of Boonyatharokul and Walker was not sensitive to saturated hydraulic conductivity for this soil. It should be remembered that this soil is relatively light, and should exhibit good water transmissibility. A heavier soil would possess a lower average value for saturated hydraulic conductivity than investigated here, and this value would in effect cause the last term in Equations 10 and 11 to be insignificant. This point becomes very important if the design engineer is faced with substantial field measurements of saturated hydraulic conductivity, at a considerable cost of time and money, in order to use the power model presented here. For the purpose of this thesis, a saturated

Table 14. Results of linear regression analysis for power model cumulative mass curves ($y = a + bx$). Ending deviation is shown as e'.

Treatment	Ksat = 1.0			Ksat = 10.				Ksat = 100.0		
	a	b	R^2	a	b	R^2	e' (cm)	a	b	R^2
W1-3	1.921	0.860	0.987	1.886	0.869	0.988	-3.4	1.573	0.935	0.989
W1-4	2.650	0.829	0.982	2.617	0.837	0.982	-4.2	2.339	0.900	0.984
T1-3	4.337	0.701	0.978	4.322	0.709	0.979	-8.1	4.155	0.768	0.982
T1-5	3.213	0.726	0.985	3.211	0.732	0.985	-9.0	3.177	0.782	0.986
T2A-3	3.063	0.754	0.986	3.064	0.763	0.986	-5.6	3.039	0.839	0.988
T2A-5	2.921	0.754	0.983	2.905	0.763	0.984	-6.1	2.756	0.837	0.986
T3A-3	0.798	0.864	0.960	0.821	0.869	0.961	-3.5	0.979	0.907	0.963
T3A-4	2.027	0.966	0.984	2.024	0.972	0.984	1.1	1.975	1.206	0.985

hydraulic conductivity of 10.0 mm/dy was assumed for the power model. This value represents an average expected for this soil. The cumulative mass curves for the eight data sites are given in Figures 42 through 49. Table 14 summarizes the regression analysis for these curves (see Appendix F for model calculations).

The cumulative mass curves for this model and treatment W1 show a fair approximation to measured data. An overall under-prediction in ET is evident graphically and reflected in the slopes of the derived regression lines (Table 14). A better approximation to measured data would be obtained with the uncorrected ET line.

The power model shows a much poorer prediction than the two previous models for data from treatment T1. The under-prediction of ET throughout the season is very obvious and unacceptable. It is seen that the uncorrected data would do a better job in this treatment.

The cumulative mass curves for treatment T2A also indicate a definite under-prediction of ET. Correction of the maximum ET data is required (as seen by the uncorrected line in Figures 46 and 47) but the power model fails to sufficiently correct this data.

The results for treatment level T3A do not show the under-prediction observed with the three previous treatments. This model tends to under-predict in the early

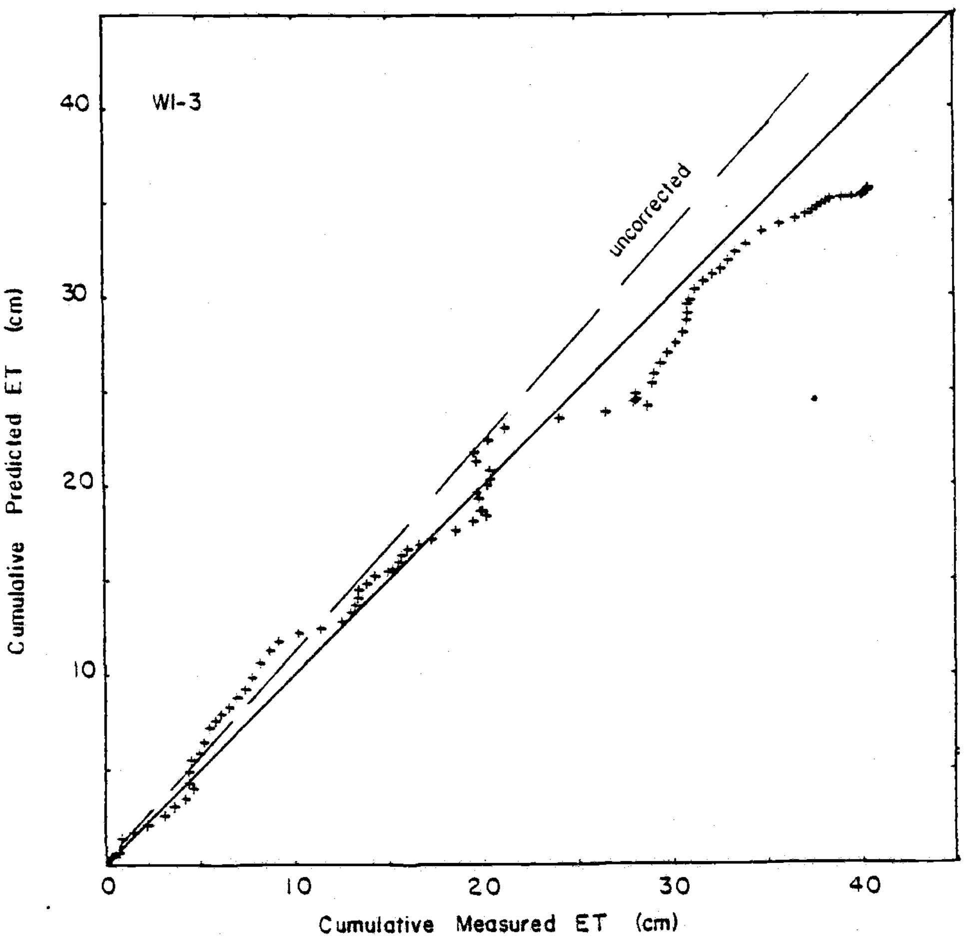

Figure 42: Cumulative double mass curve for site Wl-3 using the power model.

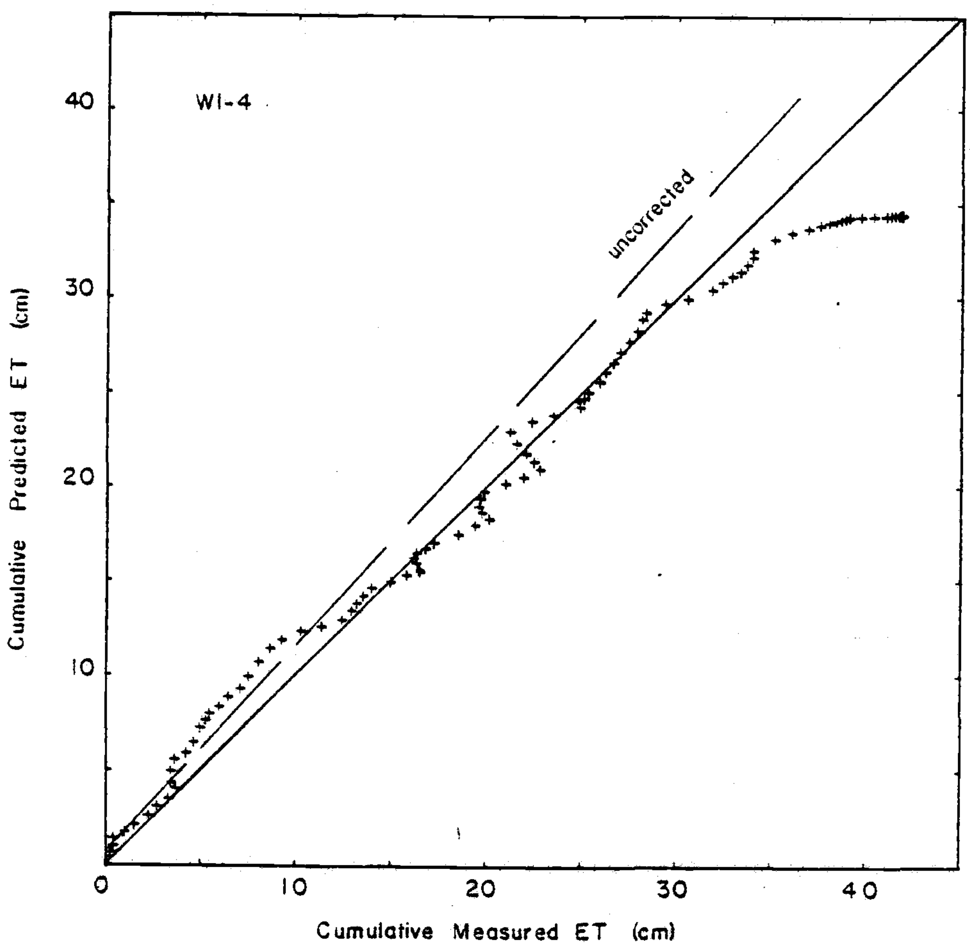

Figure 43: Cumulative double mass curve for site W1-4 using the power model.

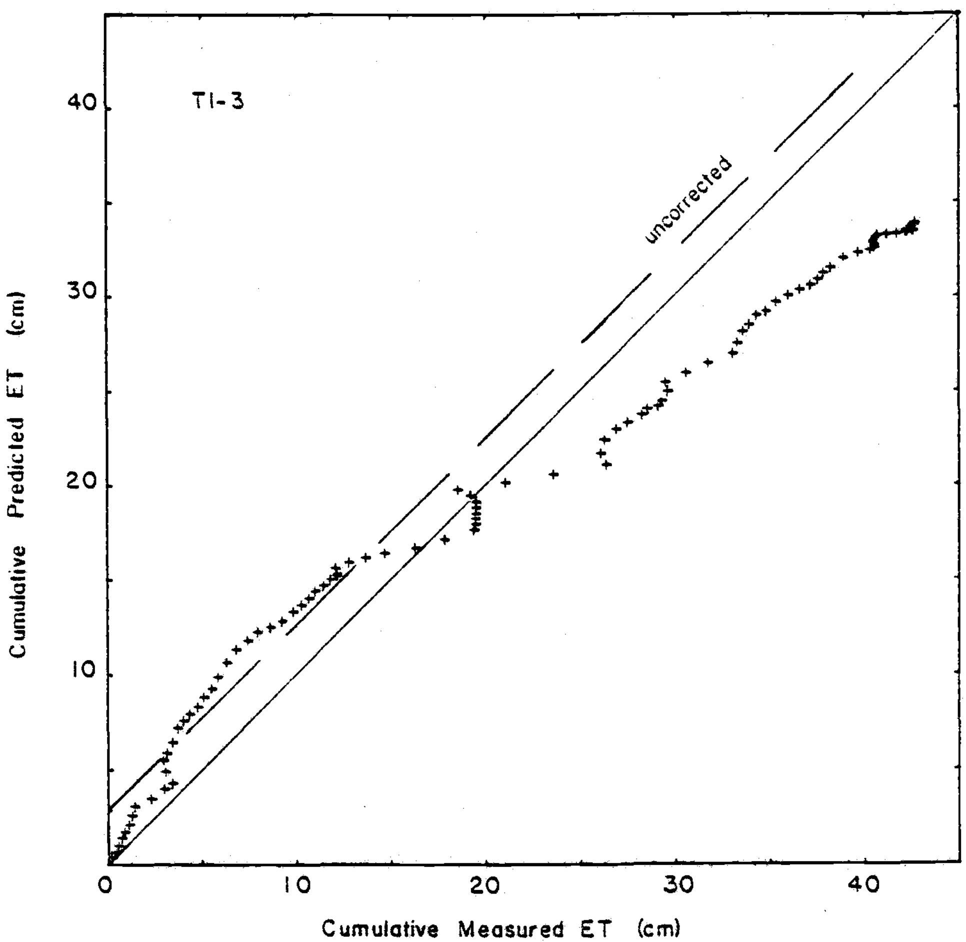

Figure 44: Cumulative double mass curve for site T1-3 using the power model.

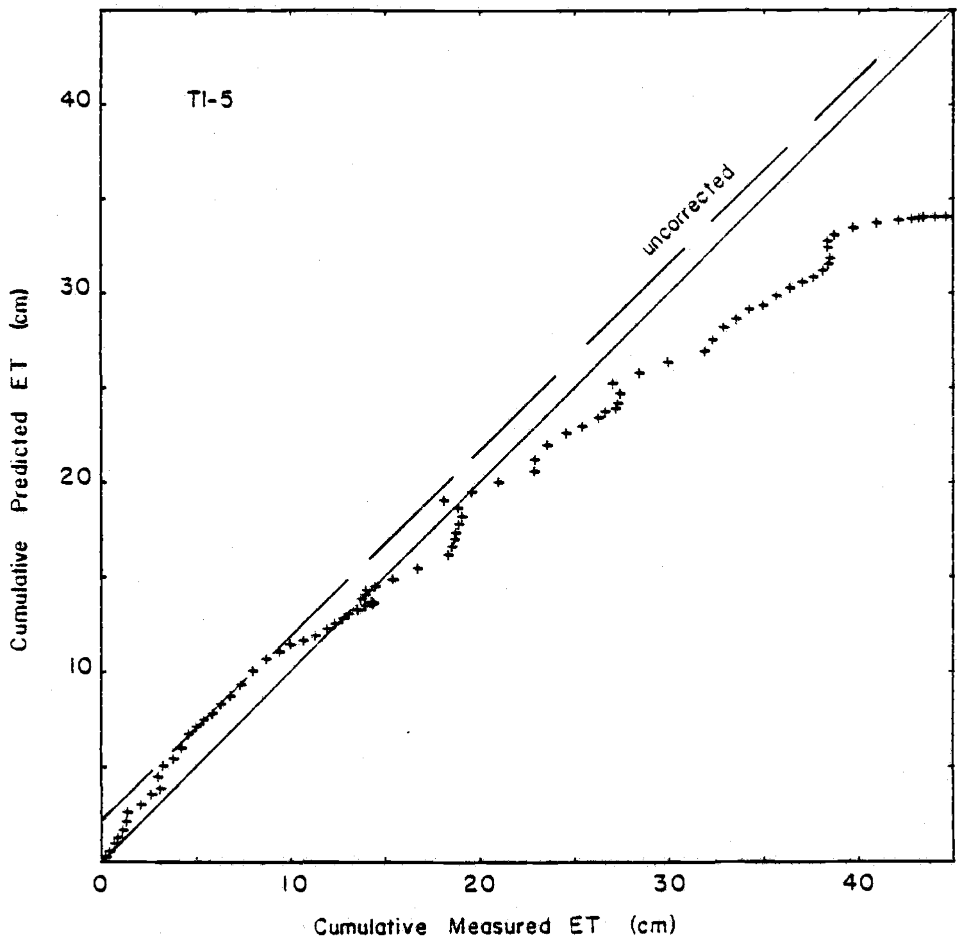

Figure 45: Cumulative double mass curve for site Tl-5 using the power model.

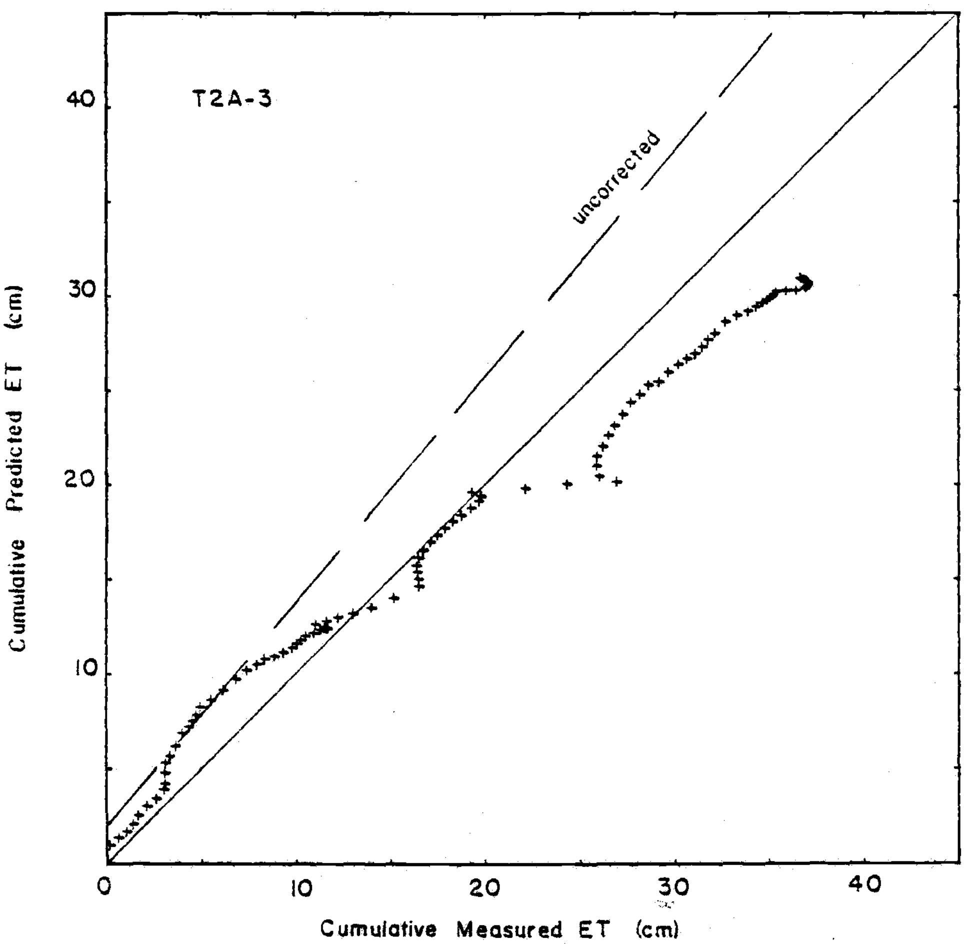

Figure 46: Cumulative double mass curve for site T2A-3 using the power model.

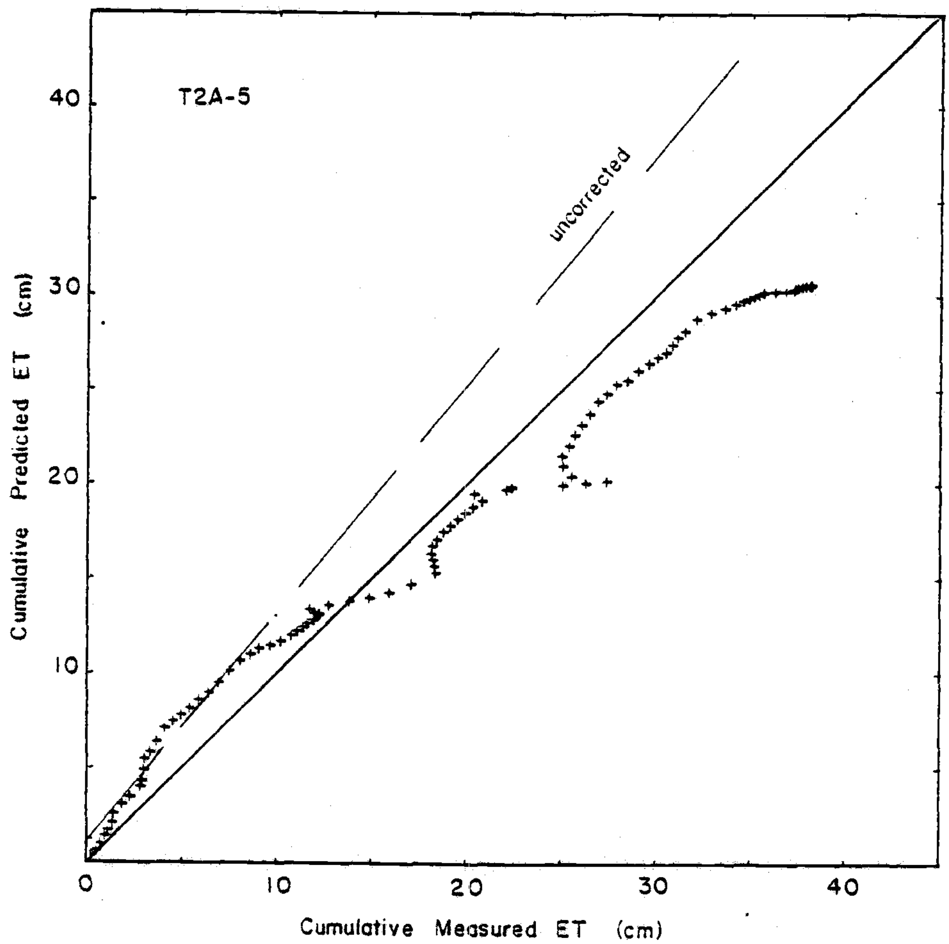

Figure 47: Cumulative double mass curve for site T2A-5 using the power model.

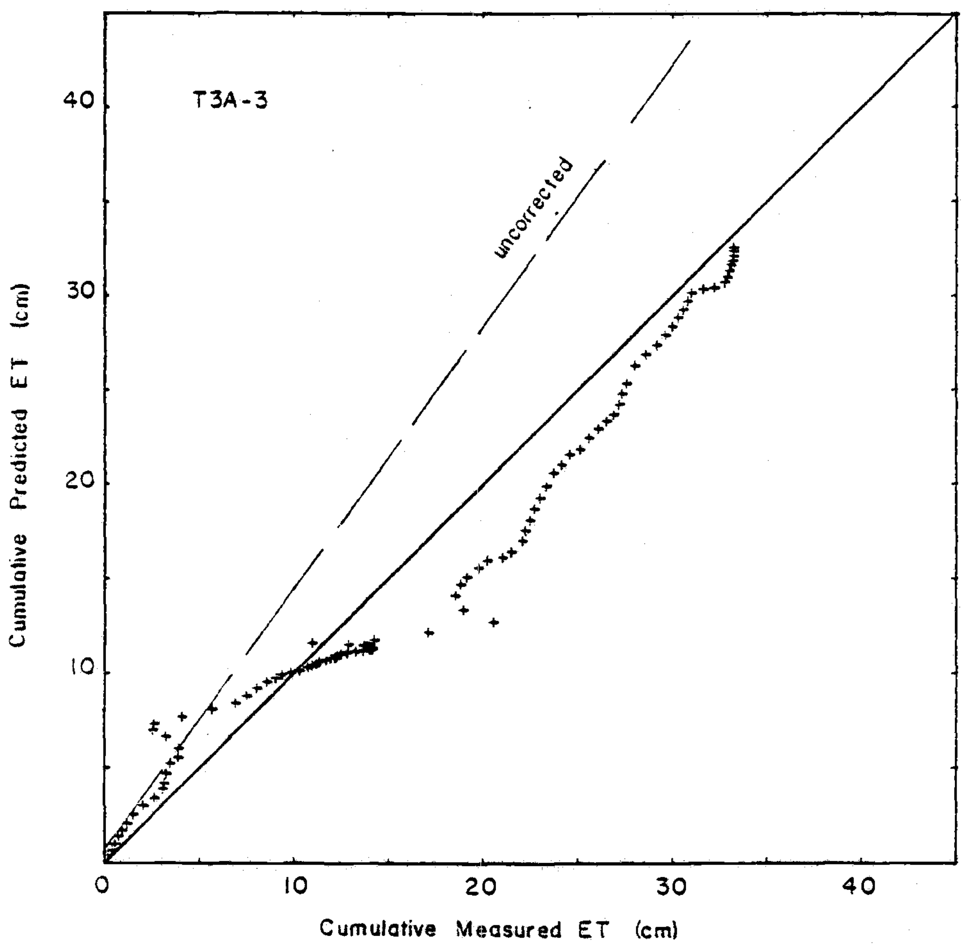

Figure 48: Cumulative double mass curve for site T3A-3 using the power model.

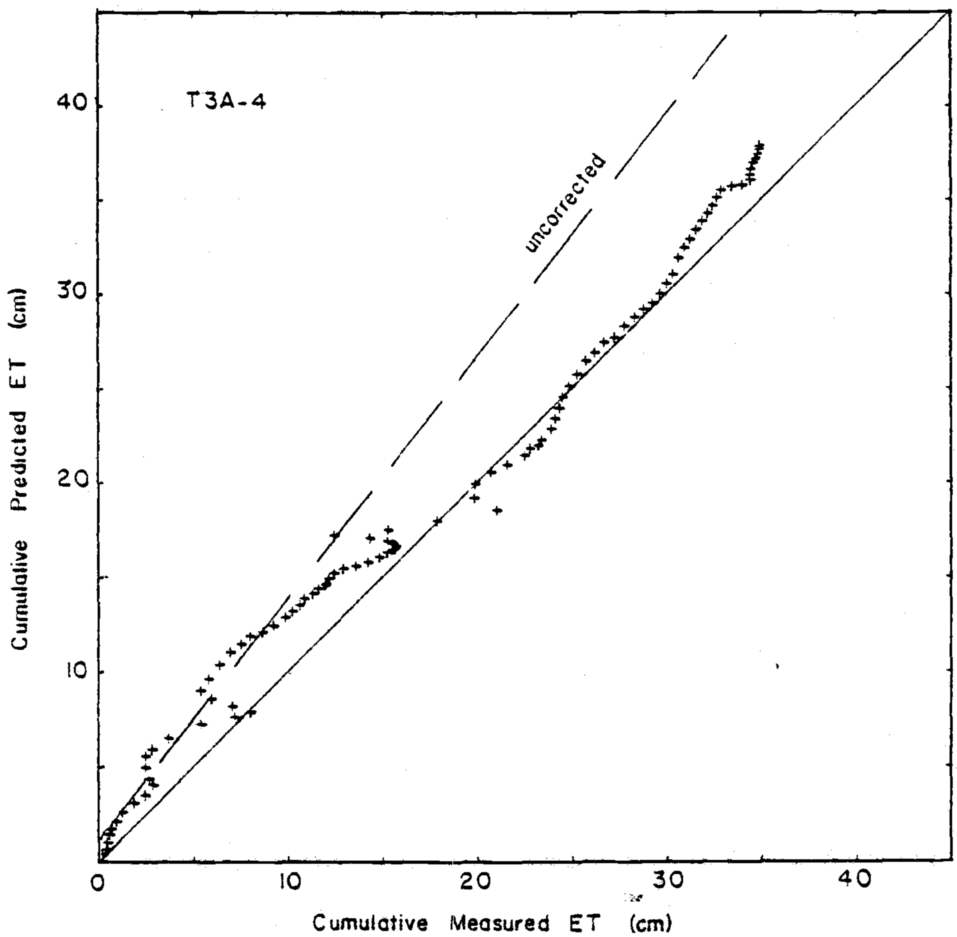

Figure 49: Cumulative double mass curve for site T3A-4 using the power model.

season and then over-predict as the season progresses. Use of only the uncorrected data would be insufficient, as it is obvious that ET decline due to water stress is occurring.

Model Comparison for Season

All three models performed similarily with the data from treatment W1 during the early part of the season. The logarithmic model did the best job of approximating the measured ET data at both sites (W1-3 and W1-4) throughout the season. The combination model tends to over-predict during the later portion of the season, while the power model under-predicted in this interval. Generally speaking, each model could have been replaced with the uncorrected data for this treatment. The better performance by the logarithmic model in this treatment is not surprising, since this model was developed under conditions similar to treatment level W1.

The slight water stress treatment (T1) once again indicated a similar response for all three models in the early part of the season. During the later portion of the season, all three models under-predicted the ET to a certain degree. The combination model does the best job in modeling the ET response during the late season, followed closely by the logarithmic model. The power model under-predicts the most severely, and does a generally poor job in this treatment. Uncorrected data could be substituted for the models without incurring significantly greater errors.

The moderate water stress treatment (T2A) indicated no significant difference between the logarithmic and combination models throughout the irrigation season. Both models do a good job of predicting the ET in this treatment. The power model response is quite similar to the other two in the early season, but it begins to significantly under-predict after mid-season.

The severe water stress treatment (T3A) does not reflect overly encouraging results for any of the models. All the models are similar in the early season and each model over-predicts, to some degree, from the middle to the end of the season. The power model produced the worst estimates during this interval, while the logarithmic and combination models are similar throughout.

Selected Interval Analysis

Each treatment was investigated for intervals when the available soil moisture was less than 50 percent. The interval had to be at least three days before it would be considered for this analysis. Fifty percent available soil moisture represents the level at which model correction becomes significant for all three models. This analysis was done to observe the models without the effects of prior ET correction for non-limiting soil moisture conditions.

Three representative periods were selected for further analysis. These were: treatment level T2A-5, julian date 123 to 158; T3A-3, julian date 120 to 150; T3A-4, julian date 128 to 149 (all julian dates are inclusive). The reasons for selecting these periods were:

1. the intervals were long enough to give a clear indication of model performance,

2. the crop coefficient was well defined during these three intervals, and

3. the preceding analysis (seasonal observations) showed that water stress was incurred in these treatments.

Cumulative mass curves were generated for each period, and model and regression analyses were performed on the data. Results of the regression analysis for the uncorrected data are given in Table 15.

Table 15. Results of linear regression for uncorrected data in the select interval analysis ($y = a + bx$).

Interval	Data Pairs	a	b	R^2
Period 1 (T2A-5)	36	0.415	1.027	0.958
Period 2 (T3A-3)	23	-0.989	1.617	0.981
Period 3 (T3A-4)	20	0.031	1.408	0.875

Table 16 shows the results of regression analysis for period 1 (T2A-5).

Table 16. Regression results from period 1 (T2A-5).

Model	a	b	R^2
Logarithmic	0.268	0.823	0.955
Combination	0.081	0.826	0.944
Power	0.032	0.578	0.942

Figure 50 shows the three models plus uncorrected data based on their regression equations. In this period (T2A-5), the uncorrected data shows the best correlation to

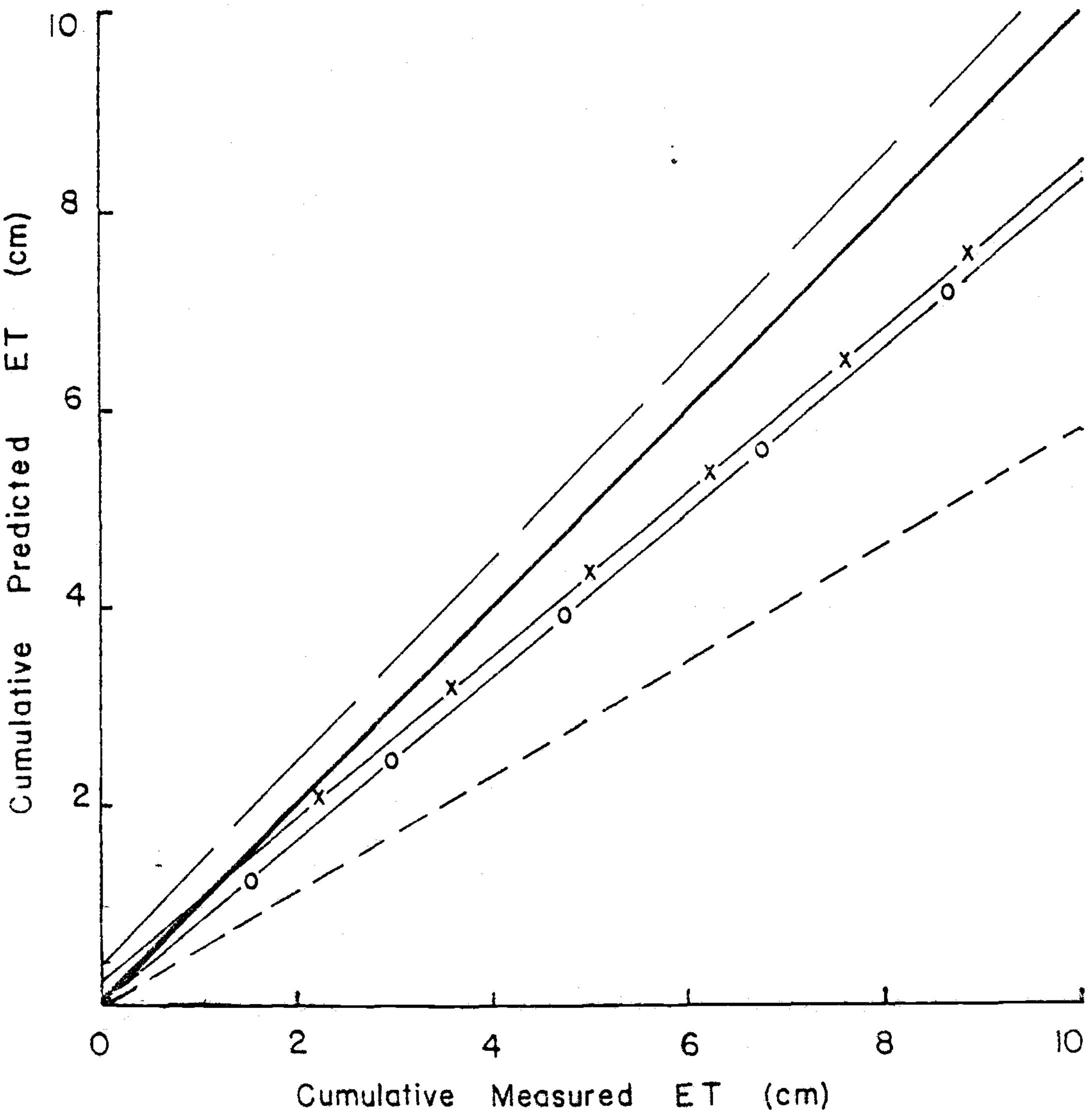

Figure 50: Results of selected interval analysis for site T2A-5.

to measured data. The logarithmic and combination models slightly under-predict the data, while the power model reflects a significant under-prediction.

Table 17 and Figure 51 give the results of regression analysis for period 2 (T3A-3).

Table 17. Regression results from period 2 (T3A-3).

Model	a	b	R^2
Logarithmic	-0.261	1.041	0.989
Combination	0.508	0.626	0.977
Power	0.502	0.354	0.963

The uncorrected data shows the effects of water stress on ET. The logarithmic model does a good job of correcting this data. The combination model shows a significant under-prediction and the power model shows a severe under-prediction.

Regression results for period 3 (T3A-4) are presented in Table 18 and Figure 52.

The logarithmic and combination models do an excellent job of correcting the data in this interval. The power model again reflects a significant under-prediction.

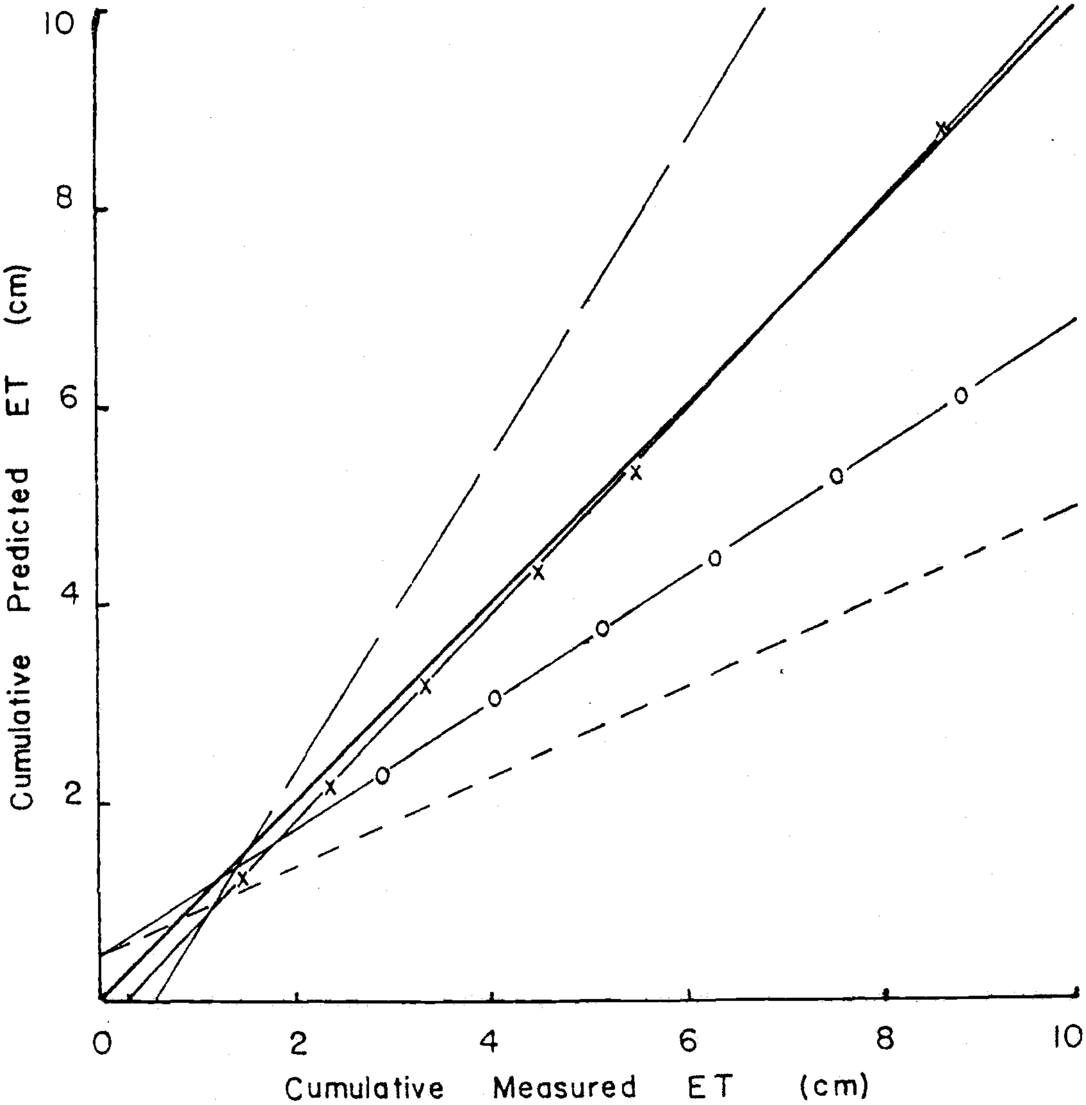

Figure 51: Results of selected interval analysis for site T3A-3.

= uncorrected data
= logarithmic model
= combination model
= power model

Table 18. Regression results from period 3 (T3A-4).

Model	a	b	R^2
Logarithmic	0.192	1.059	0.894
Combination	0.554	0.908	0.922
Power	0.451	0.611	0.929

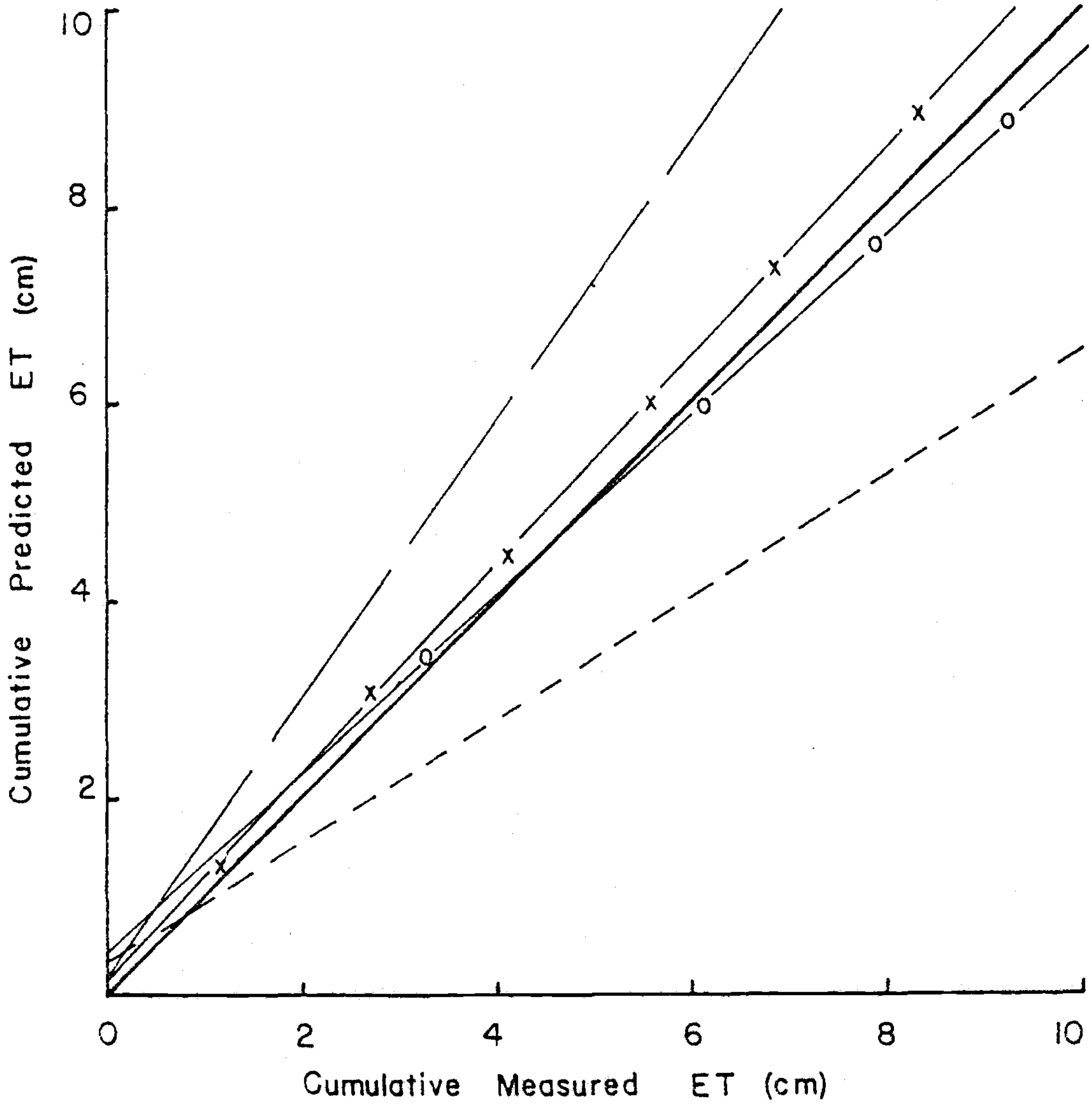

Figure 52: Results of selected interval analysis for site T3A-4.

———— ———— = uncorrected data
———x———— = logarithmic model
———o———— = combination model
— — — — — = power model

CONCLUSIONS

General Comments

This thesis summarizes the theory, experimental methodology, and the results of an investigation of the effects of low frequency deficit irrigation on crop evapotranspiration. These effects are difficult to quantify and, at best, we have only identified tendancies in the data.

Instances of negative ET measurements can be observed in the results presented previously. The occurrence of these measurements are not restricted to a particular data site or group of sites, but are generally distributed at each location of data measurement. The occurrence of data anomalies is closely linked to dates of water applications. These anomalies have been attributed to the non-instantaneous distribution of applied water within the root zone and variations in time of soil moisture measurement with respect to applied water. These factors are difficult to avoid with the instrumentation available to the research team for soil moisture determination. It is important to remember the instrumentation and methodology involved when viewing the results of this experiment.

Three stress levels were designed to observe the effects of irrigation interval on crop evapotranspiration. They are qualitatively described as low (T1), moderate (T2A), and severe (T3A). Unfortunately, it is difficult to ascertain whether these stress levels were reached. As Figures 17 through 24 indicated, the occurrence of rainfall throughout the irrigation season was evenly distributed. Although this precipitation did not always measurably increase soil water (as evidenced by neutron probe measurements), the effect on the overall stress of the plant cannot be determined. Intuition and past research does tell us that the crop will not be as severely stressed under this precipitation regime. Because of this precipitation, farms in the region experienced an overall bumper crop of winter wheat, especially in dryland fields.[6]

Each model at all the data sites over-predicted crop ET early in the season. This translated the cumulative mass curve upward for that site. The over-prediction made comparison of the models difficult. In many cases, this translation caused the regression analysis to indicate a less than favorable performance of the model. Over-prediction in the early season can be attributed primarily

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[6]Personal interview; Mr. John Madison, July 27, 1981.

to the uncertainty of the crop coefficient when the canopy is not fully developed. The crop curve (Figure 4) used in this experiment was based on calendar date following recommendations supplied by Dr. James Wright (see footnote 1). The approximation serves its purpose quite well in the mid-season, but a crop curve based on morphological development of the crop would be more accurate early in the season.

Summary of Model Performance

The three models all respond with striking similarity in their ET predictions for the early portion of the season. This result should, in fact, be expected. They all show relatively little effect of ET decline when the soil reservoir is well supplied with water. Thus if the soil is kept well irrigated, we should expect the models to respond in a like manner, as indicated by the results for treatment W1.

The power model, as developed by Boonyatharokul and Walker (1979), did not predict ET with any degree of accuracy. The data indicate that use of this model with low frequency deficit irrigation would lead to under-estimation of crop ET most of the time.

The exponents of the power model were also discussed. The exponents, and thus the model in general, were shown to be relatively insensitive to the parameter of saturated hydraulic conductivity. This insensitivity is important if an irrigation engineer is considering field measurement of saturated hydraulic conductivity for use in this power model. This investigation indicates that average exponents can be derived based only on the water uptake distribution, and the power model will predict as well as it would with more complex functions for the exponents.

The combination and logarithmic models exhibited very little relative differences in their prediction of crop ET for this experiment. The logarithmic model did the best job of predicting ET under weekly irrigation. Longer interval irrigations (T1, T2A and T3A) exhibited significant differences between measured ET with both models.

The selected interval analysis showed encouraging results in the third period only (T3A-4). The logarithmic and combination models both performed well during this period of water stress. The power model showed a consistent under-prediction throughout this analysis.

Concluding Comments

The results of this thesis indicate that the logarithmic and combination models could represent a valid ET correction for low soil moisture conditions. The combination model should be given additional consideration in light of Slabbers' work with calculating average ET for a design interval (Slabbers, 1980). His analysis has useful applications to deficit irrigation design. However, it is evident that a great deal of uncertainty exists in this area of irrigation design. The design engineer would be well advised to exercise caution in regard to the design of a deficit irrigation system.

These models should only be viewed as an approximation to crop ET under low soil moisture. The instrumentation and methodology used in this experiment did not lend itself to a more exact analysis of ET models. This experiment was highly site and crop specific, and the results should be viewed as such.

RECOMMENDATIONS

The following recommendations are developed from the results and conclusions of this experiment.

1. The use of either the logarithmic or combination models to estimate crop ET from winter wheat under low frequency deficit irrigation is recommended.

2. Further research in this area with the power model (Boonyatharokul and Walker, 1979) should use average model exponents based on the water uptake distribution.

3. The need for more exact quantification of ET decline should be addressed at research sites equipped with lysimeters.

4. General field indications of declining ET can be investigated with neutron probe instrumentation, provided precautions in data measurements and smoothing techniques are employed. The precautions should address more accurate determination of soil water in the top six inches.

5. Additional research in the field of deficit irrigation is needed. Investigations should concentrate on the effects of environmental conditions on crop ET.

6. Until further research has been completed, the irrigation design engineer should exercise caution in developing crop water requirements for low frequency deficit irrigation. A full understanding of the potential risks and costs associated with these risks should be employed when considering deficit irrigation for production agriculture.

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APPENDICES

APPENDIX A
Weather Data

DATE	TMAX F	TMIN F	TDEW F	U24 MI/DY	SOLRAD CAL/SQCM	EPAN IN
4/ 1	58.0	32.0	35.2	103.0	522.20	.12
4/ 2	57.0	35.0	33.8	179.0	445.10	.22
4/ 3	58.0	41.0	36.3	211.0	544.80	.25
4/ 4	60.0	36.0	39.9	47.0	445.00	.14
4/ 5	57.0	30.0	42.2	221.0	351.60	.23
4/ 6	57.0	34.0	32.6	178.0	448.80	.20
4/ 7	58.0	35.0	35.1	95.0	403.00	.17
4/ 8	57.0	37.0	39.9	168.0	191.10	.11
4/ 9	59.0	37.0	35.0	137.0	578.40	.24
4/10	58.0	29.0	38.7	45.0	535.90	.18
4/11	60.0	39.0	43.7	154.0	420.70	.11
4/12	60.0	35.0	39.9	122.0	548.50	.25
4/13	59.0	24.0	31.4	38.0	566.70	.16
4/14	67.0	28.0	33.8	35.0	618.70	.18
4/15	74.0	33.0	35.1	85.0	494.60	.25
4/16	68.0	45.0	35.1	72.0	614.40	.24
4/17	70.0	34.0	42.1	29.0	607.80	.23
4/18	71.0	33.0	44.6	137.0	588.70	.27
4/19	69.0	42.0	44.6	77.0	281.40	.15
4/20	65.0	50.0	42.3	224.0	433.10	.15
4/21	69.0	44.0	36.7	140.0	563.50	.26
4/22	72.0	49.0	53.6	87.0	408.10	.17
4/23	82.0	44.0	54.8	122.0	513.40	.18
4/24	84.0	47.0	42.2	90.0	630.90	.27
4/25	71.0	35.0	39.1	46.0	450.90	.14
4/26	64.0	49.0	46.5	130.0	323.10	.15
4/27	66.0	42.0	42.0	78.0	393.60	.12
4/28	76.0	47.0	51.6	131.0	449.00	.22
4/29	80.0	47.0	55.1	32.0	571.20	.20
4/30	87.0	50.0	58.7	86.0	584.20	.32

DATE	TMAX F	TMIN F	TDEW F	U24 MI/DY	SOLRAD CAL/SQCM	EPAN IN
5/ 1	72.0	55.0	47.2	197.0	606.30	.29
5/ 2	74.0	43.0	40.4	145.0	598.10	.30
5/ 3	66.0	41.0	41.3	123.0	574.20	.27
5/ 4	63.0	43.0	39.9	129.0	642.90	.20
5/ 5	56.0	42.0	41.0	37.0	423.70	.10
5/ 6	64.0	35.0	42.0	130.0	470.40	.22
5/ 7	64.0	44.0	36.7	119.0	586.70	.24
5/ 8	70.0	40.0	45.4	39.0	658.70	.24
5/ 9	75.0	45.0	55.7	147.0	563.70	.38
5/10	71.0	48.0	47.6	122.0	593.60	.29
5/11	67.0	49.0	43.3	80.0	553.80	.25
5/12	71.0	41.0	41.3	41.0	674.10	.26
5/13	71.0	38.0	44.3	25.0	357.00	.12
5/14	61.0	49.0	54.3	117.0	216.80	.12
5/15	62.0	41.0	42.2	143.0	582.70	.28
5/16	70.0	44.0	46.3	68.0	666.60	.21
5/17	71.0	38.0	42.5	42.0	537.60	.19
5/18	69.0	51.0	52.3	61.0	362.70	.12
5/19	70.0	52.0	52.6	102.0	499.00	.28
5/20	75.0	53.0	51.9	221.0	515.70	.33
5/21	73.0	54.0	49.2	219.0	682.90	.42
5/22	74.0	48.0	50.0	52.0	704.30	.24
5/23	82.0	42.0	55.1	47.0	644.20	.23
5/24	77.0	58.0	57.6	79.0	408.80	.32
5/25	72.0	56.0	56.8	128.0	607.70	.30
5/26	74.0	44.0	54.7	48.0	658.50	.25
5/27	79.0	48.0	50.3	57.0	641.20	.30
5/28	81.0	46.0	53.3	36.0	657.30	.28
5/29	83.0	50.0	55.5	81.0	598.30	.36
5/30	78.0	59.0	59.8	200.0	425.70	.40
5/31	75.0	48.0	52.2	51.0	719.30	.24

DATE	TMAX F	TMIN F	TDEW F	U24 MI/DY	SOLRAD CAL/SQCM	EPAN IN
6/ 1	81.0	41.0	49.7	105.0	625.30	.31
6/ 2	77.0	54.0	52.6	156.0	639.00	.45
6/ 3	78.0	55.0	54.8	117.0	567.10	.24
6/ 4	73.0	58.0	53.3	79.0	343.30	.17
6/ 5	81.0	52.0	58.2	74.0	526.00	.23
6/ 6	69.0	56.0	55.1	99.0	411.30	.25
6/ 7	57.0	47.0	44.9	32.0	189.80	0.00
6/ 8	67.0	51.0	55.0	102.0	421.00	.18
6/ 9	72.0	52.0	52.2	101.0	630.00	.21
6/10	73.0	53.0	54.1	95.0	638.80	.30
6/11	82.0	44.0	54.1	85.0	634.30	.30
6/12	69.0	48.0	50.8	208.0	712.80	.41
6/13	68.0	47.0	51.0	233.0	623.00	.45
6/14	73.0	52.0	52.0	110.0	668.80	.42
6/15	79.0	48.0	48.0	98.0	672.60	.37
6/16	70.0	59.0	59.0	206.0	440.40	.37
6/17	71.0	48.0	48.0	107.0	699.60	.26
6/18	67.0	55.0	55.0	73.0	256.60	.10
6/19	79.0	58.0	58.0	145.0	634.50	.45
6/20	72.0	54.0	54.0	160.0	441.50	.13
6/21	70.0	52.0	52.0	82.0	508.00	.16
6/22	72.0	58.0	58.0	112.0	376.40	.24
6/23	75.0	50.0	50.0	60.0	727.20	.25
6/24	83.0	43.0	45.5	57.0	745.20	.39
6/25	88.0	47.0	52.3	33.0	719.50	.30
6/26	83.0	67.0	53.9	205.0	786.50	.60
6/27	82.0	51.0	46.2	64.0	663.60	.30
6/28	81.0	45.0	47.5	33.0	684.80	.31
6/29	90.0	49.0	47.5	45.0	722.90	.30
6/30	86.0	59.0	60.3	97.0	626.70	.45

DATE	TMAX F	TMIN F	TDEW F	U24 MI/DY	SOLRAD CAL/SQCM	EPAN IN
7/ 1	78.0	50.0	49.2	97.0	715.20	.33
7/ 2	87.0	45.0	47.1	31.0	706.40	.30
7/ 3	95.0	47.0	52.0	27.0	718.80	.39
7/ 4	99.0	60.0	60.3	44.0	611.20	.40
7/ 5	78.0	73.0	62.0	77.0	226.20	.18
7/ 6	62.0	59.0	59.4	167.0	209.30	.22
7/ 7	69.0	50.0	47.8	148.0	695.50	.36
7/ 8	79.0	40.0	47.8	48.0	724.00	.30
7/ 9	81.0	49.0	54.1	117.0	660.00	.36
7/10	73.0	53.0	48.4	119.0	706.20	.40
7/11	75.0	46.0	52.9	38.0	679.00	.28
7/12	82.0	48.0	51.5	104.0	634.70	.31
7/13	73.0	56.0	46.7	148.0	668.50	.38
7/14	84.0	47.0	50.7	36.0	692.10	.30
7/15	90.0	48.0	56.1	42.0	670.50	.36
7/16	92.0	50.0	51.7	39.0	654.80	.34
7/17	93.0	54.0	56.8	102.0	662.30	.45
7/18	87.0	63.0	59.1	135.0	655.90	.45
7/19	88.0	62.0	61.9	111.0	643.20	.39

APPENDIX B

Alfalfa Reference ET

DATE		JULIAN DAY	REFERENCE ET IN/DY	MM/DY
4	1	91	.155	3.948
4	2	92	.176	4.463
4	3	93	.216	5.476
4	4	94	.119	3.011
4	5	95	.106	2.693
4	6	96	.197	5.004
4	7	97	.138	3.507
4	8	98	.104	2.633
4	9	99	.186	4.724
4	10	100	.118	2.987
4	11	101	.141	3.577
4	12	102	.177	4.496
4	13	103	.143	3.624
4	14	104	.165	4.185
4	15	105	.206	5.233
4	16	106	.210	5.328
4	17	107	.171	4.356
4	18	108	.231	5.860
4	19	109	.128	3.253
4	20	110	.252	6.405
4	21	111	.247	6.275
4	22	112	.149	3.775
4	23	113	.231	5.880
4	24	114	.309	7.859
4	25	115	.158	4.001
4	26	116	.145	3.695
4	27	117	.148	3.764
4	28	118	.206	5.221
4	29	119	.180	4.566
4	30	120	.257	6.516

	IN/DY	MM/DY
MONTHLY AVE. ET	.179	4.544
WEEKLY AVE. ET INTERVAL	IN/DY	MM/DY
01-07	.158	4.015
08-14	.148	3.747
15-21	.206	5.244
22-30	.198	5.031

DATE		JULIAN DAY	REFERENCE ET IN/DY	MM/DY
5	1	121	.320	8.135
5	2	122	.288	7.308
5	3	123	.200	5.087
5	4	124	.204	5.193
5	5	125	.107	2.725
5	6	126	.163	4.147
5	7	127	.236	5.991
5	8	128	.192	4.865
5	9	129	.194	4.935
5	10	130	.210	5.326
5	11	131	.182	4.624
5	12	132	.200	5.086
5	13	133	.116	2.937
5	14	134	.055	1.406
5	15	135	.190	4.831
5	16	136	.187	4.738
5	17	137	.153	3.879
5	18	138	.122	3.109
5	19	139	.173	4.400
5	20	140	.276	7.002
5	21	141	.325	8.248
5	22	142	.198	5.041
5	23	143	.187	4.761
5	24	144	.164	4.159
5	25	145	.215	5.451
5	26	146	.195	4.941
5	27	147	.226	5.751
5	28	148	.197	4.999
5	29	149	.213	5.398
5	30	150	.219	5.574
5	31	151	.215	5.466

	IN/DY	MM/DY
MONTHLY AVE. ET	.198	5.017
WEEKLY AVE. ET INTERVAL	IN/DY	MM/DY
01-07	.217	5.512
08-14	.164	4.169
15-21	.204	5.173
22-31	.203	5.154

DATE	JULIAN DAY	REFERENCE ET IN/DY	MM/DY
6 1	152	.256	6.492
6 2	153	.291	7.393
6 3	154	.242	6.150
6 4	155	.150	3.801
6 5	156	.190	4.832
6 6	157	.144	3.666
6 7	158	.060	1.526
6 8	159	.124	3.161
6 9	160	.224	5.698
6 10	161	.209	5.317
6 11	162	.216	5.489
6 12	163	.233	5.929
6 13	164	.223	5.664
6 14	165	.240	6.100
6 15	166	.278	7.059
6 16	167	.172	4.361
6 17	168	.220	5.599
6 18	169	.092	2.331
6 19	170	.248	6.289
6 20	171	.190	4.838
6 21	172	.166	4.219
6 22	173	.143	3.640
6 23	174	.217	5.510
6 24	175	.239	6.067
6 25	176	.226	5.738
6 26	177	.421	10.682
6 27	178	.267	6.775
6 28	179	.229	5.814
6 29	180	.269	6.822
6 30	181	.239	6.071

MONTHLY AVE. ET	IN/DY	MM/DY
	.214	5.434
WEEKLY AVE. ET INTERVAL	IN/DY	MM/DY
01-07	.190	4.837
08-14	.210	5.337
15-21	.195	4.957
22-31	.250	6.347

DATE		JULIAN DAY	REFERENCE ET IN/DY	MM/DY
7	1	182	.243	6.167
7	2	183	.235	5.972
7	3	184	.274	6.968
7	4	185	.281	7.136
7	5	186	.136	3.465
7	6	187	.Ø58	1.461
7	7	188	.227	5.764
7	8	189	.213	5.4Ø3
7	9	19Ø	.266	6.748
7	1Ø	191	.275	6.994
7	11	192	.194	4.933
7	12	193	.249	6.319
7	13	194	.266	6.767
7	14	195	.213	5.4ØØ
7	15	196	.244	6.2Ø7
7	16	197	.267	6.785
7	17	198	.327	8.3Ø1
7	18	199	.3Ø7	7.792
7	19	2ØØ	.261	6.641
7	19	2ØØ	.261	6.641

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APPENDIX C
Water Balance Data

W1-3

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DATE	JULIAN DAY	MEAS. SOIL WATER	PRECIP	IRRIG WATER APPLD	RAW ET	SMOOTH SOIL WATER	SMOOTH ET	SECOND SMOOTH ET
		IN.	IN.	IN.	IN/DY	IN.	IN/DY	IN/DY
4 9	99	13.91	0.000	0.000	-.730	14.28	.215	.123
4 10	100	14.64	0.000	0.000	1.010	14.06	.030	.152
4 11	101	13.63	0.000	0.000	-.190	14.03	.210	.044
4 12	102	13.82*	0.000	0.000	-.190	13.82	-.108	.025
4 13	103	14.01	0.000	0.000	.055	13.93	-.027	.248
4 14	104	13.96*	.010	.028	.093	13.96	.078	.291
4 15	105	13.90	0.000	0.000	-.290	14.02	.022	.344
4 16	106	14.19	0.000	0.000	.300	13.99	.133	.207
4 17	107	13.89	0.000	0.000	.390	13.86	.467	.231
4 18	108	13.50	0.000	0.000	.710	13.39	.093	.167
4 19	109	12.79	0.000	0.000	-.820	13.30	-.060	-.096
4 20	110	13.61	0.000	0.000	-.070	13.36	-.320	.001
4 21	111	13.68*	0.000	.370	.300	13.68	.383	.046
4 22	112	13.75	.004	0.000	.184	13.67	.074	.182
4 23	113	13.57	0.000	0.000	.100	13.60	.090	.089
4 24	114	13.47	.010	0.000	.000	13.51	.103	.116
4 25	115	13.48	.030	0.000	.220	13.41	.153	.129
4 26	116	13.29*	0.000	0.000	.190	13.29	.132	.119
4 27	117	13.10	0.000	0.000	.015	13.16	.073	.166
4 28	118	13.09*	0.000	.247	.262	13.00	.294	.160
4 29	119	13.07	0.000	0.000	.110	13.04	.112	.178
4 30	120	12.96	0.000	0.000	.210	12.93	.130	.142

DATE	JULIAN DAY	MEAS. SOIL WATER	PRECIP	IRRIG WATER APPLD	RAW ET	SMOOTH SOIL WATER	SMOOTH ET	SECOND SMOOTH ET
		IN.	IN.	IN.	IN/DY	IN.	IN/DY	IN/DY
5 1	121	12.75	0.000	0.000	.070	12.80	.185	.174
5 2	122	12.68	0.000	0.000	.275	12.61	.207	.202
5 3	123	12.41*	0.000	0.000	.275	12.41	.214	.192
5 4	124	12.13	0.000	0.000	.093	12.19	.154	.415
5 5	125	12.04*	0.000	.783	.876	12.04	.876	.461
5 6	126	11.94*	.260	0.000	.353	11.94	.353	.441
5 7	127	11.85*	0.000	0.000	.093	11.85	.093	.180
5 8	128	11.76*	0.000	0.000	.093	11.76	.093	.093
5 9	129	11.67*	0.000	0.000	.093	11.67	.093	.066
5 10	130	11.57*	0.000	0.000	.093	11.57	.014	.014
5 11	131	11.48	0.000	0.000	-.145	11.56	-.066	.171
5 12	132	11.63*	.260	.377	.492	11.63	.566	.169
5 13	133	11.77	0.000	0.000	.078	11.70	.003	.266
5 14	134	11.69*	.150	0.000	.227	11.69	.227	.103
5 15	135	11.62*	0.000	0.000	.077	11.62	.077	.109
5 16	136	11.54*	.020	0.000	.097	11.54	.022	.057
5 17	137	11.46	0.000	0.000	-.150	11.54	.102	.132
5 18	138	11.61	.070	0.000	.450	11.43	.273	.240
5 19	139	11.23*	.085	0.000	.465	11.23	.345	.253
5 20	140	10.85	0.000	0.000	.020	10.97	.140	.497
5 21	141	10.83*	0.000	.996	1.006	10.83	1.006	.366
5 22	142	10.81*	0.000	0.000	.020	10.81	-.048	.280
5 23	143	10.79	0.000	0.000	-.185	10.86	-.117	-.089
5 24	144	10.98*	0.000	0.000	-.185	10.98	-.103	-.044
5 25	145	11.16	0.000	0.000	.060	11.08	.075	-.017
5 26	146	11.10	0.000	0.000	.350	11.09	-.021	-.049
5 27	147	10.75	0.000	0.000	-.474	11.02	-.199	.225
5 28	148	11.22*	0.000	1.370	.896	11.22	.896	.074
5 29	149	11.70*	0.000	0.000	-.474	11.70	-.474	-.017
5 30	150	12.17*	0.000	0.000	-.474	12.17	-.474	-.281
5 31	151	12.65*	0.000	0.000	-.474	12.65	.104	-.043

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DATE	JULIAN DAY	MEAS. SOIL WATER	PRECIP	IRRIG WATER APPLD	RAW ET	SMOOTH SOIL WATER	SMOOTH ET	SECOND SMOOTH ET
		IN.	IN.	IN.	IN/DY	IN.	IN/DY	IN/DY
6 1	152	13.12	0.000	0.000	1.260	12.54	.242	.295
6 2	153	11.86	0.000	0.000	-.060	12.30	.539	.346
6 3	154	11.92	0.000	0.000	.417	11.76	.258	1.137
6 4	155	11.50*	0.000	2.197	2.614	11.50	2.614	.953
6 5	156	11.09*	0.000	0.000	.417	11.09	-.011	.868
6 6	157	10.67	.440	0.000	-.427	11.10	.001	-.292
6 7	158	11.54*	0.000	0.000	-.867	11.54	-.867	.052
6 8	159	12.40*	.540	1.000	.673	12.40	1.022	-.004
6 9	160	13.27	0.000	0.000	.180	12.92	-.169	.344
6 10	161	13.09*	0.000	0.000	.180	13.09	.180	.040
6 11	162	12.91*	0.000	0.000	.180	12.91	.110	.142
6 12	163	12.73	0.000	0.000	-.030	12.80	.137	.137
6 13	164	12.76	0.000	0.000	.260	12.66	.163	.167
6 14	165	12.50*	0.000	0.000	.260	12.50	.200	.149
6 15	166	12.24	0.000	0.000	.080	12.30	.082	.082
6 16	167	12.16	0.000	0.000	-.093	12.22	-.036	.018
6 17	168	12.25*	.100	0.000	.007	12.25	.007	-.010
6 18	169	12.35*	0.000	0.000	-.093	12.35	-.001	.059
6 19	170	12.44	.080	0.000	.264	12.35	.172	.118
6 20	171	12.26*	0.000	0.000	.184	12.26	.184	.180
6 21	172	12.07*	0.000	0.000	.184	12.07	.184	.184
6 22	173	11.89*	0.000	0.000	.184	11.89	.184	.173
6 23	174	11.70*	0.000	0.000	.184	11.70	.151	.151
6 24	175	11.52	0.000	0.000	.085	11.55	.118	.158
6 25	176	11.44*	0.000	0.000	.085	11.44	.204	.215
6 26	177	11.35	0.000	0.000	.443	11.23	.324	.324
6 27	178	10.91*	0.000	0.000	.443	10.91	.443	.366
6 28	179	10.46*	0.000	0.000	.443	10.46	.330	.330
6 29	180	10.02	0.000	0.000	.103	10.13	.217	.217
6 30	181	9.92*	0.000	0.000	.103	9.92	.103	.139

DATE	JULIAN DAY	MEAS. SOIL WATER	PRECIP	IRRIG WATER APPLD	RAW ET	SMOOTH SOIL WATER	SMOOTH ET	SECOND SMOOTH ET
		IN.	IN.	IN.	IN/DY	IN.	IN/DY	IN/DY
7 1	182	9.81*	0.000	0.000	.103	9.81	.098	.098
7 2	183	9.71	0.000	0.000	.098	9.72	.093	.093
7 3	184	9.62*	0.000	0.000	.088	9.62	.088	.090
7 4	185	9.53*	0.000	0.000	.088	9.53	.088	.088
7 5	186	9.45*	0.000	0.000	.088	9.45	.088	.236
7 6	187	9.36*	.500	0.000	.588	9.36	.532	.222
7 7	188	9.27	.070	0.000	-.010	9.33	.046	.185
7 8	189	9.35*	0.000	0.000	-.080	9.35	-.020	.022
7 9	190	9.43	0.000	0.000	.100	9.37	.040	.028
7 10	191	9.33*	0.000	0.000	.100	9.33	.065	.045
7 11	192	9.23	0.000	0.000	-.005	9.27	.030	.031
7 12	193	9.24*	0.000	0.000	-.005	9.24	-.002	.014
7 13	194	9.24	0.000	0.000	0.000	9.24	0.000	-.001

*=SOIL WATER VALUE WAS NOT MEASURED
THIS DAY BUT FOUND BY AVERAGING
THE DATA FROM NEAREST MEASUREMENTS

NEGATIVE ET VALUES INDICATE AN
INCREASE IN SOIL WATER FOR THAT DAY

EOI ENCOUNTERED.

W1-4

/COPY.414

DATE	JULIAN DAY	MEAS. SOIL WATER	PRECIP	IRRIG WATER APPLD	RAW ET	SMOOTH SOIL WATER	SMOOTH ET	SECOND SMOOTH ET
		IN.	IN.	IN.	IN/DY	IN.	IN/DY	IN/DY
4 9	99	14.42	0.000	0.000	-.170	14.51	.032	.036
4 10	100	14.59	0.000	0.000	.180	14.47	.040	.069
4 11	101	14.41	0.000	0.000	.119	14.43	.133	.057
4 12	102	14.30*	0.000	0.000	.110	14.33	-.002	.096
4 13	103	14.19	0.000	0.000	-.225	14.31	-.113	.224
4 14	104	14.42*	.010	1.015	.800	14.42	.788	.201
4 15	105	14.64	0.000	0.000	-.260	14.65	-.072	.294
4 16	106	14.90	0.000	0.000	.270	14.72	.167	.171
4 17	107	14.63	0.000	0.000	.490	14.56	.417	.234
4 18	108	14.14	0.000	0.000	.490	14.14	.129	.147
4 19	109	13.65	0.000	0.000	-.620	14.02	-.097	-.097
4 20	110	14.27	0.000	0.000	-.160	14.12	-.313	-.005
4 21	111	14.43*	0.000	.421	.261	14.43	.394	.079
4 22	112	14.59	.004	0.000	.244	14.46	.157	.237
4 23	113	14.35	0.000	0.000	.380	14.30	.160	.158
4 24	114	13.97	.010	0.000	-.130	14.14	.157	.144
4 25	115	14.11	.030	0.000	.230	14.00	.117	.125
4 26	116	13.91*	0.000	0.000	.200	13.91	.102	.074
4 27	117	13.71	0.000	0.000	-.005	13.81	.003	.192
4 28	118	13.81*	0.000	.450	.355	13.81	.470	.194
4 29	119	13.90	0.000	0.000	.250	13.79	.108	.253
4 30	120	13.65	0.000	0.000	.170	13.68	.180	.165

DATE	JULIAN DAY	MEAS. SOIL WATER	PRECIP	IRRIG WATER APPLD	RAW ET	SMOOTH SOIL WATER	SMOOTH ET	SECOND SMOOTH ET
		IN.	IN.	IN.	IN/DY	IN.	IN/DY	IN/DY
5 1	121	13.48	0.000	0.000	.120	13.50	.207	.216
5 2	122	13.36	0.000	0.000	.330	13.29	.260	.241
5 3	123	13.03*	0.000	0.000	.330	13.03	.257	.234
5 4	124	12.70	0.000	0.000	.111	12.77	.184	.399
5 5	125	12.59*	0.000	.645	.756	12.59	.756	.437
5 6	126	12.48*	.260	0.000	.371	12.48	.371	.413
5 7	127	12.37*	0.000	0.000	.111	12.37	.111	.108
5 8	128	12.25*	0.000	0.000	.111	12.25	.111	.111
5 9	129	12.14*	0.000	0.000	.111	12.14	.111	.132
5 10	130	12.03*	0.000	0.000	.111	12.03	.174	.174
5 11	131	11.92	0.000	0.000	.300	11.86	.237	.389
5 12	132	11.62*	.260	.334	.894	11.62	.755	.338
5 13	133	11.32	0.000	0.000	-.118	11.46	.022	.270
5 14	134	11.44*	.150	0.000	.032	11.44	.032	-.021
5 15	135	11.56*	0.000	0.000	-.118	11.56	-.118	-.061
5 16	136	11.67*	.020	0.000	-.098	11.67	-.008	-.059
5 17	137	11.79	0.000	0.000	-.120	11.79	.039	.069
5 18	138	11.91	.070	0.000	.425	11.75	.267	.188
5 19	139	11.56*	.085	0.000	.440	11.56	.258	.172
5 20	140	11.20	0.000	0.000	-.192	11.33	-.010	.500
5 21	141	11.39*	0.000	1.443	1.251	11.37	1.251	.350
5 22	142	11.58*	0.000	0.000	-.192	11.58	-.192	.280
5 23	143	11.78*	0.000	0.000	-.192	11.78	-.192	-.153
5 24	144	11.97*	0.000	0.000	-.192	11.97	-.075	-.064
5 25	145	12.16	0.000	0.000	.160	12.04	.076	.438
5 26	146	12.00	0.000	0.000	.260	11.97	.114	.375
5 27	147	11.74	0.000	0.000	-.078	11.85	.035	.439
5 28	148	11.82*	0.000	1.247	1.169	11.82	1.169	.315
5 29	149	11.90*	0.000	0.000	-.078	11.90	-.078	.338
5 30	150	11.97*	0.000	0.000	-.078	11.97	-.078	-.125
5 31	151	12.05*	0.000	0.000	-.078	12.05	-.219	-.155

W1-4

DATE	JULIAN DAY	MEAS. SOIL WATER	PRECIP	IRRIG WATER APPLD	RAW ET	SMOOTH SOIL WATER	SMOOTH ET	SECOND SMOOTH ET
		IN.	IN.	IN.	IN/DY	IN.	IN/DY	IN/DY
6 1	152	12.13	0.000	0.000	-.500	12.27	-.169	-.191
6 2	153	12.63	0.000	0.000	.070	12.44	-.184	-.138
6 3	154	12.56	0.000	0.000	-.123	12.62	-.059	.446
6 4	155	12.68*	0.000	1.704	1.581	12.63	1.581	.452
6 5	156	12.81*	0.000	0.000	-.123	12.81	-.164	.550
6 6	157	12.93	.440	0.000	.193	12.97	.234	-.050
6 7	158	13.18*	0.000	0.000	-.247	13.19	-.247	.144
6 8	159	13.42*	.540	0.000	.203	13.42	.443	.083
6 9	160	13.67	0.000	0.000	.203	13.52	.053	.233
6 10	161	13.47*	0.000	0.000	.203	13.47	.203	.123
6 11	162	13.26*	0.000	0.000	.203	13.26	.112	.154
6 12	163	13.06	0.000	0.000	-.070	13.15	.146	.146
6 13	164	13.13	0.000	0.000	.305	13.01	.180	.178
6 14	165	12.83*	0.000	0.000	.305	12.83	.207	.165
6 15	166	12.52	0.000	0.000	.010	12.62	.108	.108
6 16	167	12.51*	0.000	0.000	.010	12.51	.010	.076
6 17	168	12.50*	.100	0.000	.110	12.50	.110	.398
6 18	169	12.49*	0.000	1.000	1.010	12.49	1.075	.468
6 19	170	12.48	.080	0.000	.284	12.42	.219	.499
6 20	171	12.28*	0.000	0.000	.204	12.28	.204	.209
6 21	172	12.07*	0.000	0.000	.204	12.07	.204	.204
6 22	173	11.87*	0.000	0.000	.204	11.87	.204	.181
6 23	174	11.66*	0.000	0.000	.204	11.66	.134	.134
6 24	175	11.46	0.000	0.000	-.005	11.53	.065	.113
6 25	176	11.47*	0.000	0.000	-.005	11.47	.140	.163
6 26	177	11.47	0.000	0.000	.430	11.33	.285	.285
6 27	178	11.04*	0.000	0.000	.430	11.04	.430	.352
6 28	179	10.61*	0.000	0.000	.430	10.61	.342	.342
6 29	180	10.18	0.000	0.000	.167	10.27	.254	.254
6 30	181	10.01*	0.000	0.000	.167	10.01	.167	.186

DATE	JULIAN DAY	MEAS. SOIL WATER	PRECIP	IRRIG WATER APPLD	RAW ET	SMOOTH SOIL WATER	SMOOTH ET	SECOND SMOOTH ET
		IN.	IN.	IN.	IN/DY	IN.	IN/DY	IN/DY
7 1	182	9.85*	0.000	0.000	.167	9.85	.138	.139
7 2	183	9.68	0.000	0.000	.080	9.71	.109	.109
7 3	184	9.60*	0.000	0.000	.080	9.60	.080	.090
7 4	185	9.52*	0.000	0.000	.080	9.52	.080	.080
7 5	186	9.44*	0.000	0.000	.080	9.44	.080	.243
7 6	187	9.36*	.500	0.000	.580	9.36	.570	.260
7 7	188	9.28	.070	0.000	.120	9.29	.130	.258
7 8	189	9.23*	0.000	0.000	.050	9.23	.073	.100
7 9	190	9.18	0.000	0.000	.120	9.16	.097	.084
7 10	191	9.06*	0.000	0.000	.120	9.06	.083	.074
7 11	192	8.94	0.000	0.000	.010	8.98	.047	.045
7 12	193	8.93*	0.000	0.000	.010	8.93	.005	.026
7 13	194	8.92	0.000	0.000	0.000	8.93	0.000	.002

*=SOIL WATER VALUE WAS NOT MEASURED
THIS DAY BUT FOUND BY AVERAGING
THE DATA FROM NEAREST MEASUREMENTS

NEGATIVE ET VALUES INDICATE AN
INCREASE IN SOIL WATER FOR THAT DAY

EOI ENCOUNTERED.

T1-3

/COPY,T13

DATE	JULIAN DAY	MEAS. SOIL WATER	PRECIP	IRRIG WATER APPLD	RAW ET	SMOOTH SOIL WATER	SMOOTH ET	SECOND SMOOTH ET
		IN.	IN.	IN.	IN/DY	IN.	IN/DY	IN/DY
4 9	99	13.02	0.000	0.000	-.090	13.07	.088	.080
4 10	100	13.11	0.000	0.000	.310	12.98	.072	.087
4 11	101	12.80	0.000	0.000	-.005	12.91	.100	.055
4 12	102	12.81*	0.000	0.000	-.005	12.81	-.007	.067
4 13	103	12.81	0.000	0.000	-.010	12.81	.108	.054
4 14	104	12.82	.010	0.000	.350	12.73	.060	.095
4 15	105	12.48	0.000	0.000	-.180	12.65	.117	.058
4 16	106	12.66	0.000	0.000	.190	12.54	-.002	.056
4 17	107	12.47	0.000	0.000	-.015	12.54	.053	.340
4 18	108	12.49*	0.000	1.182	1.167	12.49	.969	.275
4 19	109	12.50	0.000	0.000	-.610	12.79	-.198	.173
4 20	110	13.11	0.000	0.000	.030	12.90	-.250	-.152
4 21	111	13.08	0.000	0.000	-.170	13.15	-.007	-.044
4 22	112	13.25	.004	0.000	.124	13.15	.124	.078
4 23	113	13.13	0.000	0.000	.410	13.03	.117	.126
4 24	114	12.72	.010	0.000	-.170	12.92	.137	.108
4 25	115	12.90	.030	0.000	.180	12.79	.070	.131
4 26	116	12.75*	0.000	0.000	.150	12.75	.187	.130
4 27	117	12.60	0.000	0.000	.260	12.56	.133	.170
4 28	118	12.34	0.000	0.000	-.010	12.41	.100	.140
4 29	119	12.35	0.000	0.000	.320	12.24	.097	.146
4 30	120	12.03	0.000	0.000	-.020	12.14	.150	.130

DATE	JULIAN DAY	MEAS. SOIL WATER	PRECIP	IRRIG WATER APPLD	RAW ET	SMOOTH SOIL WATER	SMOOTH ET	SECOND SMOOTH ET
		IN.	IN.	IN.	IN/DY	IN.	IN/DY	IN/DY
5 1	121	12.05	0.000	0.000	.150	11.99	.143	.181
5 2	122	11.90	0.000	0.000	.300	11.85	.250	.215
5 3	123	11.60*	0.000	0.000	.300	11.60	.253	.236
5 4	124	11.30	0.000	0.000	.158	11.35	.205	.205
5 5	125	11.14*	0.000	0.000	.158	11.14	.158	.260
5 6	126	10.99*	.260	0.000	.418	10.99	.418	.244
5 7	127	10.83*	0.000	0.000	.158	10.83	.157	.244
5 8	128	10.67*	0.000	0.000	.157	10.67	.158	.158
5 9	129	10.51*	0.000	0.000	.157	10.51	.157	.158
5 10	130	10.36*	0.000	0.000	.157	10.36	.157	.127
5 11	131	10.20*	0.000	0.000	.157	10.20	.065	.180
5 12	132	10.04	.260	0.000	.140	10.13	.317	.144
5 13	133	10.16	0.000	0.000	.135	10.08	.050	.135
5 14	134	10.03*	.150	0.000	.285	10.03	.037	.000
5 15	135	9.89	0.000	0.000	-.610	10.14	-.087	-.030
5 16	136	10.50	.020	0.000	.235	10.23	-.040	.281
5 17	137	10.20*	0.000	.834	1.049	10.29	.971	.353
5 18	138	10.07	.070	0.000	.050	10.15	.128	.388
5 19	139	10.09*	.085	0.000	.065	10.09	.045	.436
5 20	140	10.11*	0.000	1.704	1.684	10.11	1.714	.615
5 21	141	10.13	0.000	0.000	.070	10.10	.067	.607
5 22	142	10.06	0.000	0.000	.150	10.01	.042	.032
5 23	143	9.91	0.000	0.000	-.095	9.99	-.013	.001
5 24	144	10.01*	0.000	0.000	-.095	10.01	-.027	.001
5 25	145	10.10	0.000	0.000	.110	10.03	.042	.011
5 26	146	9.99*	0.000	0.000	.110	9.99	.018	-.004
5 27	147	9.88	0.000	0.000	-.165	9.97	-.073	-.121
5 28	148	10.05*	0.000	0.000	-.165	10.05	-.309	-.278
5 29	149	10.21	0.000	0.000	-.597	10.35	-.453	1.014
5 30	150	10.81*	0.000	4.401	3.804	10.81	3.804	.993
5 31	151	11.40*	0.000	0.000	-.597	11.40	-.373	1.094

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DATE	JULIAN DAY	MEAS. SOIL WATER	PRECIP	IRRIG WATER APPLD	RAW ET	SMOOTH SOIL WATER	SMOOTH ET	SECOND SMOOTH ET
		IN.	IN.	IN.	IN/DY	IN.	IN/DY	IN/DY
6 1	152	12.00	0.000	0.000	.075	11.78	-.149	-.121
6 2	153	11.93*	0.000	0.000	.075	11.93	.158	.083
6 3	154	11.85	0.000	0.000	.323	11.77	.241	.241
6 4	155	11.53*	0.000	0.000	.323	11.53	.323	.239
6 5	156	11.20*	0.000	0.000	.323	11.20	.153	.300
6 6	157	10.88	.440	0.000	.253	11.05	.423	.130
6 7	158	11.07*	0.000	0.000	-.187	11.07	-.187	.226
6 8	159	11.25*	.540	0.000	.353	11.25	.442	.066
6 9	160	11.44	0.000	0.000	.080	11.35	-.058	.122
6 10	161	11.36	0.000	0.000	-.067	11.41	-.018	-.047
6 11	162	11.43*	0.000	0.000	-.067	11.43	-.067	.430
6 12	163	11.49*	0.000	1.378	1.311	11.49	1.375	.457
6 13	164	11.56	0.000	0.000	.125	11.50	.061	.518
6 14	165	11.44*	0.000	0.000	.125	11.44	.118	.097
6 15	166	11.31	0.000	0.000	.105	11.32	.112	.110
6 16	167	11.21*	0.000	0.000	.105	11.21	.100	.136
6 17	168	11.10	.100	0.000	.100	11.11	.195	.145
6 18	169	11.01*	0.000	0.000	.090	11.01	.140	.202
6 19	170	10.92	.080	0.000	.320	10.87	.270	.217
6 20	171	10.68*	0.000	0.000	.240	10.64	.240	.250
6 21	172	10.44*	0.000	0.000	.240	10.44	.240	.240
6 22	173	10.20*	0.000	0.000	.240	10.20	.240	.212
6 23	174	9.96*	0.000	0.000	.240	9.96	.155	.155
6 24	175	9.72	0.000	0.000	-.015	9.81	.070	.116
6 25	176	9.74*	0.000	0.000	-.015	9.74	.124	.153
6 26	177	9.75	0.000	0.000	.403	9.61	.264	.264
6 27	178	9.35*	0.000	0.000	.403	9.35	.403	.305
6 28	179	8.94*	0.000	0.000	.403	8.94	.247	.247
6 29	180	8.54	0.000	0.000	-.067	8.70	.090	.090
6 30	181	8.61*	0.000	0.000	-.067	8.61	-.067	-.002

DATE	JULIAN DAY	MEAS. SOIL WATER	PRECIP	IRRIG WATER APPLD	RAW ET	SMOOTH SOIL WATER	SMOOTH ET	SECOND SMOOTH ET
		IN.	IN.	IN.	IN/DY	IN.	IN/DY	IN/DY
7 1	182	8.67*	0.000	0.000	-.067	8.67	-.029	-.029
7 2	183	8.74	0.000	0.000	.046	8.70	.008	.008
7 3	184	8.69*	0.000	0.000	.046	8.69	.046	.033
7 4	185	8.65*	0.000	0.000	.046	8.65	.046	.046
7 5	186	8.60*	0.000	0.000	.046	8.60	.046	.203
7 6	187	8.56*	.500	0.000	.546	8.56	.516	.206
7 7	188	8.51	.070	0.000	.025	8.54	.055	.186
7 8	189	8.56*	0.000	0.000	-.045	8.56	-.012	.022
7 9	190	8.60	0.000	0.000	.055	8.57	.022	.010
7 10	191	8.55*	0.000	0.000	.055	8.55	.048	.037
7 11	192	8.49	0.000	0.000	.033	8.50	.041	.041
7 12	193	8.46*	0.000	0.000	.033	8.46	.033	.030
7 13	194	8.42*	0.000	0.000	.033	8.42	.017	.025
7 14	195	8.39	0.000	0.000	0.000	8.41	0.000	.008

**SOIL WATER VALUE WAS NOT MEASURED THIS DAY BUT FOUND BY AVERAGING THE DATA FROM NEAREST MEASUREMENTS

NEGATIVE ET VALUES INDICATE AN INCREASE IN SOIL WATER FOR THAT DAY

EOI ENCOUNTERED.

T1-5

? COPY,T15

DATE	JULIAN DAY	MEAS. SOIL WATER	PRECIP	IRRIG WATER APPLD	RAW ET	SMOOTH SOIL WATER	SMOOTH ET	SECOND SMOOTH ET
		IN.	IN.	IN.	IN/DY	IN.	IN/DY	IN/DY
4 10	100	11.98	0.000	0.000	.320	11.82	.063	.095
4 11	101	11.66	0.000	0.000	.030	11.76	.127	.072
4 12	102	11.63*	0.000	0.000	.030	11.63	.027	.092
4 13	103	11.60	0.000	0.000	.020	11.60	.123	.073
4 14	104	11.58	.010	0.000	.330	11.49	.070	.114
4 15	105	11.26	0.000	0.000	-.160	11.42	.150	.063
4 16	106	11.42	0.000	0.000	.290	11.27	-.032	.022
4 17	107	11.13	0.000	0.000	-.225	11.30	-.053	.282
4 18	108	11.36*	0.000	1.465	1.240	11.36	.032	.216
4 19	109	11.58	0.000	0.000	-1.150	11.89	-.232	.183
4 20	110	12.73	0.000	0.000	.680	12.12	-.150	-.035
4 21	111	12.05	0.000	0.000	.020	12.27	.277	.108
4 22	112	12.03	.004	0.000	.134	11.99	.197	.207
4 23	113	11.90	0.000	0.000	.430	11.89	.147	.173
4 24	114	11.47	.010	0.000	-.110	11.65	.175	.145
4 25	115	11.59	.030	0.000	.215	11.49	.113	.164
4 26	116	11.41*	0.000	0.000	.185	11.41	.203	.158
4 27	117	11.22	0.000	0.000	.240	11.20	.158	.184
4 28	118	10.98	0.000	0.000	.050	11.04	.190	.175
4 29	119	10.93	0.000	0.000	.280	10.85	.177	.197
4 30	120	10.65	0.000	0.000	.200	10.68	.223	.217

DATE	JULIAN DAY	MEAS. SOIL WATER	PRECIP	IRRIG WATER APPLD	RAW ET	SMOOTH SOIL WATER	SMOOTH ET	SECOND SMOOTH ET
		IN.	IN.	IN.	IN/DY	IN.	IN/DY	IN/DY
5 1	121	10.45	0.000	0.000	.190	10.45	.250	.259
5 2	122	10.26	0.000	0.000	.360	10.23	.303	.282
5 3	123	9.90*	0.000	0.000	.360	9.99	.293	.274
5 4	124	9.54	0.000	0.000	.159	9.61	.226	.226
5 5	125	9.38*	0.000	0.000	.159	9.39	.159	.268
5 6	126	9.22*	.260	0.000	.419	9.22	.419	.245
5 7	127	9.06*	0.000	0.000	.159	9.06	.159	.245
5 8	128	8.91*	0.000	0.000	.159	8.91	.159	.159
5 9	129	8.75*	0.000	0.000	.159	8.75	.159	.159
5 10	130	8.59*	0.000	0.000	.159	8.59	.159	.132
5 11	131	8.43*	0.000	0.000	.159	8.43	.079	.101
5 12	132	8.27	.260	0.000	.180	8.35	.335	.161
5 13	133	8.35	0.000	0.000	.145	8.24	.070	.165
5 14	134	8.21*	.150	0.000	.295	8.21	.090	-.041
5 15	135	8.06	0.000	0.000	-.470	8.27	-.282	-.225
5 16	136	8.53	.020	0.000	-.500	8.55	-.483	.103
5 17	137	9.05*	0.000	1.520	-.012	9.05	1.070	.010
5 18	138	9.57	.070	0.000	-.233	9.57	-.306	.182
5 19	139	9.97*	.085	0.000	-.219	9.87	-.218	.375
5 20	140	10.19*	0.000	1.740	-.303	10.14	1.650	.508
5 21	141	10.48	0.000	0.000	.340	10.27	.096	.637
5 22	142	10.14	0.000	0.000	.250	10.17	.157	.085
5 23	143	9.90	0.000	0.000	-.120	10.01	.003	.049
5 24	144	10.01*	0.000	0.000	-.120	10.01	-.013	.028
5 25	145	10.13	0.000	0.000	.200	10.02	.093	.059
5 26	146	9.93*	0.000	0.000	.200	9.93	.098	.063
5 27	147	9.73	0.000	0.000	-.105	9.83	-.003	-.078
5 28	148	9.84*	0.000	0.000	-.105	9.84	-.330	-.296
5 29	149	9.94	0.000	0.000	-.780	10.17	-.555	.578
5 30	150	10.72*	0.000	3.400	2.620	10.72	2.620	.559
5 31	151	11.50*	0.000	0.000	-.780	11.50	-.388	.745

T1-5

DATE	JULIAN DAY	MEAS. SOIL WATER	PRECIP	IRRIG WATER APPLD	RAW ET	SMOOTH SOIL WATER	SMOOTH ET	SECOND SMOOTH ET
		IN.	IN.	IN.	IN/DY	IN.	IN/DY	IN/DY
6 1	152	12.28	0.000	0.000	.395	11.89	.003	.003
6 2	153	11.89*	0.000	0.000	.395	11.89	.393	.263
6 3	154	11.49	0.000	0.000	.390	11.49	.392	.392
6 4	155	11.10*	0.000	0.000	.390	11.10	.390	.325
6 5	156	10.71*	0.000	0.000	.390	10.71	.193	.340
6 6	157	10.32	.440	0.000	.240	10.52	.437	.143
6 7	158	10.52*	0.000	0.000	-.200	10.52	-.200	.221
6 8	159	10.72*	.540	0.000	.340	10.72	.427	.034
6 9	160	10.92	0.000	0.000	.060	10.83	-.123	.057
6 10	161	10.86	0.000	0.000	-.230	10.96	-.133	-.162
6 11	162	11.09*	0.000	0.000	-.230	11.09	-.230	.551
6 12	163	11.32*	0.000	2.103	1.873	11.32	2.016	.614
6 13	164	11.55	0.000	0.000	.200	11.41	.057	.763
6 14	165	11.35*	0.000	0.000	.200	11.35	.215	.167
6 15	166	11.15	0.000	0.000	.245	11.14	.230	.227
6 16	167	10.91*	0.000	0.000	.245	10.91	.235	.263
6 17	168	10.66	.100	0.000	.315	10.67	.325	.263
6 18	169	10.45*	0.000	0.000	.215	10.45	.230	.293
6 19	170	10.23	.080	0.000	.340	10.22	.325	.272
6 20	171	9.97*	0.000	0.000	.260	9.97	.260	.282
6 21	172	9.71*	0.000	0.000	.260	9.71	.260	.260
6 22	173	9.45*	0.000	0.000	.260	9.45	.260	.238
6 23	174	9.19*	0.000	0.000	.260	9.19	.193	.193
6 24	175	8.93	0.000	0.000	.060	9.00	.127	.109
6 25	176	8.87*	0.000	0.000	.060	8.87	.007	.029
6 26	177	8.81	0.000	0.000	-.100	8.86	-.047	-.047
6 27	178	8.91*	0.000	0.000	-.100	8.91	-.100	-.001
6 28	179	9.01*	0.000	0.000	-.100	9.01	.143	.143
6 29	180	9.11	0.000	0.000	.630	8.87	.387	.387
6 30	181	8.48*	0.000	0.000	.630	8.48	.630	.489

DATE	JULIAN DAY	MEAS. SOIL WATER	PRECIP	IRRIG WATER APPLD	RAW ET	SMOOTH SOIL WATER	SMOOTH ET	SECOND SMOOTH ET
		IN.	IN.	IN.	IN/DY	IN.	IN/DY	IN/DY
7 1	182	7.85*	0.000	0.000	.630	7.85	.451	.451
7 2	183	7.22	0.000	0.000	.094	7.40	.273	.273
7 3	184	7.13*	0.000	0.000	.094	7.13	.094	.154
7 4	185	7.03*	0.000	0.000	.094	7.03	.094	.094
7 5	186	6.94*	0.000	0.000	.094	6.94	.094	.242
7 6	187	6.84*	.500	0.000	.594	6.84	.539	.229
7 7	188	6.75	.070	0.000	.000	6.80	.055	.193
7 8	189	6.82*	0.000	0.000	-.070	6.82	-.015	.027
7 9	190	6.89	0.000	0.000	.095	6.84	.040	.032
7 10	191	6.80*	0.000	0.000	.095	6.80	.070	.052
7 11	192	6.70	0.000	0.000	.020	6.73	.045	.045
7 12	193	6.68*	0.000	0.000	.020	6.68	.020	.025
7 13	194	6.66*	0.000	0.000	.020	6.66	.010	.015
7 14	195	6.64	0.000	0.000	0.000	6.65	0.000	.005

**SOIL WATER VALUE WAS NOT MEASURED
THIS DAY BUT FOUND BY AVERAGING
THE DATA FROM NEAREST MEASUREMENTS

NEGATIVE ET VALUES INDICATE AN
INCREASE IN SOIL WATER FOR THAT DAY

EOI ENCOUNTERED.

T2A-3

/COPY.T2A3

DATE	JULIAN DAY	MEAS. SOIL WATER	PRECIP	IRRIG WATER APPLD	RAW ET	SMOOTH SOIL WATER	SMOOTH ET	SECOND SMOOTH ET
		IN.	IN.	IN.	IN/DY	IN.	IN/DY	IN/DY
4 9	99	9.73	0.000	0.000	-.080	9.77	-.103	-.055
4 10	100	9.81	0.000	0.000	-.270	9.87	-.007	.007
4 11	101	10.08	0.000	0.000	.330	9.88	.130	.113
4 12	102	9.75*	0.000	0.000	.330	9.75	.217	.184
4 13	103	9.42	0.000	0.000	-.010	9.53	.207	.164
4 14	104	9.43	.010	0.000	.310	9.33	.070	.129
4 15	105	9.13	0.000	0.000	-.110	9.27	.110	.109
4 16	106	9.24	0.000	0.000	.140	9.16	.147	.184
4 17	107	9.10	0.000	0.000	.410	9.01	.297	.189
4 18	108	8.69	0.000	0.000	.340	8.71	.123	.151
4 19	109	8.35	0.000	0.000	-.380	8.59	.033	.016
4 20	110	8.73	0.000	0.000	.140	8.56	-.110	0.000
4 21	111	8.59	0.000	0.000	-.090	8.67	.077	.017
4 22	112	8.68	.004	0.000	.184	8.59	.084	.006
4 23	113	8.50	0.000	0.000	.150	8.51	.127	.113
4 24	114	8.35	.010	0.000	.060	8.38	.128	.135
4 25	115	8.30	.030	0.000	.185	8.27	.150	.145
4 26	116	8.15*	0.000	0.000	.155	8.15	.157	.079
4 27	117	7.99	0.000	0.000	.160	7.99	-.068	.079
4 28	118	7.83	0.000	0.000	-.520	8.06	.150	.078
4 29	119	8.35	0.000	0.000	.810	7.91	.153	.229
4 30	120	7.54	0.000	0.000	.170	7.75	.383	.248

DATE	JULIAN DAY	MEAS. SOIL WATER	PRECIP	IRRIG WATER APPLD	RAW ET	SMOOTH SOIL WATER	SMOOTH ET	SECOND SMOOTH ET
		IN.	IN.	IN.	IN/DY	IN.	IN/DY	IN/DY
5 1	121	7.37	0.000	0.000	.170	7.37	.208	.279
5 2	122	7.20	0.000	0.000	.285	7.16	.247	.226
5 3	123	6.92*	0.000	0.000	.285	6.92	.223	.219
5 4	124	6.63	0.000	0.000	.098	6.69	.160	.160
5 5	125	6.53*	0.000	0.000	.097	6.53	.097	.205
5 6	126	6.44*	.260	0.000	.358	6.44	.358	.184
5 7	127	6.34*	0.000	0.000	.097	6.34	.097	.184
5 8	128	6.24*	0.000	0.000	.097	6.24	.097	.097
5 9	129	6.14*	0.000	0.000	.097	6.14	.097	.098
5 10	130	6.05*	0.000	0.000	.097	6.05	.098	.091
5 11	131	5.95*	0.000	0.000	.097	5.95	.078	.174
5 12	132	5.85	.260	0.000	.300	5.87	.346	.140
5 13	133	5.81	0.000	0.000	.120	5.78	-.003	.140
5 14	134	5.69	.150	0.000	-.020	5.79	.077	-.068
5 15	135	5.86*	0.000	0.000	-.170	5.86	-.277	-.188
5 16	136	6.03	.020	0.000	-.470	6.14	-.363	.231
5 17	137	6.52*	0.000	1.740	1.250	6.52	1.333	.230
5 18	138	7.01	.070	0.000	-.170	6.91	-.253	.308
5 19	139	7.25*	.085	0.000	-.155	7.25	-.155	.390
5 20	140	7.40*	0.000	1.607	1.457	7.49	1.577	.468
5 21	141	7.73	0.000	0.000	.120	7.61	-.017	.528
5 22	142	7.61	0.000	0.000	.070	7.63	.023	-.017
5 23	143	7.54	0.000	0.000	-.120	7.60	-.057	-.024
5 24	144	7.66*	0.000	0.000	-.120	7.66	-.038	-.017
5 25	145	7.78	0.000	0.000	.125	7.79	.043	.046
5 26	146	7.66*	0.000	0.000	.125	7.66	.134	.107
5 27	147	7.53	0.000	0.000	.152	7.52	.143	.143
5 28	148	7.38*	0.000	0.000	.152	7.38	.152	.149
5 29	149	7.23*	0.000	0.000	.152	7.23	.152	.152
5 30	150	7.07*	0.000	0.000	.152	7.07	.152	.162
5 31	151	6.92*	0.000	0.000	.152	6.92	.181	.181

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DATE	JULIAN DAY	MEAS. SOIL WATER	PRECIP	IRRIG WATER APPLD	RAW ET	SMOOTH SOIL WATER	SMOOTH ET	SECOND SMOOTH ET
		IN.	IN.	IN.	IN/DY	IN.	IN/DY	IN/DY
6 1	152	6.77	0.000	0.000	.240	6.74	.211	.208
6 2	153	6.53*	0.000	0.000	.240	6.53	.233	.163
6 3	154	6.29	0.000	0.000	.220	6.30	.045	.045
6 4	155	6.07	0.000	0.000	-.325	6.25	-.143	-.198
6 5	156	6.40*	0.000	0.000	-.325	6.40	-.496	1.101
6 6	157	6.72	.440	4.169	3.772	6.89	3.943	.870
6 7	158	7.56*	0.000	0.000	-.837	7.56	-.837	1.027
6 8	159	8.39*	.540	0.000	-.297	8.39	-.024	-.361
6 9	160	9.23	0.000	0.000	-.020	8.96	-.221	-.041
6 10	161	9.25	0.000	0.000	.195	9.18	.123	.004
6 11	162	9.06*	0.000	0.000	.195	9.06	.110	.116
6 12	163	8.86	0.000	0.000	-.060	8.95	.113	.113
6 13	164	8.92	0.000	0.000	.205	8.81	.117	.139
6 14	165	8.72*	0.000	0.000	.205	8.72	.188	.159
6 15	166	8.51	0.000	0.000	.155	8.53	.172	.170
6 16	167	8.36*	0.000	0.000	.155	8.36	.150	.189
6 17	168	8.20	.100	0.000	.240	8.21	.245	.183
6 18	169	8.06*	0.000	0.000	.140	8.06	.154	.216
6 19	170	7.92	.080	0.000	.262	7.91	.248	.195
6 20	171	7.74*	0.000	0.000	.182	7.74	.182	.204
6 21	172	7.56*	0.000	0.000	.182	7.56	.182	.182
6 22	173	7.37*	0.000	0.000	.182	7.37	.182	.169
6 23	174	7.19*	0.000	0.000	.182	7.19	.143	.143
6 24	175	7.01	0.000	0.000	.065	7.05	.104	.128
6 25	176	6.95*	0.000	0.000	.065	6.95	.138	.151
6 26	177	6.88	0.000	0.000	.283	6.81	.211	.211
6 27	178	6.60*	0.000	0.000	.283	6.60	.283	.240
6 28	179	6.31*	0.000	0.000	.293	6.31	.227	.227
6 29	180	6.03	0.000	0.000	.113	6.00	.170	.170
6 30	181	5.92*	0.000	0.000	.113	5.92	.113	.126

DATE	JULIAN DAY	MEAS. SOIL WATER	PRECIP	IRRIG WATER APPLD	RAW ET	SMOOTH SOIL WATER	SMOOTH ET	SECOND SMOOTH ET
		IN.	IN.	IN.	IN/DY	IN.	IN/DY	IN/DY
7 1	182	5.80*	0.000	0.000	.113	5.80	.094	.094
7 2	183	5.69	0.000	0.000	.056	5.71	.075	.075
7 3	184	5.63*	0.000	0.000	.056	5.63	.056	.062
7 4	185	5.58*	0.000	0.000	.056	5.58	.056	.056
7 5	186	5.52*	0.000	0.000	.056	5.52	.056	.211
7 6	187	5.47*	.500	0.000	.556	5.47	.521	.211
7 7	188	5.41	.070	0.000	.020	5.45	.055	.189
7 8	189	5.46*	0.000	0.000	-.050	5.46	-.010	.025
7 9	190	5.51	0.000	0.000	.070	5.47	.030	.013
7 10	191	5.44*	0.000	0.000	.070	5.44	.020	.007
7 11	192	5.37	0.000	0.000	-.080	5.42	-.030	-.030
7 12	193	5.45*	0.000	0.000	-.080	5.45	-.080	-.050
7 13	194	5.53*	0.000	0.000	-.080	5.53	-.040	-.060
7 14	195	5.61	0.000	0.000	0.000	5.57	0.000	-.020

*=SOIL WATER VALUE WAS NOT MEASURED
THIS DAY BUT FOUND BY AVERAGING
THE DATA FROM NEAREST MEASUREMENTS

NEGATIVE ET VALUES INDICATE AN
INCREASE IN SOIL WATER FOR THAT DAY

EOI ENCOUNTERED.

T2A-5

DATE	JULIAN DAY	MEAS. SOIL WATER	PRECIP	IRRIG WATER APPLD	RAW ET	SMOOTH SOIL WATER	SMOOTH ET	SECOND SMOOTH ET
		IN.	IN.	IN.	IN/DY	IN.	IN/DY	IN/DY
4 9	99	14.53	0.000	0.000	-.110	14.59	.088	.088
4 10	100	14.64	0.000	0.000	.320	14.50	.087	.105
4 11	101	14.32	0.000	0.000	.250	14.41	.140	.080
4 12	102	14.27*	0.000	0.000	.050	14.27	.013	.096
4 13	103	14.22	0.000	0.000	-.060	14.26	.133	.057
4 14	104	14.28	.010	0.000	.420	14.12	.023	.092
4 15	105	13.87	0.000	0.000	-.310	14.11	.120	.042
4 16	106	14.18	0.000	0.000	.260	13.99	-.017	.170
4 17	107	13.92	0.000	0.000	0.000	14.01	.407	.158
4 18	108	13.92	0.000	0.000	.060	13.60	.083	.219
4 19	109	12.96	0.000	0.000	-.710	13.52	.167	.021
4 20	110	13.67	0.000	0.000	.250	13.35	-.187	.038
4 21	111	13.42	0.000	0.000	-.100	13.54	.133	.011
4 22	112	13.52	.004	0.000	.254	13.40	.087	.128
4 23	113	13.27	0.000	0.000	.100	13.32	.163	.132
4 24	114	13.17	.010	0.000	.150	13.16	.147	.167
4 25	115	13.03	.030	0.000	.200	13.02	.190	.170
4 26	116	12.86*	0.000	0.000	.170	12.86	.173	.174
4 27	117	12.69	0.000	0.000	.180	12.69	.160	.173
4 28	118	12.51	0.000	0.000	.130	12.53	.187	.186
4 29	119	12.38	0.000	0.000	.250	12.34	.210	.206
4 30	- 120	12.13	0.000	0.000	.250	12.13	.220	.219

DATE	JULIAN DAY	MEAS. SOIL WATER	PRECIP	IRRIG WATER APPLD	RAW ET	SMOOTH SOIL WATER	SMOOTH ET	SECOND SMOOTH ET
		IN.	IN.	IN.	IN/DY	IN.	IN/DY	IN/DY
5 1	121	11.88	0.000	0.000	.160	11.91	.227	.227
5 2	122	11.72	0.000	0.000	.270	11.68	.233	.228
5 3	123	11.45*	0.000	0.000	.270	11.45	.222	.210
5 4	124	11.18	0.000	0.000	.128	11.23	.175	.175
5 5	125	11.05*	0.000	0.000	.128	11.05	.127	.230
5 6	126	10.93*	.260	0.000	.388	10.93	.388	.214
5 7	127	10.80*	0.000	0.000	.128	10.80	.128	.214
5 8	128	10.67*	0.000	0.000	.128	10.67	.128	.128
5 9	129	10.54*	0.000	0.000	.128	10.54	.128	.128
5 10	130	10.42*	0.000	0.000	.128	10.42	.128	.081
5 11	131	10.29*	0.000	0.000	.128	10.29	-.012	.134
5 12	132	10.16	.260	0.000	-.030	10.30	.286	.053
5 13	133	10.45	0.000	0.000	.240	10.27	-.115	.068
5 14	134	10.21	.150	0.000	-.145	10.39	.033	-.101
5 15	135	10.51*	0.000	0.000	-.295	10.51	-.222	-.106
5 16	136	10.80	.020	0.000	-.055	10.73	-.128	.395
5 17	137	10.88*	0.000	1.668	1.593	10.88	1.536	.429
5 18	138	10.95	.070	0.000	-.177	11.01	-.119	.418
5 19	139	11.20*	.085	0.000	-.162	11.20	-.162	.415
5 20	140	11.44*	0.000	1.686	-.247	11.44	1.526	.446
5 21	141	11.69	0.000	0.000	.020	11.64	-.026	.503
5 22	142	11.67	0.000	0.000	.150	11.63	.008	-.021
5 23	143	11.52	0.000	0.000	-.145	11.62	-.047	-.033
5 24	144	11.67*	0.000	0.000	-.145	11.67	-.060	-.027
5 25	145	11.81	0.000	0.000	.110	11.73	.025	.029
5 26	146	11.70*	0.000	0.000	.110	11.70	.123	.094
5 27	147	11.59	0.000	0.000	.148	11.58	.135	.135
5 28	148	11.44*	0.000	0.000	.148	11.44	.148	.144
5 29	149	11.29*	0.000	0.000	.148	11.29	.148	.148
5 30	150	11.15*	0.000	0.000	.148	11.15	.148	.152
5 31	151	11.00*	0.000	0.000	.148	11.00	.160	.160

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DATE	JULIAN DAY	MEAS. SOIL WATER	PRECIP	IRRIG WATER APPLD	RAW ET	SMOOTH SOIL WATER	SMOOTH ET	SECOND SMOOTH ET
		IN.	IN.	IN.	IN/DY	IN.	IN/DY	IN/DY
6 1	152	10.85	0.000	0.000	.185	10.84	.173	.190
6 2	153	10.67*	0.000	0.000	.185	10.67	.233	.229
6 3	154	10.48	0.000	0.000	.330	10.43	.280	.280
6 4	155	10.15	0.000	0.000	.325	10.15	.327	.114
6 5	156	9.83*	0.000	0.000	.325	9.83	-.266	1.060
6 6	157	9.50	.440	3.980	-.246	10.00	3.120	.469
6 7	158	10.95*	0.000	0.000	-1.447	10.95	-1.447	.431
6 8	159	12.39*	.540	0.000	-.907	12.39	-.381	-.729
6 9	160	13.84	0.000	0.000	.130	13.31	-.361	-.181
6 10	161	13.71	0.000	0.000	.235	13.68	.200	-.017
6 11	162	13.48*	0.000	0.000	.235	13.48	.110	.143
6 12	163	13.24	0.000	0.000	-.140	13.37	.120	.129
6 13	164	13.38	0.000	0.000	.265	13.25	.130	.153
6 14	• 165	13.12*	0.000	0.000	.265	13.12	.210	.165
6 15	166	12.85	0.000	0.000	.100	12.91	.155	.164
6 16	167	12.75*	0.000	0.000	.100	12.75	.128	.180
6 17	168	12.65	.100	0.000	.285	12.62	.257	.191
6 18	169	12.47*	0.000	0.000	.185	12.47	.189	.239
6 19	170	12.28	.080	0.000	.276	12.28	.272	.219
6 20	171	12.08*	0.000	0.000	.196	12.09	.196	.221
6 21	172	11.89*	0.000	0.000	.196	11.89	.196	.196
6 22	173	11.69*	0.000	0.000	.196	11.69	.196	.174
6 23	174	11.50*	0.000	0.000	.196	11.50	.131	.131
6 24	175	11.30	0.000	0.000	0.000	11.37	.065	.106
6 25	176	11.30*	0.000	0.000	0.000	11.30	.122	.144
6 26	177	11.30	0.000	0.000	.367	11.18	.244	.244
6 27	178	10.93*	0.000	0.000	.367	10.93	.367	.301
6 28	179	10.57*	0.000	0.000	.367	10.57	.291	.291
6 29	180	10.20	0.000	0.000	.140	10.29	.216	.216
6 30	181	10.06*	0.000	0.000	.140	10.06	.140	.160

DATE	JULIAN DAY	MEAS. SOIL WATER	PRECIP	IRRIG WATER APPLD	RAW ET	SMOOTH SOIL WATER	SMOOTH ET	SECOND SMOOTH ET
		IN.	IN.	IN.	IN/DY	IN.	IN/DY	IN/DY
7 1	182	9.92*	0.000	0.000	.140	9.92	.125	.125
7 2	183	9.78	0.000	0.000	.096	9.79	.111	.111
7 3	184	9.68*	0.000	0.000	.096	9.69	.096	.101
7 4	185	9.59*	0.000	0.000	.096	9.59	.096	.096
7 5	186	9.49*	0.000	0.000	.096	9.49	.096	.241
7 6	187	9.40*	.500	0.000	.596	9.40	.531	.221
7 7	188	9.30	.370	0.000	-.030	9.37	.035	.174
7 8	189	9.40*	0.000	0.000	-.100	9.40	-.045	.000
7 9	190	9.50	0.000	0.000	.065	9.45	.010	.014
7 10	191	9.44*	0.000	0.000	.065	9.44	.078	.059
7 11	192	9.37	0.000	0.000	.103	9.36	.091	.091
7 12	193	9.27*	0.000	0.000	.103	9.27	.103	.082
7 13	194	9.16*	0.000	0.000	.103	9.16	.052	.078
7 14	195	9.06	0.000	0.000	0.000	9.11	0.000	.026

*=SOIL WATER VALUE WAS NOT MEASURED
THIS DAY BUT FOUND BY AVERAGING
THE DATA FROM NEAREST MEASUREMENTS

NEGATIVE ET VALUES INDICATE AN
INCREASE IN SOIL WATER FOR THAT DAY

EOI ENCOUNTERED.

T3A-3

/COPY.T3A3

DATE	JULIAN DAY	MEAS. SOIL WATER	PRECIP	IRRIG WATER APPLD	RAW ET	SMOOTH SOIL WATER	SMOOTH ET	SECOND SMOOTH ET
		IN.	IN.	IN.	IN/DY	IN.	IN/DY	IN/DY
4 9	99	11.65	0.000	0.000	.010	11.65	.075	.080
4 10	100	11.64	0.000	0.000	.220	11.57	.085	.083
4 11	101	11.42	0.000	0.000	.025	11.49	.090	.062
4 12	102	11.40*	0.000	0.000	.025	11.40	.010	.068
4 13	103	11.37	0.000	0.000	-.020	11.39	.105	.068
4 14	104	11.39	.010	0.000	.320	11.29	.090	.103
4 15	105	11.08	0.000	0.000	-.050	11.20	.113	.131
4 16	106	11.13	0.000	0.000	.080	11.09	.190	.213
4 17	107	11.05	0.000	0.000	.540	10.90	.337	.224
4 18	108	10.51	0.000	0.000	.390	10.56	.147	.172
4 19	109	10.12	0.000	0.000	-.490	10.41	.033	.029
4 20	110	10.61	0.000	0.000	.200	10.38	-.007	.041
4 21	111	10.41	0.000	0.000	0.000	10.48	.187	.081
4 22	112	10.41	.004	0.000	.364	10.29	.154	.166
4 23	113	10.05	0.000	0.000	.090	10.14	.157	.006
4 24	114	9.96	.010	0.000	.030	9.98	-.293	-.260
4 25	115	9.94	.030	0.000	-.990	10.29	-.643	-.270
4 26	116	10.94*	0.000	0.000	-1.020	10.96	.127	.032
4 27	117	11.98	0.000	0.000	2.420	10.83	.613	.578
4 28	118	9.56	0.000	0.000	.440	10.22	.993	.630
4 29	119	9.12	0.000	0.000	.120	9.23	.283	.489
4 30	120	9.00	0.000	0.000	.290	8.94	.190	.234

DATE	JULIAN DAY	MEAS. SOIL WATER	PRECIP	IRRIG WATER APPLD	RAW ET	SMOOTH SOIL WATER	SMOOTH ET	SECOND SMOOTH ET
		IN.	IN.	IN.	IN/DY	IN.	IN/DY	IN/DY
5 1	121	8.71	0.000	0.000	.160	8.75	.230	.211
5 2	122	8.55	0.000	0.000	.240	8.52	.213	.211
5 3	123	8.31*	0.000	0.000	.240	8.31	.190	.181
5 4	124	8.07	0.000	0.000	.089	8.12	.139	.139
5 5	125	7.98*	0.000	0.000	.089	7.98	.089	.192
5 6	126	7.89*	.260	0.000	.349	7.89	.349	.175
5 7	127	7.80*	0.000	0.000	.089	7.80	.089	.175
5 8	128	7.72*	0.000	0.000	.089	7.72	.089	.089
5 9	129	7.63*	0.000	0.000	.089	7.63	.089	.089
5 10	130	7.54*	0.000	0.000	.089	7.54	.089	.064
5 11	131	7.45*	0.000	0.000	.089	7.45	.016	.140
5 12	132	7.36	.260	0.000	.130	7.43	.316	.091
5 13	133	7.49	0.000	0.000	.210	7.38	-.060	.101
5 14	134	7.28	.150	0.000	-.110	7.44	.047	-.004
5 15	135	7.54*	0.000	0.000	-.260	7.54	.000	.034
5 16	136	7.80	.020	0.000	.540	7.54	.057	.081
5 17	137	7.28	0.000	0.000	-.150	7.50	.185	.128
5 18	138	7.43	.070	0.000	.255	7.32	.143	.183
5 19	139	7.25*	.085	0.000	.270	7.25	.222	.160
5 20	140	7.06	0.000	0.000	.040	7.11	.115	.128
5 21	141	7.02	0.000	0.000	.120	6.99	.047	.053
5 22	142	6.90	0.000	0.000	-.020	6.95	-.003	-.012
5 23	143	6.92	0.000	0.000	-.110	6.95	-.080	-.047
5 24	144	7.03*	0.000	0.000	-.110	7.03	-.057	-.047
5 25	145	7.14	0.000	0.000	.050	7.09	-.003	-.031
5 26	146	7.09*	0.000	0.000	.050	7.00	-.033	-.051
5 27	147	7.04	0.000	0.000	-.200	7.12	-.117	-.310
5 28	148	7.24*	0.000	0.000	-.200	7.24	-.779	-.751
5 29	149	7.44	0.000	0.000	-1.937	8.02	-1.358	1.289
5 30	150	9.38*	0.000	7.940	6.003	9.38	6.003	1.118
5 31	151	11.31*	0.000	0.000	-1.937	11.31	-1.291	1.356

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DATE	JULIAN DAY	MEAS. SOIL WATER	PRECIP	IRRIG WATER APPLD	RAW ET	SMOOTH SOIL WATER	SMOOTH ET	SECOND SMOOTH ET
		IN.	IN.	IN.	IN/DY	IN.	IN/DY	IN/DY
6 1	152	13.25	0.000	0.000	0.000	12.60	-.646	-.627
6 2	153	13.25*	0.000	0.000	0.000	13.25	.056	-.160
6 3	154	13.25	0.000	0.000	.167	13.19	.111	.111
6 4	155	13.08*	0.000	0.000	.167	13.08	.167	.126
6 5	156	12.92*	0.000	0.000	.167	12.92	.099	.246
6 6	157	12.75	.440	0.000	.403	12.82	.471	.178
6 7	158	12.79*	0.000	0.000	-.037	12.79	-.037	.320
6 8	159	12.82*	.540	0.000	.503	12.82	.526	.178
6 9	160	12.86	0.000	0.000	.030	12.84	.044	.224
6 10	161	12.83	0.000	0.000	.140	12.79	.103	.076
6 11	162	12.69*	0.000	0.000	.140	12.69	.080	.091
6 12	163	12.55	0.000	0.000	-.040	12.61	.090	.090
6 13	164	12.59	0.000	0.000	.170	12.52	.100	.117
6 14	165	12.42*	0.000	0.000	.170	12.42	.160	.137
6 15	166	12.25	0.000	0.000	.140	12.26	.150	.149
6 16	167	12.11*	0.000	0.000	.140	12.11	.137	.173
6 17	168	11.97	.100	0.000	.230	11.97	.233	.171
6 18	169	11.84*	0.000	0.000	.130	11.84	.143	.204
6 19	170	11.71	.080	0.000	.250	11.70	.237	.183
6 20	171	11.54*	0.000	0.000	.170	11.54	.170	.192
6 21	172	11.37*	0.000	0.000	.170	11.37	.170	.170
6 22	173	11.20*	0.000	0.000	.170	11.20	.170	.148
6 23	174	11.03*	0.000	0.000	.170	11.03	.105	.105
6 24	175	10.86	0.000	0.000	-.025	10.93	.040	.073
6 25	176	10.89*	0.000	0.000	-.025	10.89	.073	.095
6 26	177	10.91	0.000	0.000	.270	10.81	.172	.172
6 27	178	10.64*	0.000	0.000	.270	10.64	.270	.223
6 28	179	10.37*	0.000	0.000	.270	10.37	.227	.227
6 29	180	10.10	0.000	0.000	.140	10.14	.183	.183
6 30	181	9.96*	0.000	0.000	.140	9.96	.140	.140

DATE	JULIAN DAY	MEAS. SOIL WATER	PRECIP	IRRIG WATER APPLD	RAW ET	SMOOTH SOIL WATER	SMOOTH ET	SECOND SMOOTH ET
		IN.	IN.	IN.	IN/DY	IN.	IN/DY	IN/DY
7 1	182	9.82*	0.000	0.000	.140	9.82	.121	.121
7 2	183	9.68	0.000	0.000	.084	9.70	.103	.103
7 3	184	9.60*	0.000	0.000	.084	9.60	.084	.090
7 4	185	9.51*	0.000	0.000	.084	9.51	.084	.084
7 5	186	9.43*	0.000	0.000	.084	9.43	.084	.239
7 6	187	9.34*	.500	0.000	.584	9.31	.548	.238
7 7	188	9.26	.070	0.000	.045	9.30	.081	.214
7 8	189	9.29*	0.000	0.000	-.025	9.29	.012	.047
7 9	190	9.31	0.000	0.000	.085	9.27	.048	.039
7 10	191	9.23*	0.000	0.000	.085	9.23	.057	.044
7 11	192	9.14	0.000	0.000	0.000	9.17	.028	.042
7 12	193	9.14*	0.000	0.000	0.000	9.14	0.000	.014
7 13	194	9.14*	0.000	0.000	0.000	9.14	0.000	0.000
7 14	195	9.14	0.000	0.000	0.000	9.14	0.000	0.000

**SOIL WATER VALUE WAS NOT MEASURED
THIS DAY BUT FOUND BY AVERAGING
THE DATA FROM NEAREST MEASUREMENTS

NEGATIVE ET VALUES INDICATE AN
INCREASE IN SOIL WATER FOR THAT DAY

EOI ENCOUNTERED.

T3A-4

/COPY,T3A4

DATE	JULIAN DAY	MEAS. SOIL WATER	PRECIP	IRRIG WATER APPLD	RAW ET	SMOOTH SOIL WATER	SMOOTH ET	SECOND SMOOTH ET
		IN.	IN.	IN.	IN/DY	IN.	IN/DY	IN/DY
4 9	99	16.19	0.000	0.000	-.170	16.20	.088	.069
4 10	100	16.36	0.000	0.000	.350	16.19	.050	.078
4 11	101	16.01	0.000	0.000	-.030	16.14	.097	.028
4 12	102	16.04*	0.000	0.000	-.030	16.04	-.063	.052
4 13	103	16.07	0.000	0.000	-.130	16.10	.123	.036
4 14	104	16.20	.010	0.000	.540	15.98	.047	.106
4 15	105	15.67	0.000	0.000	-.290	15.94	.147	.114
4 16	106	15.96	0.000	0.000	.200	15.80	.150	.248
4 17	107	15.76	0.000	0.000	.540	15.65	.447	.226
4 18	108	15.22	0.000	0.000	.600	15.20	.080	.159
4 19	109	14.62	0.000	0.000	-.900	15.12	-.050	-.077
4 20	110	15.52	0.000	0.000	.150	15.17	-.260	-.074
4 21	111	15.37	0.005	0.000	-.030	15.43	.087	-.004
4 22	112	15.40	.004	0.000	.144	15.34	.161	.135
4 23	113	15.26	0.000	0.000	.360	15.19	.157	.342
4 24	114	14.90	.010	0.000	-.020	15.03	.708	.687
4 25	115	14.93	.030	0.000	1.795	14.33	1.197	.708
4 26	116	13.17*	0.000	0.000	1.765	13.17	.220	.331
4 27	117	11.40	0.000	0.000	-2.870	12.95	-.425	-.388
4 28	118	14.27	0.000	0.000	-.170	13.37	-.960	-.434
4 29	119	14.44	0.000	0.000	.160	14.33	.083	-.227
4 30	120	14.28	0.000	0.000	.260	14.25	.197	.172

DATE	JULIAN DAY	MEAS. SOIL WATER	PRECIP	IRRIG WATER APPLD	RAW ET	SMOOTH SOIL WATER	SMOOTH ET	SECOND SMOOTH ET
		IN.	IN.	IN.	IN/DY	IN.	IN/DY	IN/DY
5 1	121	14.02	0.000	0.000	.170	14.05	.235	.224
5 2	122	13.85	0.000	0.000	.275	13.82	.240	.236
5 3	123	13.58*	0.000	0.000	.275	13.58	.233	.222
5 4	124	13.30	0.000	0.000	.150	13.34	.192	.192
5 5	125	13.15*	0.000	0.000	.150	13.15	.150	.251
5 6	126	13.00*	.260	0.000	.410	13.00	.410	.237
5 7	127	12.85*	0.000	0.000	.150	12.85	.150	.237
5 8	128	12.70*	0.000	0.000	.150	12.70	.150	.150
5 9	129	12.55*	0.000	0.000	.150	12.55	.150	.150
5 10	130	12.40*	0.000	0.000	.150	12.40	.150	.104
5 11	131	12.25*	0.000	0.000	.150	12.25	.013	.180
5 12	132	12.10	.260	0.000	.000	12.24	.377	.116
5 13	133	12.36	0.000	0.000	.460	12.12	-.043	.139
5 14	134	11.90	.150	0.000	-.180	12.15	.083	.012
5 15	135	12.23*	0.000	0.000	-.330	12.23	-.003	.056
5 16	136	12.56	.020	0.000	.670	12.23	.087	.116
5 17	137	11.91	0.000	0.000	-.120	12.17	.263	.184
5 18	138	12.03	.070	0.000	.330	11.90	.203	.266
5 19	139	11.77*	.095	0.000	.345	11.77	.332	.253
5 20	140	11.51	0.000	0.000	.220	11.52	.223	.238
5 21	141	11.29	0.000	0.000	.190	11.30	.160	.161
5 22	142	11.10	0.000	0.000	.070	11.14	.098	.102
5 23	143	11.03	0.000	0.000	.035	11.04	.047	.151
5 24	144	11.00*	0.000	0.000	.035	11.00	.008	.012
5 25	145	10.96	0.000	0.000	-.045	10.99	-.018	-.044
5 26	146	11.01*	0.000	0.000	-.045	11.01	-.123	-.114
5 27	147	11.05	0.000	0.000	-.280	11.13	-.202	-.365
5 28	148	11.33*	0.000	0.000	-.280	11.33	-.770	-.744
5 29	149	11.61	0.000	0.000	-1.750	12.10	-1.260	1.128
5 30	150	13.36*	0.000	7.163	5.413	13.36	5.413	1.007
5 31	151	15.11*	0.000	0.000	-1.750	15.11	-1.133	1.254

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DATE	JULIAN DAY	MEAS. SOIL WATER	PRECIP	IRRIG WATER APPLD	RAW ET	SMOOTH SOIL WATER	SMOOTH ET	SECOND SMOOTH ET
		IN.	IN.	IN.	IN/DY	IN.	IN/DY	IN/DY
6 1	152	16.86	0.000	0.000	.100	16.24	-.517	-.477
6 2	153	16.76*	0.000	0.000	.100	16.75	.220	.014
6 3	154	16.66	0.000	0.000	.460	16.54	.340	.340
6 4	155	16.29*	0.000	0.000	.460	16.29	.460	.337
6 5	156	15.74*	0.000	0.000	.460	15.74	.211	.358
6 6	157	15.28	.440	0.000	.153	15.53	.402	.149
6 7	158	15.57*	0.000	0.000	-.287	15.57	-.287	.179
6 8	159	15.85*	.540	0.000	.253	15.85	.422	.056
6 9	160	16.14	0.000	0.000	.220	15.97	.033	.213
6 10	161	15.92	0.000	0.000	.165	15.94	.183	.081
6 11	162	15.76*	0.000	0.000	.165	15.76	.027	.091
6 12	163	15.59	0.000	0.000	-.250	15.73	.062	.062
6 13	164	15.84	0.000	0.000	.279	15.67	.097	.128
6 14	165	15.57*	0.000	0.000	.270	15.57	.225	.167
6 15	166	15.30	0.000	0.000	.135	15.35	.180	.182
6 16	167	15.17*	0.000	0.000	.135	15.17	.142	.190
6 17	168	15.03	.100	0.000	.255	15.02	.248	.185
6 18	169	14.88*	0.000	0.000	.155	14.88	.166	.224
6 19	170	14.72	.080	0.000	.268	14.71	.257	.204
6 20	171	14.53*	0.000	0.000	.188	14.53	.188	.211
6 21	172	14.34*	0.000	0.000	.188	14.34	.188	.188
6 22	173	14.16*	0.000	0.000	.188	14.16	.188	.180
6 23	174	13.97*	0.000	0.000	.188	13.97	.164	.164
6 24	175	13.78	0.000	0.000	.116	13.80	.140	.140
6 25	176	13.66*	0.000	0.000	.116	13.66	.116	.124
6 26	177	13.55*	0.000	0.000	.116	13.55	.116	.116
6 27	178	13.43*	0.000	0.000	.116	13.43	.116	.118
6 28	179	13.32*	0.000	0.000	.116	13.32	.122	.122
6 29	180	13.20	0.000	0.000	.133	13.19	.128	.128
6 30	181	13.07*	0.000	0.000	.133	13.07	.133	.126
DATE	**JULIAN DAY**	**MEAS. SOIL WATER**	**PRECIP**	**IRRIG WATER APPLD**	**RAW ET**	**SMOOTH SOIL WATER**	**SMOOTH ET**	**SECOND SMOOTH ET**
		IN.	IN.	IN.	IN/DY	IN.	IN/DY	IN/DY
7 1	182	12.93*	0.000	0.000	.133	12.93	.116	.116
7 2	183	12.80	0.000	0.000	.082	12.82	.099	.099
7 3	184	12.72*	0.000	0.000	.082	12.72	.082	.088
7 4	185	12.64*	0.000	0.000	.082	12.64	.082	.082
7 5	186	12.55*	0.000	0.000	.082	12.55	.082	.229
7 6	187	12.47*	.500	0.000	.582	12.47	.523	.213
7 7	188	12.39	.070	0.000	-.025	12.45	.034	.172
7 8	189	12.49*	0.000	0.000	-.095	12.49	-.040	.003
7 9	190	12.53	0.000	0.000	.070	12.53	.015	.012
7 10	191	12.51*	0.000	0.000	.070	12.51	.061	.043
7 11	192	12.44	0.000	0.000	.043	12.45	.052	.052
7 12	193	12.40*	0.000	0.000	.043	12.43	.043	.039
7 13	194	12.35*	0.000	0.000	.043	12.35	.022	.032
7 14	195	12.31	0.000	0.000	0.000	12.33	0.000	.011

**SOIL WATER VALUE WAS NOT MEASURED THIS DAY BUT FOUND BY AVERAGING THE DATA FROM NEAREST MEASUREMENTS

NEGATIVE ET VALUES INDICATE AN INCREASE IN SOIL WATER FOR THAT DAY

EOI ENCOUNTERED.

APPENDIX D

Logarithmic Model Results

W1-3

W13

DATE	JULIAN DAY	AVAILABLE WATER	COEFFICIENT KA	PREDICTED ET	MEASURED ET	ET RATIO	CUMULATIVE PREDICTED	CUMULATIVE MEASURED
		CM		MM/DY	MM/DY		CM	CM
4 9	99	15.04	1.000	4.10	3.12	.76	.41	.31
4 10	100	14.48	.990	2.60	3.86	1.48	.67	.70
4 11	101	14.41	.990	3.15	1.12	.36	.99	.81
4 12	102	13.87	.980	3.97	.64	.16	1.38	.87
4 13	103	14.15	.980	3.21	6.30	1.96	1.70	1.50
4 14	104	14.23	.990	3.75	7.39	1.97	2.08	2.24
4 15	105	14.38	.990	4.75	8.74	1.84	2.55	3.12
4 16	106	14.30	.990	4.89	5.26	1.08	3.04	3.64
4 17	107	13.97	.980	4.02	5.87	1.46	3.44	4.23
4 18	108	12.78	.960	5.30	4.24	.80	3.97	4.65
4 19	109	12.55	.960	2.96	-2.44	-.82	4.27	4.41
4 20	110	12.70	.960	5.91	.03	.01	4.86	4.41
4 21	111	13.52	.970	5.87	1.17	.20	5.45	4.53
4 22	112	13.49	.970	3.57	4.62	1.29	5.81	4.99
4 23	113	13.31	.970	5.53	2.26	.41	6.36	5.22
4 24	114	13.09	.970	7.37	2.95	.40	7.10	5.51
4 25	115	12.83	.960	3.78	3.28	.87	7.47	5.84
4 26	116	12.53	.960	3.48	3.02	.87	7.82	6.14
4 27	117	12.20	.950	3.54	4.22	1.19	8.17	6.56
4 28	118	12.02	.950	4.91	4.06	.83	8.67	6.97
4 29	119	11.89	.950	4.28	4.52	1.06	9.09	7.42
4 30	120	11.61	.940	6.14	3.61	.59	9.71	7.78
5 1	121	11.28	.940	7.62	4.42	.58	10.47	8.23
5 2	122	10.80	.930	6.77	5.13	.76	11.15	8.74
5 3	123	10.20	.920	4.66	4.38	1.05	11.61	9.23
5 4	124	9.73	.900	4.74	10.54	2.22	12.09	10.28
5 5	125	9.35	.900	2.47	11.71	4.74	12.33	11.45
5 6	126	9.10	.890	3.73	11.20	3.00	12.71	12.57
5 7	127	8.87	.880	5.35	4.57	.85	13.24	13.03
5 8	128	8.64	.880	4.37	2.36	.54	13.68	13.27
5 9	129	8.41	.870	4.40	1.68	.38	14.12	13.43
5 10	130	8.16	.870	4.71	.36	.08	14.59	13.47
5 11	131	8.13	.870	4.08	4.34	1.06	15.00	13.90
5 12	132	8.31	.870	4.52	4.27	.94	15.45	14.33
5 13	133	8.49	.870	2.62	6.76	2.58	15.71	15.01
5 14	134	8.46	.870	1.26	2.62	2.08	15.84	15.27
5 15	135	8.28	.870	4.29	2.77	.65	16.27	15.55
5 16	136	8.08	.860	4.18	1.70	.41	16.69	15.72
5 17	137	8.08	.860	3.42	3.35	.98	17.03	16.05
5 18	138	7.80	.860	2.73	6.10	2.23	17.30	16.66
5 19	139	7.29	.840	3.78	6.43	1.70	17.68	17.30
5 20	140	6.63	.820	5.87	12.62	2.15	18.27	18.57
5 21	141	6.28	.810	6.83	9.30	1.36	18.95	19.50
5 22	142	6.23	.810	4.16	7.11	1.71	19.36	20.21
5 23	143	6.35	.810	3.95	-2.26	-.57	19.76	19.98
5 24	144	6.66	.820	3.49	-1.22	-.35	20.11	19.86
5 25	145	6.91	.830	4.62	-.43	-.09	20.57	19.81
5 26	146	6.71	.820	4.16	-1.24	-.30	20.99	19.69
5 27	147	6.76	.830	4.85	5.72	1.18	21.47	20.26
5 28	148	7.27	.840	4.29	1.88	.44	21.90	20.45
5 29	149	8.49	.870	4.82	-.43	-.09	22.38	20.41
5 30	150	9.68	.900	5.13	-7.14	-1.39	22.89	19.69
5 31	151	10.90	.930	5.18	-1.09	-.21	23.41	19.58

W1-3

DATE	JULIAN DAY	AVAILABLE WATER	COEFFICIENT KA	PREDICTED ET	MEASURED ET	ET RATIO	CUMULATIVE PREDICTED	CUMULATIVE MEASURED
		CM		MM/DY	MM/DY		CM	CM
6 1	152	10.62	.920	6.11	7.49	1.23	24.02	20.33
6 2	153	10.01	.910	6.86	8.79	1.28	24.71	21.21
6 3	154	8.64	.880	5.51	28.88	5.24	25.26	24.10
6 4	155	7.98	.860	3.34	24.21	7.25	25.59	26.52
6 5	156	6.94	.830	4.06	22.05	5.43	26.00	28.73
6 6	157	6.96	.830	3.09	-7.42	-2.40	26.31	27.98
6 7	158	8.08	.860	1.34	1.32	.99	26.44	28.12
6 8	159	10.27	.920	2.92	-.10	-.03	26.74	28.11
6 9	160	11.59	.940	5.42	8.74	1.61	27.28	28.98
6 10	161	12.02	.950	5.10	1.02	.20	27.79	29.08
6 11	162	11.56	.940	5.21	3.61	.69	28.31	29.44
6 12	163	11.28	.940	5.60	3.48	.62	28.87	29.79
6 13	164	10.93	.930	5.31	4.24	.80	29.40	30.22
6 14	165	10.52	.920	5.67	3.78	.67	29.97	30.59
6 15	166	10.01	.910	6.49	2.08	.32	30.62	30.80
6 16	167	9.81	.910	3.99	.46	.12	31.01	30.85
6 17	168	9.89	.910	5.14	-.25	-.05	31.53	30.82
6 18	169	10.14	.910	2.15	1.50	.70	31.74	30.97
6 19	170	10.14	.910	5.80	3.00	.52	32.32	31.27
6 20	171	9.91	.910	4.44	4:57	1.03	32.77	31.73
6 21	172	9.43	.900	3.79	4.67	1.23	33.15	32.20
6 22	173	8.97	.890	3.23	4.39	1.36	33.47	32.64
6 23	174	8.49	.870	4.77	3.84	.81	33.95	33.02
6 24	175	8.11	.870	5.20	4.01	.77	34.47	33.42
6 25	176	7.83	.860	4.83	5.46	1.13	34.95	33.97
6 26	177	7.29	.840	8.73	8.23	.94	35.82	34.79
6 27	178	6.48	.820	5.38	9.30	1.73	36.36	35.72
6 28	179	5.34	.780	4.33	8.38	1.94	36.79	36.56
6 29	180	4.50	.740	4.85	5.51	1.14	37.28	37.11
6 30	181	3.97	.710	4.12	3.53	.86	37.69	37.46
7 1	182	3.69	.700	4.01	2.49	.62	38.09	37.71
7 2	183	3.46	.690	3.68	2.36	.64	38.46	37.95
7 3	184	3.20	.670	4.11	2.29	.56	38.87	38.18
7 4	185	2.98	.650	3.97	2.24	.56	39.27	38.40
7 5	186	2.77	.640	1.84	5.99	3.26	39.45	39.00
7 6	187	2.54	.620	.73	5.64	7.73	39.52	39.56
7 7	188	2.47	.620	2.77	4.72	1.70	39.80	40.03
7 8	189	2.52	.620	2.51	.56	.22	40.05	40.09
7 9	190	2.57	.620	3.08	.71	.23	40.36	40.16
7 10	191	2.47	.620	3.02	1.14	.38	40.66	40.28
7 11	192	2.32	.600	1.99	.79	.40	40.86	40.35
7 12	193	2.24	.600	2.41	.36	.15	41.10	40.39
7 13	194	2.24	.600	2.39	-.03	-.01	41.34	40.39

.945 CP SECONDS EXECUTION TIME.

W1-4

XW14

DATE	JULIAN DAY	AVAILABLE WATER	COEFFICIENT KA	PREDICTED ET	MEASURED ET	ET RATIO	CUMULATIVE PREDICTED	CUMULATIVE MEASURED
		CM		MM/DY	MM/DY		CM	CM
4 9	99	14.45	.990	4.06	.91	.22	.41	.09
4 10	100	14.34	.990	2.60	1.73	.67	.67	.26
4 11	101	14.24	.990	3.14	1.45	.46	.98	.41
4 12	102	13.91	.980	3.97	.15	.04	1.38	.42
4 13	103	13.91	.980	3.20	5.69	1.78	1.70	.99
4 14	104	14.22	.990	3.75	5.11	1.36	2.07	1.50
4 15	105	14.80	.990	4.78	7.47	1.56	2.55	2.25
4 16	106	14.98	1.000	4.94	4.34	.88	3.04	2.69
4 17	107	14.57	.990	4.06	5.94	1.46	3.45	3.28
4 18	108	13.51	.970	5.37	3.73	.69	3.99	3.65
4 19	109	13.20	.970	2.99	-2.46	-.82	4.29	3.41
4 20	110	13.45	.970	5.99	-.13	-.02	4.89	3.39
4 21	111	14.24	.990	5.94	2.01	.34	5.48	3.59
4 22	112	14.32	.990	3.62	6.02	1.66	5.84	4.20
4 23	113	13.91	.980	5.59	4.01	.72	6.40	4.60
4 24	114	13.51	.970	7.42	3.66	.49	7.14	4.96
4 25	115	13.15	.970	3.80	3.18	.84	7.52	5.28
4 26	116	12.92	.960	3.50	1.88	.54	7.87	5.47
4 27	117	12.67	.960	3.57	4.88	1.37	8.23	5.96
4 28	118	12.67	.960	4.97	4.93	.99	8.73	6.45
4 29	119	12.62	.960	4.34	6.43	1.48	9.16	7.09
4 30	120	12.34	.950	6.22	4.19	.67	9.78	7.51
5 1	121	11.88	.950	7.71	5.49	.71	10.55	8.06
5 2	122	11.35	.940	6.85	6.12	.89	11.24	8.67
5 3	123	10.69	.920	4.70	5.94	1.26	11.71	9.27
5 4	124	10.03	.910	4.77	10.13	2.12	12.19	10.28
5 5	125	9.57	.900	2.49	11.10	4.46	12.43	11.39
5 6	126	9.29	.890	3.75	10.49	2.80	12.81	12.44
5 7	127	9.01	.890	5.37	5.03	.94	13.35	12.94
5 8	128	8.71	.880	4.37	2.82	.65	13.78	13.22
5 9	129	8.43	.870	4.40	3.35	.76	14.22	13.56
5 10	130	8.15	.870	4.71	4.42	.94	14.69	14.00
5 11	131	7.71	.850	4.02	9.88	2.46	15.10	14.99
5 12	132	7.10	.840	4.34	8.59	1.98	15.53	15.85
5 13	133	6.70	.820	2.47	6.86	2.78	15.78	16.53
5 14	134	6.65	.820	1.19	-.53	-.45	15.90	16.48
5 15	135	6.95	.830	4.10	-1.55	-.38	16.31	16.33
5 16	136	7.23	.840	4.06	-1.50	-.37	16.71	16.18
5 17	137	7.54	.850	3.36	1.75	.52	17.05	16.35
5 18	138	7.44	.850	2.69	4.78	1.78	17.32	16.83
5 19	139	6.95	.830	3.74	4.37	1.17	17.69	17.27
5 20	140	6.50	.820	5.84	12.70	2.17	18.27	18.54
5 21	141	6.52	.820	6.90	8.89	1.29	18.96	19.42
5 22	142	7.00	.830	4.29	7.34	1.71	19.39	20.16
5 23	143	7.51	.850	4.13	-3.89	-.94	19.81	19.77
5 24	144	7.99	.860	3.66	-1.63	-.45	20.17	19.61
5 25	145	8.17	.870	4.82	.97	.20	20.65	19.70
5 26	146	7.99	.860	4.35	1.91	.44	21.09	19.89
5 27	147	7.69	.850	5.01	11.15	2.23	21.59	21.01
5 28	148	7.61	.850	4.34	9.53	2.20	22.02	21.96
5 29	149	7.82	.860	4.72	8.59	1.82	22.50	22.82
5 30	150	7.99	.860	4.90	-3.18	-.65	22.99	22.50
5 31	151	8.20	.870	4.84	-3.94	-.81	23.47	22.11

W1-4

DATE	JULIAN DAY	AVAILABLE WATER	COEFFICIENT KA	PREDICTED ET	MEASURED ET	ET RATIO	CUMULATIVE PREDICTED	CUMULATIVE MEASURED
		CM		MM/DY	MM/DY		CM	CM
6 1	152	8.76	.880	5.84	-4.85	-.83	24.05	21.62
6 2	153	9.19	.890	6.72	-3.51	-.52	24.73	21.27
6 3	154	9.64	.900	5.66	11.33	2.00	25.29	22.41
6 4	155	9.80	.910	3.51	11.48	3.27	25.64	23.55
6 5	156	10.13	.910	4.45	13.97	3.14	26.09	24.95
6 6	157	10.53	.920	3.42	-1.50	-.44	26.43	24.80
6 7	158	11.07	.930	1.44	3.66	2.54	26.57	25.17
6 8	159	11.68	.940	3.01	2.11	.70	26.88	25.38
6 9	160	11.93	.950	5.46	5.92	1.08	27.42	25.97
6 10	161	11.80	.950	5.08	3.12	.61	27.93	26.28
6 11	162	11.27	.940	5.18	3.91	.75	28.45	26.67
6 12	163	10.99	.930	5.57	3.71	.67	29.00	27.04
6 13	164	10.64	.920	5.28	4.52	.86	29.53	27.50
6 14	165	10.18	.910	5.63	4.19	.74	30.10	27.92
6 15	166	9.64	.900	6.43	2.74	.43	30.74	28.19
6 16	167	9.37	.900	3.94	1.93	.49	31.13	28.38
6 17	168	9.34	.900	5.07	10.11	1.99	31.64	29.39
6 18	169	9.31	.890	2.10	11.89	5.66	31.35	30.58
6 19	170	9.14	.890	5.66	12.67	2.24	32.42	31.85
6 20	171	8.78	.880	4.31	5.31	1.23	32.85	32.38
6 21	172	8.25	.870	3.67	5.18	1.41	33.21	32.90
6 22	173	7.74	.860	3.11	4.60	1.48	33.52	33.36
6 23	174	7.21	.840	4.58	3.40	.74	33.98	33.70
6 24	175	6.88	.830	4.99	2.87	.58	34.48	33.99
6 25	176	6.72	.830	4.65	4.14	.89	34.95	34.40
6 26	177	6.37	.810	8.43	7.24	.86	35.79	35.12
6 27	178	5.63	.790	5.18	8.94	1.73	36.31	36.02
6 28	179	4.54	.740	4.14	8.69	2.10	36.72	36.89
6 29	180	3.68	.700	4.58	6.45	1.41	37.18	37.53
6 30	181	3.02	.660	3.79	4.72	1.25	37.56	38.00
7 1	182	2.61	.630	3.60	3.51	.98	37.92	38.35
7 2	183	2.25	.600	3.21	2.77	.86	38.24	38.63
7 3	184	1.97	.570	3.50	2.29	.65	38.59	38.86
7 4	185	1.77	.550	3.33	2.03	.61	38.92	39.06
7 5	186	1.57	.530	1.51	6.17	4.09	39.07	39.68
7 6	187	1.36	.500	.58	6.60	11.38	39.13	40.34
7 7	188	1.19	.470	2.11	6.55	3.10	39.34	41.00
7 8	189	1.03	.440	1.80	2.54	1.41	39.52	41.25
7 9	190	.86	.410	2.02	2.13	1.05	39.72	41.46
7 10	191	.60	.350	1.70	1.93	1.14	39.89	41.66
7 11	192	.40	.280	.92	1.14	1.24	39.99	41.77
7 12	193	.27	.220	.90	.66	.73	40.08	41.84
7 13	194	.27	.220	.89	.05	.06	40.17	41.84

.947 CP SECONDS EXECUTION TIME.

T1-3

XT13

DATE	JULIAN DAY	AVAILABLE WATER	COEFFICIENT KA	PREDICTED ET	MEASURED ET	ET RATIO	CUMULATIVE PREDICTED	CUMULATIVE MEASURED
		CM		MM/DY	MM/DY		CM	CM
4 9	99	14.18	.980	4.05	2.03	.50	.41	.20
4 10	100	13.95	.980	2.58	2.21	.86	.66	.42
4 11	101	13.77	.980	3.12	1.40	.45	.98	.56
4 12	102	13.52	.970	3.95	1.70	.43	1.37	.73
4 13	103	13.52	.970	3.18	1.37	.43	1.69	.87
4 14	104	13.24	.970	3.69	2.41	.65	2.06	1.11
4 15	105	13.11	.970	4.65	1.47	.32	2.52	1.26
4 16	106	12.83	.960	4.78	1.42	.30	3.00	1.40
4 17	107	12.83	.960	3.95	8.64	2.19	3.40	2.27
4 18	108	12.70	.960	5.30	6.99	1.32	3.93	2.96
4 19	109	13.24	.970	3.00	4.39	1.46	4.23	3.40
4 20	110	13.75	.980	6.01	-3.86	-.64	4.83	3.02
4 21	111	14.38	.990	5.95	-1.12	-.19	5.42	2.91
4 22	112	14.38	.990	3.62	1.98	.55	5.78	3.10
4 23	113	14.08	.980	5.60	3.20	.57	6.34	3.42
4 24	114	13.80	.980	7.46	2.74	.37	7.09	3.70
4 25	115	13.47	.970	3.82	3.33	.87	7.47	4.03
4 26	116	13.37	.970	3.53	3.30	.93	7.82	4.36
4 27	117	12.88	.960	3.59	4.32	1.20	8.18	4.79
4 28	118	12.55	.960	4.96	3.56	.72	8.68	5.15
4 29	119	12.07	.950	4.29	3.71	.86	9.11	5.52
4 30	120	11.82	.950	6.16	3.30	.54	9.72	5.85
5 1	121	11.43	.940	7.64	4.60	.60	10.49	6.31
5 2	122	11.08	.930	6.81	5.46	.80	11.17	6.85
5 3	123	10.44	.920	4.68	5.99	1.28	11.64	7.45
5 4	124	9.81	.910	4.75	5.21	1.10	12.11	7.97
5 5	125	9.28	.890	2.47	6.60	2.67	12.36	8.63
5 6	126	8.89	.880	3.71	6.20	1.67	12.73	9.25
5 7	127	8.49	.870	5.29	6.20	1.17	13.26	9.87
5 8	128	8.08	.860	4.30	4.01	.93	13.69	10.28
5 9	129	7.68	.850	4.30	4.01	.93	14.12	10.68
5 10	130	7.29	.840	4.58	3.23	.71	14.58	11.00
5 11	131	6.89	.830	3.91	4.57	1.17	14.97	11.46
5 12	132	6.71	.820	4.28	3.66	.86	15.40	11.82
5 13	133	6.58	.820	2.46	3.43	1.39	15.64	12.17
5 14	134	6.46	.820	1.18	0.00	0.00	15.76	12.17
5 15	135	6.74	.830	4.07	-.76	-.19	16.17	12.09
5 16	136	6.96	.830	4.02	7.14	1.78	16.57	12.80
5 17	137	7.12	.840	3.32	8.97	2.70	16.90	13.70
5 18	138	6.76	.830	2.63	9.86	3.75	17.16	14.69
5 19	139	6.61	.820	3.69	16.15	4.38	17.53	16.30
5 20	140	6.66	.820	5.88	15.62	2.66	18.12	17.86
5 21	141	6.63	.820	6.93	15.42	2.23	18.81	19.41
5 22	142	6.46	.820	4.20	.81	.19	19.23	19.49
5 23	143	6.35	.810	3.95	.03	.01	19.63	19.49
5 24	144	6.41	.820	3.46	.03	.01	19.97	19.49
5 25	145	6.46	.820	4.54	.28	.06	20.43	19.52
5 26	146	6.35	.810	4.10	-.10	-.02	20.84	19.51
5 27	147	6.30	.810	4.76	-3.07	-.64	21.31	19.20
5 28	148	6.51	.820	4.17	-7.06	-1.69	21.73	18.50
5 29	149	7.27	.840	4.64	25.76	5.55	22.20	21.07
5 30	150	8.44	.870	4.96	25.22	5.08	22.69	23.60
5 31	151	9.94	.910	5.07	27.79	5.48	23.20	26.37

T1-3

DATE		JULIAN DAY	AVAILABLE WATER	COEFFICIENT KA	PREDICTED ET	MEASURED ET	ET RATIO	CUMULATIVE PREDICTED	CUMULATIVE MEASURED
			CM		MM/DY	MM/DY		CM	CM
6	1	152	10.90	.930	6.15	-3.07	-.50	23.81	26.07
6	2	153	11.28	.940	7.05	2.11	.30	24.52	26.28
6	3	154	10.88	.930	5.82	6.12	1.05	25.10	26.89
6	4	155	10.27	.920	3.55	6.07	1.71	25.46	27.50
6	5	156	9.43	.900	4.38	7.62	1.74	25.89	28.26
6	6	157	9.05	.890	3.30	3.30	1.00	26.22	28.59
6	7	158	9.10	.890	1.38	5.74	4.16	26.36	29.16
6	8	159	9.56	.900	2.87	1.68	.59	26.65	29.33
6	9	160	9.81	.910	5.22	3.10	.59	27.17	29.64
6	10	161	9.96	.910	4.88	-1.19	-.24	27.66	29.52
6	11	162	10.01	.910	5.04	10.92	2.17	28.16	30.61
6	12	163	10.16	.910	5.47	11.61	2.12	28.71	31.78
6	13	164	10.19	.910	5.23	13.16	2.52	29.23	33.09
6	14	165	10.04	.910	5.61	2.46	.44	29.79	33.34
6	15	166	9.73	.900	6.45	2.79	.43	30.44	33.62
6	16	167	9.45	.900	3.95	3.45	.87	30.83	33.96
6	17	168	9.20	.890	5.05	3.68	.73	31.34	34.33
6	18	169	8.95	.890	2.08	5.13	2.47	31.55	34.84
6	19	170	8.59	.880	5.57	5.51	.99	32.10	35.39
6	20	171	8.11	.870	4.23	6.35	1.50	32.53	36.03
6	21	172	7.50	.850	3.58	6.10	1.70	32.88	36.64
6	22	173	6.89	.830	3.02	5.38	1.78	33.19	37.18
6	23	174	6.28	.810	4.42	3.94	.89	33.63	37.57
6	24	175	5.90	.800	4.79	2.95	.62	34.11	37.87
6	25	176	5.72	.790	4.45	3.89	.87	34.55	38.25
6	26	177	5.39	.780	8.07	6.71	.83	35.36	38.93
6	27	178	4.73	.750	4.94	7.75	1.57	35.85	39.70
6	28	179	3.69	.700	3.90	6.27	1.61	36.24	40.33
6	29	180	3.08	.660	4.33	2.29	.53	36.68	40.56
6	30	181	2.85	.650	3.73	-.05	-.01	37.05	40.55
7	1	182	3.00	.660	3.77	-.74	-.20	37.43	40.48
7	2	183	3.08	.660	3.55	.20	.06	37.78	40.50
7	3	184	3.05	.660	4.05	.34	.21	38.19	40.58
7	4	185	2.95	.650	3.96	1.17	.30	38.58	40.70
7	5	186	2.82	.640	1.85	5.16	2.79	38.77	41.21
7	6	187	2.72	.640	.74	5.23	7.07	38.84	41.74
7	7	188	2.67	.630	2.84	4.72	1.66	39.13	42.21
7	8	189	2.72	.640	2.58	.56	.22	39.38	42.27
7	9	190	2.75	.640	3.15	.48	.15	39.70	42.31
7	10	191	2.70	.630	3.11	.94	.30	40.01	42.41
7	11	192	2.57	.620	2.06	1.04	.50	40.22	42.51
7	12	193	2.47	.620	2.49	.76	.31	40.46	42.59
7	13	194	2.37	.610	2.43	.64	.26	40.71	42.65
7	14	195	2.34	.610	1.87	.20	.11	40.89	42.67

.967 CP SECONDS EXECUTION TIME.

T1-5

XT15

DATE	JULIAN DAY	AVAILABLE WATER	COEFFICIENT KA	PREDICTED ET	MEASURED ET	ET RATIO	CUMULATIVE PREDICTED	CUMULATIVE MEASURED
		CM		MM/DY	MM/DY		CM	CM
4 10	100	13.45	.970	2.56	2.41	.94	.26	.24
4 11	101	13.30	.970	3.10	1.83	.59	.57	.42
4 12	102	12.97	.970	3.91	2.34	.60	.96	.66
4 13	103	12.89	.960	3.14	1.85	.59	1.27	.84
4 14	104	12.59	.960	3.65	2.90	.79	1.64	1.13
4 15	105	12.44	.960	4.60	1.60	.35	2.10	1.29
4 16	106	12.06	.950	4.71	.56	.12	2.57	1.35
4 17	107	12.13	.950	3.90	7.16	1.84	2.96	2.07
4 18	108	12.28	.950	5.26	5.49	1.04	3.48	2.61
4 19	109	13.63	.980	3.02	4.65	1.54	3.79	3.08
4 20	110	14.21	.990	6.06	-.89	-.15	4.39	2.99
4 21	111	14.60	.990	5.97	2.74	.46	4.99	3.26
4 22	112	13.88	.980	3.60	5.26	1.46	5.35	3.79
4 23	113	13.40	.970	5.54	4.39	.79	5.90	4.23
4 24	114	13.02	.970	7.36	3.68	.50	6.64	4.60
4 25	115	12.61	.960	3.76	4.17	1.11	7.01	5.01
4 26	116	12.41	.960	3.47	4.01	1.16	7.36	5.41
4 27	117	11.88	.950	3.52	4.67	1.33	7.71	5.88
4 28	118	11.47	.940	4.86	4.45	.92	8.20	6.33
4 29	119	10.99	.930	4.20	5.00	1.19	8.62	6.83
4 30	120	10.56	.920	6.01	5.51	.92	9.22	7.38
5 1	121	9.97	.910	7.40	6.58	.89	9.96	8.04
5 2	122	9.34	.900	6.54	7.16	1.09	10.61	8.75
5 3	123	8.58	.880	4.46	6.96	1.56	11.06	9.45
5 4	124	7.84	.860	4.50	5.74	1.28	11.51	10.02
5 5	125	7.26	.840	2.32	6.81	2.94	11.74	10.70
5 6	126	6.85	.830	3.47	6.22	1.79	12.09	11.33
5 7	127	6.44	.820	4.94	6.22	1.26	12.58	11.95
5 8	128	6.06	.800	3.99	4.04	1.01	12.98	12.35
5 9	129	5.66	.790	3.98	4.04	1.02	13.38	12.76
5 10	130	5.25	.770	4.21	3.35	.80	13.80	13.09
5 11	131	4.84	.760	3.56	4.85	1.36	14.16	13.58
5 12	132	4.64	.750	3.88	4.09	1.05	14.55	13.98
5 13	133	4.46	.740	2.22	4.19	1.89	14.77	14.40
5 14	134	4.28	.730	1.05	-1.04	-.99	14.87	14.30
5 15	135	4.44	.740	3.64	-5.72	-1.57	15.24	13.73
5 16	136	5.15	.770	3.71	2.62	.71	15.61	13.99
5 17	137	6.42	.820	3.23	.25	.08	15.93	14.01
5 18	138	7.56	.850	2.70	4.62	1.71	16.20	14.48
5 19	139	8.50	.880	3.93	9.53	2.42	16.59	15.43
5 20	140	9.29	.890	6.38	12.90	2.02	17.23	16.72
5 21	141	9.52	.900	7.57	16.18	2.14	17.99	18.34
5 22	142	9.26	.890	4.59	2.16	.47	18.45	18.55
5 23	143	8.86	.880	4.30	1.24	.29	18.88	18.68
5 24	144	8.86	.880	3.75	.71	.19	19.25	18.75
5 25	145	8.88	.880	4.92	1.50	.30	19.74	18.90
5 26	146	8.65	.880	4.43	1.60	.36	20.19	19.06
5 27	147	8.40	.870	5.12	-1.98	-.39	20.70	18.86
5 28	148	8.42	.870	4.45	-7.52	-1.69	21.14	18.11
5 29	149	9.26	.890	4.92	14.68	2.98	21.64	19.58
5 30	150	10.66	.920	5.25	14.20	2.70	22.16	21.00
5 31	151	12.64	.960	5.36	18.92	3.53	22.70	22.89

T1-5

DATE	JULIAN DAY	AVAILABLE WATER	COEFFICIENT KA	PREDICTED ET	MEASURED ET	ET RATIO	CUMULATIVE PREDICTED	CUMULATIVE MEASURED
		CM		MM/DY	MM/DY		CM	CM
6 1	152	13.63	.980	6.46	.08	.01	23.34	22.90
6 2	153	13.63	.980	7.36	6.68	.91	24.08	23.56
6 3	154	12.61	.960	6.02	9.96	1.65	24.68	24.56
6 4	155	11.62	.940	3.65	8.26	2.26	25.05	25.39
6 5	156	10.63	.920	4.50	8.64	1.92	25.50	26.25
6 6	157	10.15	.910	3.39	3.63	1.07	25.83	26.61
6 7	158	10.15	.910	1.42	5.61	3.95	25.98	27.17
6 8	159	10.66	.920	2.95	.86	.29	26.27	27.26
6 9	160	10.94	.930	5.35	1.45	.27	26.81	27.40
6 10	161	11.27	.940	5.02	-4.11	-.82	27.31	26.99
6 11	162	11.60	.940	5.22	14.00	2.68	27.83	28.39
6 12	163	12.18	.950	5.70	15.60	2.74	28.40	29.95
6 13	164	12.41	.960	5.47	19.38	3.54	28.95	31.89
6 14	165	12.26	.950	5.87	4.24	.72	29.53	32.32
6 15	166	11.73	.940	6.73	5.77	.86	30.21	32.89
6 16	167	11.14	.930	4.10	6.68	1.63	30.62	33.56
6 17	168	10.53	.920	5.21	6.68	1.28	31.14	34.23
6 18	169	9.97	.910	2.14	7.44	3.48	31.35	34.97
6 19	170	9.39	.900	5.69	6.91	1.21	31.92	35.66
6 20	171	8.75	.880	4.31	7.16	1.66	32.35	36.38
6 21	172	8.09	.860	3.65	6.60	1.81	32.72	37.04
6 22	173	7.43	.850	3.08	6.05	1.96	33.03	37.64
6 23	174	6.77	.830	4.51	4.90	1.09	33.48	38.13
6 24	175	6.29	.810	4.88	2.77	.57	33.96	38.41
6 25	176	5.96	.800	4.50	.74	.16	34.41	38.49
6 26	177	5.93	.800	8.28	-1.19	-.14	35.24	38.37
6 27	178	6.06	.800	5.29	-.03	-.01	35.77	38.36
6 28	179	6.32	.810	4.53	3.63	.80	36.22	38.73
6 29	180	5.96	.800	5.24	9.83	1.88	36.75	39.71
6 30	181	4.97	.760	4.39	12.42	2.83	37.19	40.95
7 1	182	3.37	.680	3.91	11.46	2.93	37.58	42.10
7 2	183	2.23	.600	3.20	6.93	2.17	37.90	42.79
7 3	184	1.54	.520	3.20	3.91	1.22	38.22	43.18
7 4	185	1.29	.490	2.95	2.39	.81	38.51	43.42
7 5	186	1.06	.450	1.29	6.15	4.77	38.64	44.04
7 6	187	.80	.400	.47	5.82	12.38	38.69	44.62
7 7	188	.70	.370	1.68	4.90	2.92	38.86	45.11
7 8	189	.75	.390	1.56	.69	.44	39.01	45.18
7 9	190	.80	.400	1.96	.81	.41	39.21	45.26
7 10	191	.70	.370	1.83	1.32	.72	39.39	45.39
7 11	192	.52	.320	1.07	1.14	1.07	39.50	45.50
7 12	193	.40	.280	1.12	.64	.57	39.61	45.57
7 13	194	.35	.260	1.03	.38	.37	39.71	45.61
7 14	195	.32	.250	.76	.13	.17	39.79	45.62

.935 CP SECONDS EXECUTION TIME.

T2A-3

XT2A3

DATE	JULIAN DAY	AVAILABLE WATER	COEFFICIENT KA	PREDICTED ET	MEASURED ET	ET RATIO	CUMULATIVE PREDICTED	CUMULATIVE MEASURED
		CM		MM/DY	MM/DY		CM	CM
4 9	99	13.70	.980	4.02	-1.40	-.35	.40	-.14
4 10	100	13.95	.980	2.58	.18	.07	.66	-.12
4 11	101	13.98	.980	3.13	2.87	.92	.97	.17
4 12	102	13.65	.980	3.95	4.67	1.18	1.37	.63
4 13	103	13.09	.970	3.15	4.17	1.32	1.68	1.05
4 14	104	12.58	.960	3.65	3.28	.90	2.05	1.38
4 15	105	12.43	.960	4.60	2.77	.60	2.51	1.65
4 16	106	12.15	.950	4.72	4.67	.99	2.98	2.12
4 17	107	11.77	.940	3.87	4.30	1.24	3.37	2.60
4 18	108	11.00	.930	5.13	3.84	.75	3.88	2.99
4 19	109	10.70	.920	2.86	.41	.14	4.17	3.03
4 20	110	10.62	.920	5.67	0.00	0.00	4.73	3.03
4 21	111	10.90	.930	5.60	.43	.08	5.29	3.07
4 22	112	10.70	.920	3.39	2.44	.72	5.63	3.31
4 23	113	10.50	.920	5.24	2.87	.55	6.16	3.60
4 24	114	10.17	.910	6.96	3.43	.49	6.85	3.94
4 25	115	9.89	.910	3.56	3.68	1.03	7.21	4.31
4 26	116	9.58	.900	3.27	2.01	.61	7.53	4.51
4 27	117	9.17	.890	3.32	2.01	.61	7.87	4.71
4 28	118	9.35	.900	4.63	1.98	.43	8.33	4.91
4 29	119	8.97	.890	4.01	5.82	1.45	8.73	5.49
4 30	120	8.57	.880	5.72	6.30	1.10	9.30	6.12
5 1	121	7.60	.850	6.93	7.09	1.02	10.00	6.83
5 2	122	7.07	.840	6.11	5.74	.94	10.61	7.41
5 3	123	6.46	.820	4.16	5.33	1.28	11.02	7.94
5 4	124	5.87	.800	4.18	4.06	.97	11.44	8.34
5 5	125	5.47	.780	2.16	5.21	2.41	11.66	8.87
5 6	126	5.24	.770	3.24	4.67	1.44	11.98	9.33
5 7	127	4.98	.760	4.61	4.67	1.01	12.44	9.80
5 8	128	4.73	.750	3.73	2.46	.66	12.82	10.05
5 9	129	4.48	.740	3.73	2.49	.67	13.19	10.30
5 10	130	4.25	.730	3.96	2.31	.58	13.58	10.53
5 11	131	3.99	.720	3.37	4.42	1.31	13.92	10.97
5 12	132	3.79	.700	3.66	3.56	.97	14.29	11.32
5 13	133	3.56	.690	2.08	3.56	1.71	14.50	11.68
5 14	134	3.59	.690	1.00	-1.73	-1.73	14.60	11.51
5 15	135	3.76	.700	3.47	-4.78	-1.38	14.94	11.03
5 16	136	4.48	.740	3.57	5.87	1.64	15.30	11.62
5 17	137	5.44	.780	3.09	6.07	1.96	15.61	12.22
5 18	138	6.48	.820	2.60	7.82	3.01	15.87	13.01
5 19	139	7.30	.840	3.78	9.91	2.62	16.25	14.00
5 20	140	7.90	.860	6.14	11.89	1.94	16.86	15.19
5 21	141	8.21	.870	7.31	13.41	1.83	17.59	16.53
5 22	142	8.26	.870	4.47	-.43	-.10	18.04	16.48
5 23	143	8.18	.870	4.21	-.61	-.14	18.46	16.42
5 24	144	8.34	.870	3.69	-.43	-.12	18.83	16.38
5 25	145	8.44	.870	4.86	1.17	.24	19.31	16.50
5 26	146	8.34	.870	4.39	2.72	.62	19.75	16.77
5 27	147	7.98	.860	5.06	3.63	.72	20.26	17.13
5 28	148	7.63	.850	4.35	3.78	.87	20.69	17.51
5 29	149	7.24	.840	4.64	3.86	.83	21.16	17.90
5 30	150	6.84	.830	4.71	4.11	.87	21.63	18.31
5 31	151	6.46	.820	4.56	4.60	1.01	22.08	18.77

T2A-3

DATE	JULIAN DAY	AVAILABLE WATER	COEFFICIENT KA	PREDICTED ET	MEASURED ET	ET RATIO	CUMULATIVE PREDICTED	CUMULATIVE MEASURED
		CM		MM/DY	MM/DY		CM	CM
6 1	152	6.00	.800	5.30	5.28	1.00	22.61	19.29
6 2	153	5.47	.780	5.89	4.14	.70	23.20	19.71
6 3	154	4.88	.760	4.75	1.14	.24	23.68	19.82
6 4	155	4.76	.750	2.92	-5.03	-1.72	23.97	19.32
6 5	156	5.14	.770	3.75	27.97	7.46	24.35	22.12
6 6	157	6.38	.810	3.02	22.10	7.32	24.65	24.33
6 7	158	8.08	.860	1.34	26.09	19.47	24.78	26.93
6 8	159	10.19	.910	2.92	-9.17	-3.14	25.07	26.02
6 9	160	11.64	.940	5.43	-1.04	-.19	25.62	25.91
6 10	161	12.20	.950	5.11	.10	.02	26.13	25.92
6 11	162	11.89	.950	5.25	2.95	.56	26.65	26.22
6 12	163	11.61	.940	5.64	2.87	.51	27.22	26.51
6 13	164	11.31	.940	5.35	3.53	.66	27.75	26.86
6 14	165	11.03	.930	5.73	4.04	.71	28.32	27.26
6 15	166	10.55	.920	6.57	4.32	.66	28.98	27.69
6 16	167	10.11	.910	4.01	4.80	1.20	29.38	28.17
6 17	168	9.73	.900	5.12	4.65	.91	29.89	28.64
6 18	169	9.35	.900	2.10	5.49	2.61	30.10	29.19
6 19	170	8.97	.890	5.63	4.95	.88	30.67	29.68
6 20	171	8.54	.880	4.28	5.18	1.21	31.10	30.20
6 21	172	8.08	.860	3.65	4.62	1.27	31.46	30.66
6 22	173	7.60	.850	3.10	4.29	1.38	31.77	31.09
6 23	174	7.14	.840	4.57	3.63	.79	32.23	31.46
6 24	175	6.79	.830	4.97	3.25	.65	32.72	31.78
6 25	176	6.53	.820	4.61	3.84	.83	33.19	32.16
6 26	177	6.18	.810	8.37	5.36	.64	34.02	32.70
6 27	178	5.64	.790	5.19	6.10	1.18	34.54	33.31
6 28	179	4.91	.760	4.23	5.77	1.36	34.96	33.89
6 29	180	4.35	.730	4.80	4.32	.90	35.44	34.32
6 30	181	3.92	.710	4.11	3.20	.78	35.86	34.64
7 1	182	3.61	.690	3.99	2.39	.60	36.25	34.88
7 2	183	3.38	.680	3.66	1.91	.52	36.62	35.07
7 3	184	3.18	.670	4.13	1.57	.38	37.03	35.23
7 4	185	3.05	.660	4.01	1.42	.35	37.43	35.37
7 5	186	2.90	.650	1.87	5.36	2.87	37.62	35.90
7 6	187	2.77	.640	.75	5.36	7.15	37.69	36.44
7 7	188	2.72	.640	2.86	4.30	1.68	37.98	36.92
7 8	189	2.75	.640	2.59	.54	.25	38.24	36.98
7 9	190	2.77	.640	3.16	.33	.10	38.55	37.02
7 10	191	2.70	.630	3.11	.18	.06	38.87	37.04
7 11	192	2.65	.630	2.08	-.76	-.37	39.07	36.96
7 12	193	2.72	.640	2.57	-1.27	-.49	39.33	36.83
7 13	194	2.93	.650	2.61	-1.52	-.58	39.59	36.68
7 14	195	3.03	.660	2.03	-.51	-.25	39.79	36.63

.966 CP SECONDS EXECUTION TIME.

T2A-5

XT2A5

DATE	JULIAN DAY	AVAILABLE WATER	COEFFICIENT KA	PREDICTED ET	MEASURED ET	ET RATIO	CUMULATIVE PREDICTED	CUMULATIVE MEASURED
		CM		MM/DY	MM/DY		CM	CM
4 9	99	15.10	1.000	4.10	2.24	.55	.41	.22
4 10	100	14.87	.990	2.62	2.67	1.02	.67	.49
4 11	101	14.64	.990	3.16	2.03	.64	.99	.69
4 12	102	14.29	.990	3.99	2.44	.61	1.39	.94
4 13	103	14.26	.990	3.21	1.45	.45	1.71	1.08
4 14	104	13.90	.980	3.74	2.34	.63	2.08	1.32
4 15	105	13.88	.980	4.71	1.07	.23	2.55	1.42
4 16	106	13.57	.980	4.84	4.32	.89	3.04	1.86
4 17	107	13.63	.980	4.00	4.01	1.00	3.44	2.26
4 18	108	12.58	.960	5.28	5.56	1.05	3.97	2.81
4 19	109	12.38	.960	2.95	.53	.18	4.26	2.87
4 20	110	11.95	.950	5.83	.97	.17	4.84	2.96
4 21	111	12.43	.960	5.77	.28	.05	5.42	2.99
4 22	112	12.08	.950	3.49	3.25	.93	5.77	3.32
4 23	113	11.87	.950	5.40	3.35	.62	6.31	3.65
4 24	114	11.47	.940	7.16	4.24	.59	7.03	4.08
4 25	115	11.11	.930	3.65	4.32	1.18	7.39	4.51
4 26	116	10.70	.920	3.36	4.42	1.32	7.73	4.95
4 27	117	10.27	.920	3.41	4.39	1.29	8.07	5.39
4 28	118	9.87	.910	4.69	4.72	1.01	8.54	5.86
4 29	119	9.38	.900	4.05	5.23	1.29	8.94	6.38
4 30	120	8.85	.880	5.76	5.56	.97	9.52	6.94
5 1	121	8.29	.870	7.08	5.77	.81	10.23	7.52
5 2	122	7.71	.850	6.25	5.79	.93	10.85	8.09
5 3	123	7.12	.840	4.26	5.33	1.25	11.28	8.63
5 4	124	6.56	.820	4.30	4.45	1.03	11.71	9.07
5 5	125	6.11	.810	2.22	5.84	2.63	11.93	9.66
5 6	126	5.80	.790	3.33	5.44	1.63	12.26	10.20
5 7	127	5.47	.790	4.73	5.44	1.15	12.73	10.75
5 8	128	5.14	.770	3.82	3.25	.85	13.12	11.07
5 9	129	4.81	.750	3.80	3.25	.86	13.50	11.40
5 10	130	4.51	.740	4.03	2.06	.51	13.90	11.60
5 11	131	4.18	.730	3.42	3.40	.99	14.24	11.94
5 12	132	4.20	.730	3.77	1.35	.36	14.62	12.08
5 13	133	4.13	.720	2.17	1.73	.80	14.84	12.25
5 14	134	4.43	.740	1.06	-2.57	-2.42	14.94	11.99
5 15	135	4.74	.750	3.70	-2.69	-.73	15.31	11.72
5 16	136	5.29	.770	3.74	10.03	2.68	15.69	12.73
5 17	137	5.68	.790	3.13	10.90	3.48	16.00	13.82
5 18	138	6.01	.800	2.55	10.62	4.16	16.25	14.88
5 19	139	6.49	.820	3.67	10.54	2.87	16.62	15.93
5 20	140	7.10	.840	5.98	11.33	1.89	17.22	17.07
5 21	141	7.50	.850	7.15	12.78	1.79	17.93	18.34
5 22	142	7.58	.850	4.37	-.53	-.12	18.37	18.29
5 23	143	7.55	.850	4.13	-.84	-.20	18.78	18.21
5 24	144	7.68	.850	3.62	-.69	-.19	19.14	18.14
5 25	145	7.83	.860	4.77	.74	.16	19.62	18.21
5 26	146	7.76	.860	4.31	2.39	.55	20.05	18.45
5 27	147	7.45	.850	4.97	3.43	.69	20.55	18.79
5 28	148	7.10	.840	4.27	3.66	.86	20.98	19.16
5 29	149	6.72	.830	4.55	3.76	.83	21.43	19.53
5 30	150	6.36	.810	4.62	3.86	.84	21.89	19.92
5 31	151	5.98	.800	4.47	4.06	.91	22.34	20.33

T2A-5

DATE	JULIAN DAY	AVAILABLE WATER	COEFFICIENT KA	PREDICTED ET	MEASURED ET	ET RATIO	CUMULATIVE PREDICTED	CUMULATIVE MEASURED
		CM		MM/DY	MM/DY		CM	CM
6 1	152	5.57	.790	5.20	4.80	.92	22.86	20.81
6 2	153	5.14	.770	5.80	5.82	1.00	23.44	21.39
6 3	154	4.53	.740	4.65	7.11	1.53	23.91	22.10
6 4	155	3.82	.710	2.74	2.90	1.06	24.18	22.39
6 5	156	3.01	.660	3.21	26.92	8.39	24.50	25.08
6 6	157	3.67	.700	2.59	11.91	4.60	24.76	26.27
6 7	158	5.85	.800	1.23	10.95	8.90	24.88	27.37
6 8	159	9.51	.900	2.87	-18.52	-6.45	25.17	25.52
6 9	160	11.85	.950	5.45	-4.60	-.84	25.71	25.06
6 10	161	12.79	.960	5.17	-.43	-.08	26.23	25.01
6 11	162	12.28	.950	5.28	3.63	.69	26.76	25.38
6 12	163	12.00	.950	5.68	3.05	.54	27.33	25.68
6 13	164	11.70	.940	5.40	3.89	.72	27.87	26.07
6 14	165	11.36	.940	5.77	4.19	.73	28.44	26.49
6 15	166	10.83	.930	6.61	4.17	.63	29.11	26.91
6 16	167	10.43	.920	4.04	4.57	1.13	29.51	27.36
6 17	168	10.09	.910	5.16	4.85	.94	30.03	27.85
6 18	169	9.71	.900	2.12	6.07	2.86	30.24	28.45
6 19	170	9.23	.890	5.67	5.56	.98	30.80	29.01
6 20	171	8.72	.880	4.31	5.61	1.30	31.24	29.57
6 21	172	8.24	.870	3.67	4.98	1.36	31.60	30.07
6 22	173	7.73	.860	3.11	4.42	1.42	31.91	30.51
6 23	174	7.25	.840	4.59	3.33	.73	32.37	30.84
6 24	175	6.92	.830	5.00	2.69	.54	32.87	31.11
6 25	176	6.74	.830	4.65	3.66	.79	33.34	31.48
6 26	177	6.44	.820	8.46	6.20	.73	34.18	32.10
6 27	178	5.80	.790	5.23	7.65	1.46	34.71	32.86
6 28	179	4.89	.760	4.23	7.39	1.75	35.13	33.60
6 29	180	4.15	.720	4.74	5.49	1.16	35.60	34.15
6 30	181	3.59	.690	4.00	4.06	1.02	36.00	34.56
7 1	182	3.24	.670	3.86	3.18	.82	36.39	34.88
7 2	183	2.91	.650	3.49	2.82	.81	36.74	35.16
7 3	184	2.63	.630	3.86	2.57	.67	37.12	35.42
7 4	185	2.40	.610	3.71	2.44	.66	37.50	35.66
7 5	186	2.14	.590	1.69	6.12	3.62	37.66	36.27
7 6	187	1.92	.570	.66	5.61	8.50	37.73	36.83
7 7	188	1.84	.560	2.50	4.42	1.77	37.98	37.27
7 8	189	1.92	.570	2.29	0.00	0.00	38.21	37.27
7 9	190	2.04	.580	2.85	.36	.13	38.49	37.31
7 10	191	2.02	.580	2.82	1.50	.53	38.78	37.46
7 11	192	1.81	.550	1.83	2.31	1.26	38.96	37.69
7 12	193	1.59	.530	2.13	2.08	.98	39.17	37.90
7 13	194	1.31	.490	1.96	1.98	1.01	39.37	38.10
7 14	195	1.18	.470	1.45	.66	.46	39.51	38.16

.981 CP SECONDS EXECUTION TIME.

T3A-3

XT3A3

DATE	JULIAN DAY	AVAILABLE WATER	COEFFICIENT KA	PREDICTED ET	MEASURED ET	ET RATIO	CUMULATIVE PREDICTED	CUMULATIVE MEASURED
		CM		MM/DY	MM/DY		CM	CM
4 9	99	13.12	.970	3.98	2.03	.51	.40	.20
4 10	100	12.92	.960	2.54	2.11	.33	.65	.41
4 11	101	12.71	.960	3.07	1.57	.51	.96	.57
4 12	102	12.49	.960	3.88	1.73	.45	1.35	.74
4 13	103	12.46	.960	3.12	1.73	.55	1.66	.92
4 14	104	12.18	.950	3.63	2.62	.72	2.02	1.18
4 15	105	11.98	.950	4.56	3.33	.73	2.48	1.51
4 16	106	11.70	.940	4.68	5.41	1.16	2.95	2.05
4 17	107	11.22	.930	3.83	5.69	1.49	3.33	2.62
4 18	108	10.35	.920	5.05	4.37	.87	3.83	3.06
4 19	109	9.97	.910	2.81	.71	.25	4.12	3.13
4 20	110	9.90	.910	5.58	1.04	.19	4.67	3.23
4 21	111	10.15	.910	5.51	2.06	.37	5.22	3.44
4 22	112	9.67	.900	3.31	4.22	1.27	5.56	3.86
4 23	113	9.29	.890	5.10	.15	.03	6.07	3.88
4 24	114	8.88	.880	6.74	-6.60	-.98	6.74	3.22
4 25	115	9.67	.900	3.54	-6.86	-1.94	7.09	2.53
4 26	116	11.37	.940	3.40	.81	.24	7.43	2.61
4 27	117	11.04	.930	3.46	14.68	4.24	7.78	4.08
4 28	118	9.49	.900	4.65	16.00	3.44	8.24	5.68
4 29	119	6.97	.830	3.77	12.42	3.29	8.62	6.92
4 30	120	5.24	.810	5.28	5.94	1.13	9.15	7.52
5 1	121	5.76	.790	6.45	5.36	.83	9.79	8.05
5 2	122	5.17	.770	5.63	5.36	.95	10.36	8.59
5 3	123	4.64	.750	3.80	4.60	1.21	10.74	9.05
5 4	124	4.15	.720	3.79	3.53	.93	11.12	9.40
5 5	125	3.80	.710	1.95	4.88	2.50	11.31	9.89
5 6	126	3.57	.690	2.90	4.45	1.53	11.60	10.33
5 7	127	3.34	.680	4.11	4.45	1.08	12.01	10.78
5 8	128	3.14	.670	3.31	2.26	.68	12.34	11.01
5 9	129	2.91	.650	3.28	2.26	.69	12.67	11.23
5 10	130	2.68	.630	3.45	1.63	.47	13.02	11.39
5 11	131	2.45	.620	2.90	3.56	1.23	13.31	11.75
5 12	132	2.40	.610	3.17	2.31	.73	13.62	11.98
5 13	133	2.28	.600	1.80	2.57	1.43	13.80	12.24
5 14	134	2.43	.610	.88	-.10	-.11	13.89	12.23
5 15	135	2.68	.630	3.12	.86	.28	14.20	12.31
5 16	136	2.68	.630	3.06	2.06	.67	14.51	12.52
5 17	137	2.58	.630	2.48	3.25	1.31	14.76	12.85
5 18	138	2.12	.590	1.86	4.65	2.50	14.94	13.31
5 19	139	1.95	.570	2.55	4.06	1.59	15.20	13.72
5 20	140	1.59	.530	3.77	3.25	.86	15.58	14.04
5 21	141	1.28	.490	4.09	1.35	.33	15.98	14.18
5 22	142	1.18	.470	2.42	-.30	-.12	16.23	14.15
5 23	143	1.18	.470	2.29	-1.19	-.52	16.46	14.03
5 24	144	1.39	.500	2.12	-1.19	-.56	16.67	13.91
5 25	145	1.54	.520	2.90	-.79	-.27	16.96	13.83
5 26	146	1.54	.520	2.63	-1.30	-.49	17.22	13.70
5 27	147	1.61	.530	3.12	-7.87	-2.52	17.53	12.91
5 28	148	1.92	.570	2.88	-19.08	-6.63	17.82	11.00
5 29	149	3.90	.710	3.92	32.74	8.35	18.21	14.28
5 30	150	7.36	.840	4.80	28.40	5.92	18.69	17.12
5 31	151	12.26	.950	5.32	34.44	6.47	19.22	20.56

T3A-3

DATE	JULIAN DAY	AVAILABLE WATER	COEFFICIENT KA	PREDICTED ET	MEASURED ET	ET RATIO	CUMULATIVE PREDICTED	CUMULATIVE MEASURED
		CM		MM/DY	MM/DY		CM	CM
6 1	152	15.53	1.000	6.62	-15.93	-2.41	19.89	18.97
6 2	153	17.19	1.000	7.54	-4.06	-.54	20.64	18.56
6 3	154	17.03	1.000	6.27	2.82	.45	21.27	18.84
6 4	155	16.75	1.000	3.88	3.20	.82	21.65	19.16
6 5	156	16.35	1.000	4.88	6.25	1.28	22.14	19.79
6 6	157	16.09	1.000	3.71	4.52	1.22	22.51	20.24
6 7	158	16.02	1.000	1.55	8.13	5.25	22.67	21.05
6 8	159	16.09	1.000	3.19	4.52	1.42	22.99	21.51
6 9	160	16.14	1.000	5.76	5.69	.99	23.56	22.08
6 10	161	16.02	1.000	5.37	1.93	.36	24.10	22.27
6 11	162	15.76	1.000	5.54	2.31	.42	24.65	22.50
6 12	163	15.56	1.000	5.99	2.29	.38	25.25	22.73
6 13	164	15.33	1.000	5.72	2.97	.52	25.83	23.03
6 14	165	15.08	1.000	6.15	3.48	.57	26.44	23.37
6 15	166	14.67	.990	7.07	3.78	.53	27.15	23.75
6 16	167	14.29	.990	4.34	4.39	1.01	27.58	24.19
6 17	168	13.93	.980	5.55	4.34	.78	28.14	24.62
6 18	169	13.60	.980	2.29	5.18	2.26	28.37	25.14
6 19	170	13.25	.970	6.16	4.65	.75	28.98	25.61
6 20	171	12.84	.960	4.71	4.88	1.04	29.45	26.10
6 21	172	12.41	.960	4.03	4.32	1.07	29.86	26.53
6 22	173	11.98	.950	3.45	3.76	1.09	30.20	26.90
6 23	174	11.55	.940	5.13	2.67	.52	30.71	27.17
6 24	175	11.29	.940	5.62	1.85	.33	31.28	27.36
6 25	176	11.19	.930	5.26	2.41	.46	31.80	27.60
6 26	177	10.99	.930	9.63	4.37	.45	32.76	28.03
6 27	178	10.56	.920	6.06	5.66	.93	33.37	28.60
6 28	179	9.87	.910	5.06	5.77	1.14	33.88	29.18
6 29	180	9.29	.890	5.86	4.65	.79	34.46	29.64
6 30	181	8.83	.880	5.10	3.76	.74	34.97	30.02
7 1	182	8.47	.870	5.02	3.07	.61	35.47	30.32
7 2	183	8.17	.870	4.65	2.62	.56	35.94	30.59
7 3	184	7.91	.860	5.27	2.29	.43	36.47	30.82
7 4	185	7.69	.850	5.18	2.13	.41	36.98	31.03
7 5	186	7.48	.850	2.44	6.07	2.49	37.23	31.64
7 6	187	7.25	.840	.98	6.05	6.17	37.33	32.24
7 7	188	7.15	.840	3.76	5.44	1.45	37.70	32.78
7 8	189	7.13	.840	3.39	1.19	.35	38.04	32.90
7 9	190	7.08	.840	4.12	.99	.24	38.45	33.00
7 10	191	6.97	.830	4.08	1.12	.27	38.86	33.11
7 11	192	6.82	.830	2.73	1.07	.39	39.13	33.22
7 12	193	6.75	.830	3.34	.36	.11	39.47	33.26
7 13	194	6.75	.830	3.30	0.00	0.00	39.80	33.26
7 14	195	6.75	.830	2.54	0.00	0.00	40.05	33.26

.953 CP SECONDS EXECUTION TIME.

T3A-4

XT3A4

DATE	JULIAN DAY	AVAILABLE WATER	COEFFICIENT KA	PREDICTED ET	MEASURED ET	ET RATIO	CUMULATIVE PREDICTED	CUMULATIVE MEASURED
		CM		MM/DY	MM/DY		CM	CM
4 9	99	16.44	1.000	4.11	1.75	.43	.41	.18
4 10	100	16.21	1.000	2.63	1.98	.75	.67	.37
4 11	101	16.09	1.000	3.19	.71	.22	.99	.44
4 12	102	15.83	1.000	4.05	1.32	.33	1.40	.58
4 13	103	15.98	1.000	3.26	.91	.28	1.72	.67
4 14	104	15.68	1.000	3.81	2.69	.71	2.11	.94
4 15	105	15.58	1.000	4.81	2.90	.60	2.59	1.23
4 16	106	15.22	1.000	4.96	6.30	1.27	3.08	1.86
4 17	107	14.84	.990	4.08	5.74	1.41	3.49	2.43
4 18	108	13.70	.980	5.38	4.04	.75	4.03	2.83
4 19	109	13.49	.970	3.01	-1.96	-.65	4.33	2.64
4 20	110	13.62	.980	6.00	-1.88	-.31	4.93	2.45
4 21	111	14.28	.990	5.95	-.10	-.02	5.52	2.44
4 22	112	14.05	.980	3.61	3.43	.95	5.89	2.78
4 23	113	13.67	.980	5.57	8.69	1.56	6.44	3.65
4 24	114	13.27	.970	7.39	17.45	2.36	7.18	5.40
4 25	115	11.49	.940	3.68	17.98	4.89	7.55	7.20
4 26	116	8.54	.880	3.18	8.41	2.64	7.87	8.04
4 27	117	7.98	.860	3.21	-9.86	-3.07	8.19	7.05
4 28	118	9.05	.890	4.59	-11.02	-2.40	8.65	5.95
4 29	119	11.49	.940	4.25	-5.77	-1.36	9.07	5.37
4 30	120	11.29	.940	6.10	4.37	.72	9.68	5.81
5 1	121	10.78	.930	7.54	5.69	.75	10.44	6.38
5 2	122	10.10	.910	6.68	5.99	.90	11.10	6.98
5 3	123	9.58	.900	4.58	5.64	1.23	11.56	7.54
5 4	124	8.97	.890	4.65	4.88	1.05	12.03	8.03
5 5	125	8.49	.870	2.41	6.38	2.65	12.27	8.67
5 6	126	8.11	.870	3.63	6.02	1.66	12.63	9.27
5 7	127	7.73	.850	5.17	6.02	1.16	13.15	9.87
5 8	128	7.35	.840	4.20	3.81	.91	13.57	10.25
5 9	129	6.97	.830	4.20	3.81	.91	13.99	10.63
5 10	130	6.59	.820	4.47	2.64	.59	14.44	10.90
5 11	131	6.21	.810	3.81	4.57	1.20	14.82	11.35
5 12	132	6.18	.810	4.19	2.95	.70	15.24	11.65
5 13	133	5.87	.800	2.39	3.53	1.48	15.47	12.00
5 14	134	5.98	.800	1.15	.30	.26	15.59	12.03
5 15	135	6.15	.810	3.98	1.42	.36	15.99	12.17
5 16	136	6.15	.810	3.90	2.95	.76	16.38	12.47
5 17	137	6.00	.800	3.17	4.67	1.47	16.69	12.94
5 18	138	5.32	.780	2.47	6.76	2.74	16.94	13.61
5 19	139	4.99	.760	3.42	6.43	1.88	17.28	14.25
5 20	140	4.35	.730	5.24	6.05	1.15	17.81	14.86
5 21	141	3.79	.700	5.94	4.09	.69	18.40	15.27
5 22	142	3.39	.680	3.50	2.59	.74	18.75	15.53
5 23	143	3.13	.670	3.23	1.30	.40	19.07	15.66
5 24	144	3.03	.660	2.79	.30	.11	19.35	15.69
5 25	145	3.00	.660	3.65	-1.12	-.31	19.72	15.58
5 26	146	3.06	.660	3.33	-2.90	-.87	20.05	15.29
5 27	147	3.36	.680	3.99	-9.27	-2.32	20.45	14.36
5 28	148	3.87	.710	3.62	-18.90	-5.22	20.81	12.47
5 29	149	5.82	.800	4.38	28.65	6.54	21.25	15.33
5 30	150	9.02	.890	5.04	25.58	5.08	21.75	17.89
5 31	151	13.47	.970	5.43	31.35	5.87	22.30	21.08

T3A-4

DATE	JULIAN DAY	AVAILABLE WATER	COEFFICIENT KA	PREDICTED ET	MEASURED ET	ET RATIO	CUMULATIVE PREDICTED	CUMULATIVE MEASURED
		CM		MM/DY	MM/DY		CM	CM
6 1	152	16.34	1.000	6.62	-12.12	-1.83	22.96	19.86
6 2	153	17.66	1.000	7.54	.36	.05	23.71	19.90
6 3	154	17.10	1.000	6.27	8.64	1.38	24.34	20.76
6 4	155	16.24	1.000	3.88	8.56	2.21	24.73	21.62
6 5	156	15.07	1.000	4.87	9.09	1.87	25.21	22.53
6 6	157	14.54	.990	3.67	2.77	.75	25.58	22.81
6 7	158	14.64	.990	1.54	4.55	2.95	25.74	23.26
6 8	159	15.35	1.000	3.19	1.42	.45	26.05	23.40
6 9	160	15.65	1.000	5.76	5.41	.94	26.63	23.94
6 10	161	15.58	1.000	5.37	2.06	.38	27.17	24.15
6 11	162	15.12	1.000	5.53	2.31	.42	27.72	24.38
6 12	163	15.04	1.000	5.97	1.57	.26	28.32	24.54
6 13	164	14.89	1.000	5.69	3.25	.57	28.89	24.86
6 14	165	14.64	.990	6.11	4.24	.69	29.50	25.29
6 15	166	14.08	.980	7.01	4.62	.66	30.20	25.75
6 16	167	13.62	.980	4.29	4.83	1.13	30.63	26.23
6 17	168	13.24	.970	5.49	4.70	.86	31.18	26.70
6 18	169	12.89	.960	2.27	5.69	2.51	31.40	27.27
6 19	170	12.45	.960	6.08	5.18	.85	32.01	27.79
6 20	171	12.00	.950	4.64	5.36	1.16	32.48	28.32
6 21	172	11.51	.940	3.97	4.78	1.20	32.87	28.80
6 22	173	11.06	.930	3.39	4.57	1.35	33.21	29.26
6 23	174	10.57	.920	5.02	4.17	.83	33.71	29.68
6 24	175	10.14	.910	5.49	3.56	.65	34.26	30.03
6 25	176	9.79	.910	5.10	3.15	.62	34.77	30.35
6 26	177	9.51	.900	9.31	2.95	.32	35.70	30.64
6 27	178	9.20	.890	5.87	3.00	.51	36.29	30.94
6 28	179	8.92	.890	4.94	3.10	.63	36.78	31.25
6 29	180	8.59	.880	5.75	3.25	.57	37.36	31.58
6 30	181	8.29	.870	5.02	3.20	.64	37.86	31.90
7 1	182	7.93	.860	4.94	2.95	.60	38.36	32.19
7 2	183	7.65	.850	4.58	2.51	.55	38.81	32.44
7 3	184	7.40	.850	5.18	2.24	.43	39.33	32.67
7 4	185	7.20	.840	5.10	2.08	.41	39.84	32.88
7 5	186	6.97	.830	2.40	5.32	2.43	40.08	33.46
7 6	187	6.76	.830	.97	5.41	5.58	40.18	34.00
7 7	188	6.71	.830	3.70	4.37	1.18	40.55	34.44
7 8	189	6.81	.830	3.35	.08	.02	40.88	34.44
7 9	190	6.92	.830	4.10	.30	.07	41.29	34.47
7 10	191	6.87	.830	4.07	1.09	.27	41.70	34.58
7 11	192	6.71	.830	2.72	1.32	.49	41.97	34.71
7 12	193	6.59	.820	3.32	.99	.30	42.30	34.81
7 13	194	6.46	.820	3.27	.81	.25	42.63	34.89
7 14	195	6.41	.820	2.51	.28	.11	42.88	34.92

.968 CP SECONDS EXECUTION TIME.

APPENDIX E

Combination Model Results

W1-3

_GO,XW13

DATE	JULIAN DAY	AVAILABLE WATER	COEFFICIENT KB	PREDICTED ET	MEASURED ET	ET RATIO	CUMULATIVE PREDICTED	CUMULATIVE MEASURED
		CM		MM/DY	MM/DY		CM	CM
4 9	99	15.04	1.000	4.10	3.12	.76	.41	.31
4 10	100	14.48	1.000	2.63	3.86	1.47	.67	.70
4 11	101	14.41	1.000	3.18	1.12	.35	.99	.81
4 12	102	13.87	1.000	4.05	.64	.16	1.40	.87
4 13	103	14.15	1.000	3.28	6.30	1.92	1.72	1.50
4 14	104	14.23	1.000	3.79	7.39	1.95	2.10	2.24
4 15	105	14.38	1.000	4.80	8.74	1.82	2.58	3.12
4 16	106	14.30	1.000	4.94	5.26	1.06	3.08	3.64
4 17	107	13.97	1.000	4.10	5.87	1.43	3.49	4.23
4 18	108	12.78	1.000	5.52	4.24	.77	4.04	4.65
4 19	109	12.55	1.000	3.08	-2.44	-.79	4.35	4.41
4 20	110	12.70	1.000	6.16	.03	.00	4.96	4.41
4 21	111	13.52	1.000	6.05	1.17	.19	5.57	4.53
4 22	112	13.49	1.000	3.68	4.62	1.26	5.94	4.99
4 23	113	13.31	1.000	5.70	2.26	.40	6.51	5.22
4 24	114	13.09	1.000	7.60	2.95	.39	7.27	5.51
4 25	115	12.83	1.000	3.94	3.28	.83	7.66	5.84
4 26	116	12.53	1.000	3.63	3.02	.83	8.02	6.14
4 27	117	12.20	1.000	3.73	4.22	1.13	8.39	6.56
4 28	118	12.02	1.000	5.17	4.06	.79	8.91	6.97
4 29	119	11.89	1.000	4.51	4.52	1.00	9.36	7.42
4 30	120	11.61	1.000	6.53	3.61	.55	10.01	7.78
5 1	121	11.28	1.000	8.11	4.42	.55	10.83	8.23
5 2	122	10.80	1.000	7.28	5.13	.70	11.55	8.74
5 3	123	10.29	1.000	5.07	4.88	.96	12.06	9.23
5 4	124	9.73	1.000	5.27	10.54	2.00	12.59	10.28
5 5	125	9.35	1.000	2.74	11.71	4.27	12.86	11.45
5 6	126	9.10	1.000	4.19	11.20	2.67	13.28	12.57
5 7	127	8.87	1.000	6.08	4.57	.75	13.89	13.03
5 8	128	8.64	1.000	4.97	2.36	.48	14.38	13.27
5 9	129	8.41	1.000	5.06	1.68	.33	14.89	13.43
5 10	130	8.16	1.000	5.41	.36	.07	15.43	13.47
5 11	131	8.13	1.000	4.69	4.34	.93	15.90	13.90
5 12	132	8.31	1.000	5.20	4.27	.82	16.42	14.33
5 13	133	8.49	1.000	3.01	6.76	2.24	16.72	15.01
5 14	134	8.46	1.000	1.45	2.62	1.81	16.87	15.27
5 15	135	8.28	1.000	4.93	2.77	.56	17.36	15.55
5 16	136	8.08	1.000	4.86	1.70	.35	17.85	15.72
5 17	137	8.08	1.000	3.98	3.35	.84	18.24	16.05
5 18	138	7.80	1.000	3.17	6.10	1.92	18.56	16.66
5 19	139	7.29	.957	4.31	6.43	1.49	18.99	17.30
5 20	140	6.63	.870	6.23	12.62	2.03	19.61	18.57
5 21	141	6.28	.824	6.95	9.30	1.34	20.31	19.50
5 22	142	6.23	.818	4.20	7.11	1.69	20.73	20.21
5 23	143	6.35	.833	4.06	-2.26	-.56	21.14	19.98
5 24	144	6.66	.874	3.72	-1.22	-.33	21.51	19.86
5 25	145	6.91	.907	5.05	-.43	-.09	22.01	19.81
5 26	146	6.71	.881	4.47	-1.24	-.28	22.46	19.69
5 27	147	6.76	.887	5.18	5.72	1.10	22.98	20.26
5 28	148	7.27	.954	4.87	1.88	.39	23.46	20.45
5 29	149	8.49	1.000	5.54	-.43	-.08	24.02	20.41
5 30	150	9.68	1.000	5.70	-7.14	-1.25	24.59	19.69
5 31	151	10.90	1.000	5.57	-1.09	-.20	25.15	19.58

W1-3

DATE	JULIAN DAY	AVAILABLE WATER	COEFFICIENT KB	PREDICTED ET	MEASURED ET	ET RATIO	CUMULATIVE PREDICTED	CUMULATIVE MEASURED
		CM		MM/DY	MM/DY		CM	CM
6 1	152	10.62	1.000	6.64	7.49	1.13	25.81	20.33
6 2	153	10.01	1.000	7.54	8.79	1.17	26.56	21.21
6 3	154	8.64	1.000	6.26	28.88	4.61	27.19	24.10
6 4	155	7.98	1.000	3.88	24.21	6.23	27.58	26.52
6 5	156	6.94	.911	4.46	22.05	4.95	28.02	28.73
6 6	157	6.96	.913	3.40	-7.42	-2.18	28.36	27.98
6 7	158	8.08	1.000	1.56	1.32	.85	28.52	28.12
6 8	159	10.27	1.000	3.17	-.10	-.03	28.84	28.11
6 9	160	11.59	1.000	5.77	8.74	1.52	29.41	28.98
6 10	161	12.02	1.000	5.37	1.02	.19	29.95	29.08
6 11	162	11.56	1.000	5.54	3.61	.65	30.50	29.44
6 12	163	11.28	1.000	5.96	3.48	.58	31.10	29.79
6 13	164	10.93	1.000	5.71	4.24	.74	31.67	30.22
6 14	165	10.52	1.000	6.16	3.78	.61	32.29	30.59
6 15	166	10.01	1.000	7.13	2.08	.29	33.00	30.80
6 16	167	9.81	1.000	4.38	.46	.10	33.44	30.85
6 17	168	9.89	1.000	5.65	-.25	-.04	34.00	30.82
6 18	169	10.14	1.000	2.36	1.50	.63	34.24	30.97
6 19	170	10.14	1.000	6.37	3.00	.47	34.88	31.27
6 20	171	9.91	1.000	4.88	4.57	.94	35.37	31.73
6 21	172	9.43	1.000	4.21	4.67	1.11	35.79	32.20
6 22	173	8.97	1.000	3.63	4.39	1.21	36.15	32.64
6 23	174	8.49	1.000	5.48	3.84	.70	36.70	33.02
6 24	175	8.11	1.000	5.98	4.01	.67	37.30	33.42
6 25	176	7.83	1.000	5.62	5.46	.97	37.86	33.97
6 26	177	7.29	.957	9.94	8.23	.83	38.85	34.79
6 27	178	6.48	.850	5.58	9.30	1.67	39.41	35.72
6 28	179	5.34	.701	3.89	8.38	2.15	39.80	36.56
6 29	180	4.50	.591	3.87	5.51	1.42	40.19	37.11
6 30	181	3.97	.521	3.02	3.53	1.17	40.49	37.46
7 1	182	3.69	.484	2.77	2.49	.90	40.76	37.71
7 2	183	3.46	.454	2.42	2.36	.97	41.01	37.95
7 3	184	3.20	.420	2.58	2.29	.89	41.26	38.18
7 4	185	2.98	.391	2.39	2.24	.94	41.50	38.40
7 5	186	2.77	.364	1.05	5.99	5.73	41.61	39.00
7 6	187	2.54	.333	.39	5.64	14.37	41.65	39.56
7 7	188	2.47	.324	1.45	4.72	3.26	41.79	40.03
7 8	189	2.52	.331	1.34	.56	.42	41.93	40.09
7 9	190	2.57	.337	1.68	.71	.42	42.09	40.16
7 10	191	2.47	.324	1.58	1.14	.72	42.25	40.28
7 11	192	2.32	.304	1.01	.79	.78	42.35	40.35
7 12	193	2.24	.294	1.18	.36	.30	42.47	40.39
7 13	194	2.24	.294	1.17	-.03	-.03	42.59	40.39

.948 CP SECONDS EXECUTION TIME.

W1-4

XW14

DATE	JULIAN DAY	AVAILABLE WATER	COEFFICIENT KB	PREDICTED ET	MEASURED ET	ET RATIO	CUMULATIVE PREDICTED	CUMULATIVE MEASURED
		CM		MM/DY	MM/DY		CM	CM
4 9	99	14.45	1.000	4.10	.91	.22	.41	.09
4 10	100	14.34	1.000	2.63	1.73	.66	.67	.26
4 11	101	14.24	1.000	3.17	1.45	.46	.99	.41
4 12	102	13.91	1.000	4.05	.15	.04	1.40	.42
4 13	103	13.91	1.000	3.27	5.69	1.74	1.72	.99
4 14	104	14.22	1.000	3.79	5.11	1.35	2.10	1.50
4 15	105	14.80	1.000	4.83	7.47	1.55	2.58	2.25
4 16	106	14.98	1.000	4.94	4.34	.88	3.08	2.69
4 17	107	14.57	1.000	4.10	5.94	1.45	3.49	3.28
4 18	108	13.51	1.000	5.54	3.73	.67	4.04	3.65
4 19	109	13.20	1.000	3.08	-2.46	-.80	4.35	3.41
4 20	110	13.45	1.000	6.18	-.13	-.02	4.97	3.39
4 21	111	14.24	1.000	6.00	2.01	.34	5.57	3.59
4 22	112	14.32	1.000	3.66	6.02	1.65	5.93	4.20
4 23	113	13.91	1.000	5.70	4.01	.70	6.50	4.60
4 24	114	13.51	1.000	7.65	3.66	.48	7.27	4.96
4 25	115	13.15	1.000	3.92	3.18	.81	7.66	5.28
4 26	116	12.92	1.000	3.65	1.88	.52	8.02	5.47
4 27	117	12.67	1.000	3.72	4.88	1.31	8.40	5.96
4 28	118	12.67	1.000	5.18	4.93	.95	8.91	6.45
4 29	119	12.62	1.000	4.52	6.43	1.42	9.37	7.09
4 30	120	12.34	1.000	6.55	4.19	.64	10.02	7.51
5 1	121	11.88	1.000	8.12	5.49	.68	10.83	8.06
5 2	122	11.35	1.000	7.29	6.12	.84	11.56	8.67
5 3	123	10.69	1.000	5.11	5.94	1.16	12.07	9.27
5 4	124	10.03	1.000	5.24	10.13	1.93	12.60	10.28
5 5	125	9.57	1.000	2.77	11.10	4.01	12.87	11.39
5 6	126	9.29	1.000	4.21	10.49	2.49	13.29	12.44
5 7	127	9.01	1.000	6.03	5.03	.83	13.90	12.94
5 8	128	8.71	1.000	4.97	2.82	.57	14.39	13.22
5 9	129	8.43	1.000	5.06	3.35	.66	14.90	13.56
5 10	130	8.15	1.000	5.41	4.42	.82	15.44	14.00
5 11	131	7.71	1.000	4.73	9.88	2.09	15.91	14.99
5 12	132	7.10	.932	4.81	8.59	1.78	16.40	15.85
5 13	133	6.70	.879	2.65	6.86	2.59	16.66	16.53
5 14	134	6.65	.873	1.27	-.53	-.42	16.79	16.48
5 15	135	6.95	.912	4.51	-1.55	-.34	17.24	16.33
5 16	136	7.23	.949	4.59	-1.50	-.33	17.70	16.18
5 17	137	7.54	.990	3.91	1.75	.45	18.09	16.35
5 18	138	7.44	.976	3.09	4.78	1.55	18.40	16.83
5 19	139	6.95	.912	4.11	4.37	1.06	18.81	17.27
5 20	140	6.50	.853	6.08	12.70	2.09	19.41	18.54
5 21	141	6.52	.856	7.20	8.89	1.23	20.13	19.42
5 22	142	7.00	.919	4.75	7.34	1.55	20.61	20.16
5 23	143	7.51	.986	4.79	-3.89	-.81	21.09	19.77
5 24	144	7.99	1.000	4.26	-1.63	-.38	21.51	19.61
5 25	145	8.17	1.000	5.54	.97	.18	22.07	19.70
5 26	146	7.99	1.000	5.06	1.91	.38	22.57	19.89
5 27	147	7.69	1.000	5.89	11.15	1.89	23.16	21.01
5 28	148	7.61	.999	5.10	9.53	1.87	23.67	21.96
5 29	149	7.82	1.000	5.49	8.59	1.57	24.22	22.82
5 30	150	7.99	1.000	5.70	-3.18	-.56	24.79	22.50
5 31	151	8.20	1.000	5.56	-3.94	-.71	25.35	22.11

W1-4

DATE	JULIAN DAY	AVAILABLE WATER	COEFFICIENT KB	PREDICTED ET	MEASURED ET	ET RATIO	CUMULATIVE PREDICTED	CUMULATIVE MEASURED
		CM		MM/DY	MM/DY		CM	CM
6 1	152	8.76	1.000	6.64	-4.85	-.73	26.01	21.62
6 2	153	9.19	1.000	7.55	-3.51	-.46	26.77	21.27
6 3	154	9.64	1.000	6.29	11.33	1.80	27.40	22.41
6 4	155	9.80	1.000	3.86	11.48	2.98	27.78	23.55
6 5	156	10.13	1.000	4.89	13.97	2.86	28.27	24.95
6 6	157	10.53	1.000	3.72	-1.50	-.40	28.64	24.80
6 7	158	11.07	1.000	1.55	3.66	2.36	28.80	25.17
6 8	159	11.68	1.000	3.20	2.11	.66	29.12	25.38
6 9	160	11.93	1.000	5.75	5.92	1.03	29.69	25.97
6 10	161	11.80	1.000	5.35	3.12	.58	30.23	26.28
6 11	162	11.27	1.000	5.51	3.91	.71	30.78	26.67
6 12	163	10.99	1.000	5.99	3.71	.62	31.38	27.04
6 13	164	10.64	1.000	5.74	4.52	.79	31.95	27.50
6 14	165	10.18	1.000	6.19	4.19	.68	32.57	27.92
6 15	166	9.64	1.000	7.14	2.74	.38	33.28	28.19
6 16	167	9.37	1.000	4.38	1.93	.44	33.72	28.38
6 17	168	9.34	1.000	5.63	10.11	1.79	34.28	29.39
6 18	169	9.31	1.000	2.36	11.89	5.04	34.52	30.58
6 19	170	9.14	1.000	6.36	12.67	1.99	35.16	31.85
6 20	171	8.78	1.000	4.90	5.31	1.08	35.65	32.38
6 21	172	8.25	1.000	4.22	5.18	1.23	36.07	32.90
6 22	173	7.74	1.000	3.62	4.60	1.27	36.43	33.36
6 23	174	7.21	.946	5.16	3.40	.66	36.95	33.70
6 24	175	6.88	.903	5.43	2.37	.53	37.49	33.99
6 25	176	6.72	.882	4.94	4.14	.84	37.98	34.40
6 26	177	6.37	.836	8.70	7.24	.83	38.85	35.12
6 27	178	5.63	.739	4.84	8.94	1.85	39.34	36.02
6 28	179	4.54	.596	3.33	8.69	2.61	39.67	36.89
6 29	180	3.68	.483	3.16	6.45	2.04	39.99	37.53
6 30	181	3.02	.396	2.28	4.72	2.07	40.21	38.00
7 1	182	2.61	.343	1.96	3.51	1.79	40.41	38.35
7 2	183	2.25	.295	1.58	2.77	1.75	40.57	38.63
7 3	184	1.97	.259	1.59	2.29	1.44	40.73	38.86
7 4	185	1.77	.232	1.41	2.03	1.44	40.87	39.06
7 5	186	1.57	.206	.59	6.17	10.51	40.93	39.68
7 6	187	1.36	.178	.21	6.60	31.98	40.95	40.34
7 7	188	1.19	.156	.70	6.55	9.34	41.02	41.00
7 8	189	1.03	.135	.55	2.54	4.59	41.07	41.25
7 9	190	.86	.113	.56	2.13	3.83	41.13	41.46
7 10	191	.60	.079	.38	1.93	5.05	41.17	41.66
7 11	192	.40	.052	.17	1.14	6.61	41.18	41.77
7 12	193	.27	.035	.14	.66	4.55	41.20	41.84
7 13	194	.27	.035	.14	.05	.35	41.21	41.84

.946 CP SECONDS EXECUTION TIME.

T1-3

XT13

DATE	JULIAN DAY	AVAILABLE WATER	COEFFICIENT KB	PREDICTED ET	MEASURED ET	ET RATIO	CUMULATIVE PREDICTED	CUMULATIVE MEASURED
		CM		MM/DY	MM/DY		CM	CM
4 9	99	14.18	1.000	4.13	2.03	.49	.41	.20
4 10	100	13.95	1.000	2.63	2.21	.34	.68	.42
4 11	101	13.77	1.000	3.18	1.40	.44	.99	.56
4 12	102	13.52	1.000	4.07	1.70	.42	1.40	.73
4 13	103	13.52	1.000	3.28	1.37	.42	1.73	.87
4 14	104	13.24	1.000	3.80	2.41	.63	2.11	1.11
4 15	105	13.11	1.000	4.79	1.47	.31	2.59	1.26
4 16	106	12.83	1.000	4.98	1.42	.29	3.09	1.40
4 17	107	12.83	1.000	4.11	8.64	2.10	3.50	2.27
4 18	108	12.70	1.000	5.52	6.99	1.27	4.05	2.96
4 19	109	13.24	1.000	3.09	4.39	1.42	4.36	3.40
4 20	110	13.75	1.000	6.13	-3.86	-.63	4.97	3.02
4 21	111	14.38	1.000	6.01	-1.12	-.19	5.57	2.91
4 22	112	14.38	1.000	3.66	1.98	.54	5.94	3.10
4 23	113	14.08	1.000	5.71	3.20	.56	6.51	3.42
4 24	114	13.80	1.000	7.61	2.74	.36	7.27	3.70
4 25	115	13.47	1.000	3.94	3.33	.85	7.67	4.03
4 26	116	13.37	1.000	3.64	3.30	.91	8.03	4.36
4 27	117	12.88	1.000	3.74	4.32	1.16	8.40	4.79
4 28	118	12.55	1.000	5.17	3.56	.69	8.92	5.15
4 29	119	12.07	1.000	4.52	3.71	.82	9.37	5.52
4 30	120	11.82	1.000	6.48	3.30	.51	10.02	5.85
5 1	121	11.43	1.000	8.13	4.60	.57	10.83	6.31
5 2	122	11.08	1.000	7.32	5.46	.75	11.57	6.85
5 3	123	10.44	1.000	5.09	5.99	1.18	12.08	7.45
5 4	124	9.81	1.000	5.22	5.21	1.00	12.60	7.97
5 5	125	9.28	1.000	2.78	6.60	2.38	12.87	8.63
5 6	126	8.89	1.000	4.22	6.20	1.47	13.30	9.25
5 7	127	8.49	1.000	6.08	6.20	1.02	13.90	9.87
5 8	128	8.08	1.000	5.00	4.01	.80	14.40	10.28
5 9	129	7.68	1.000	5.06	4.01	.79	14.91	10.68
5 10	130	7.29	.957	5.22	3.23	.62	15.43	11.00
5 11	131	6.89	.904	4.26	4.57	1.07	15.86	11.46
5 12	132	6.71	.881	4.60	3.66	.80	16.32	11.82
5 13	133	6.58	.864	2.59	3.43	1.32	16.58	12.17
5 14	134	6.46	.848	1.22	0.00	0.00	16.70	12.17
5 15	135	6.74	.885	4.34	-.76	-.18	17.13	12.09
5 16	136	6.96	.913	4.42	7.14	1.61	17.57	12.30
5 17	137	7.12	.934	3.69	8.97	2.43	17.94	13.70
5 18	138	6.76	.887	2.81	9.86	3.51	18.22	14.69
5 19	139	6.61	.867	3.90	16.15	4.14	18.62	16.30
5 20	140	6.66	.874	6.27	15.62	2.49	19.24	17.86
5 21	141	6.63	.870	7.35	15.42	2.10	19.98	19.41
5 22	142	6.46	.848	4.34	.81	.19	20.41	19.49
5 23	143	6.35	.833	4.06	.03	.01	20.82	19.49
5 24	144	6.41	.841	3.55	.03	.01	21.17	19.49
5 25	145	6.46	.848	4.69	.28	.06	21.64	19.52
5 26	146	6.35	.833	4.22	-.10	-.02	22.06	19.51
5 27	147	6.30	.827	4.86	-3.07	-.63	22.55	19.20
5 28	148	6.51	.854	4.34	-7.06	-1.63	22.98	18.50
5 29	149	7.27	.954	5.27	25.76	4.89	23.51	21.07
5 30	150	8.44	1.000	5.70	25.22	4.42	24.08	23.60
5 31	151	9.94	1.000	5.57	27.79	4.99	24.64	26.37

T1-3

DATE	JULIAN DAY	AVAILABLE WATER	COEFFICIENT KB	PREDICTED ET	MEASURED ET	ET RATIO	CUMULATIVE PREDICTED	CUMULATIVE MEASURED
		CM		MM/DY	MM/DY		CM	CM
6 1	152	10.90	1.000	6.61	-3.07	-.46	25.30	26.07
6 2	153	11.28	1.000	7.50	2.11	.28	26.05	26.28
6 3	154	10.88	1.000	6.26	6.12	.98	26.68	26.89
6 4	155	10.27	1.000	3.86	6.07	1.57	27.06	27.50
6 5	156	9.43	1.000	4.87	7.62	1.57	27.55	28.26
6 6	157	9.05	1.000	3.71	3.30	.89	27.92	28.59
6 7	158	9.10	1.000	1.55	5.74	3.70	28.07	29.16
6 8	159	9.56	1.000	3.19	1.68	.53	28.39	29.33
6 9	160	9.81	1.000	5.74	3.10	.54	28.97	29.64
6 10	161	9.96	1.000	5.36	-1.19	-.22	29.50	29.52
6 11	162	10.01	1.000	5.54	10.92	1.97	30.06	30.61
6 12	163	10.16	1.000	6.01	11.61	1.93	30.66	31.78
6 13	164	10.19	1.000	5.75	13.16	2.29	31.23	33.09
6 14	165	10.04	1.000	6.16	2.46	.40	31.85	33.34
6 15	166	9.73	1.000	7.17	2.79	.39	32.57	33.62
6 16	167	9.45	1.000	4.39	3.45	.79	33.00	33.96
6 17	168	9.20	1.000	5.67	3.68	.65	33.57	34.33
6 18	169	8.95	1.000	2.34	5.13	2.20	33.81	34.84
6 19	170	8.59	1.000	6.33	5.51	.87	34.44	35.39
6 20	171	8.11	1.000	4.86	6.35	1.31	34.92	36.03
6 21	172	7.50	.984	4.15	6.10	1.47	35.34	36.64
6 22	173	6.89	.904	3.29	5.38	1.64	35.67	37.18
6 23	174	6.28	.824	4.50	3.94	.88	36.12	37.57
6 24	175	5.90	.774	4.64	2.95	.64	36.58	37.87
6 25	176	5.72	.751	4.23	3.89	.92	37.00	38.25
6 26	177	5.39	.707	7.32	6.71	.92	37.74	38.93
6 27	178	4.73	.621	4.09	7.75	1.90	38.15	39.70
6 28	179	3.69	.484	2.70	6.27	2.32	38.42	40.33
6 29	180	3.08	.404	2.65	2.29	.86	38.68	40.56
6 30	181	2.85	.374	2.15	-.05	-.02	38.89	40.55
7 1	182	3.00	.394	2.25	-.74	-.33	39.12	40.48
7 2	183	3.08	.404	2.17	.20	.09	39.34	40.50
7 3	184	3.05	.400	2.46	.84	.34	39.58	40.58
7 4	185	2.95	.387	2.36	1.17	.50	39.82	40.70
7 5	186	2.82	.370	1.07	5.16	4.82	39.93	41.21
7 6	187	2.72	.357	.41	5.23	12.67	39.97	41.74
7 7	188	2.67	.350	1.58	4.72	2.99	40.12	42.21
7 8	189	2.72	.357	1.44	.56	.39	40.27	42.27
7 9	190	2.75	.361	1.78	.48	.27	40.45	42.31
7 10	191	2.70	.354	1.75	.94	.54	40.62	42.41
7 11	192	2.57	.337	1.12	1.04	.93	40.73	42.51
7 12	193	2.47	.324	1.30	.76	.58	40.86	42.59
7 13	194	2.37	.311	1.24	.64	.52	40.99	42.65
7 14	195	2.34	.307	.94	.20	.21	41.08	42.67

.963 CP SECONDS EXECUTION TIME.

T1-5

DATE	JULIAN DAY	AVAILABLE WATER	COEFFICIENT KB	PREDICTED ET	MEASURED ET	ET RATIO	CUMULATIVE PREDICTED	CUMULATIVE MEASURED
		CM		MM/DY	MM/DY		CM	CM
4 10	100	13.45	1.000	2.64	2.41	.91	.26	.24
4 11	101	13.30	1.000	3.20	1.83	.57	.58	.42
4 12	102	12.97	1.000	4.03	2.34	.58	.99	.66
4 13	103	12.89	1.000	3.27	1.85	.57	1.31	.84
4 14	104	12.59	1.000	3.80	2.90	.76	1.69	1.13
4 15	105	12.44	1.000	4.79	1.60	.33	2.17	1.29
4 16	106	12.06	1.000	4.96	.56	.11	2.67	1.35
4 17	107	12.13	1.000	4.11	7.16	1.74	3.08	2.07
4 18	108	12.28	1.000	5.54	5.49	.99	3.63	2.61
4 19	109	13.63	1.000	3.08	4.65	1.51	3.94	3.08
4 20	110	14.21	1.000	6.12	-.89	-.15	4.55	2.99
4 21	111	14.60	1.000	6.03	2.74	.45	5.16	3.26
4 22	112	13.88	1.000	3.67	5.26	1.43	5.52	3.79
4 23	113	13.40	1.000	5.71	4.39	.77	6.09	4.23
4 24	114	13.02	1.000	7.59	3.68	.49	6.85	4.60
4 25	115	12.61	1.000	3.92	4.17	1.06	7.25	5.01
4 26	116	12.41	1.000	3.61	4.01	1.11	7.61	5.41
4 27	117	11.88	1.000	3.71	4.67	1.26	7.98	5.88
4 28	118	11.47	1.000	5.17	4.45	.86	8.49	6.33
4 29	119	10.99	1.000	4.52	5.00	1.11	8.95	6.83
4 30	120	10.56	1.000	6.53	5.51	.84	9.60	7.38
5 1	121	9.97	1.000	8.13	6.58	.81	10.41	8.04
5 2	122	9.34	1.000	7.27	7.16	.99	11.14	8.75
5 3	123	8.58	1.000	5.07	6.96	1.37	11.65	9.45
5 4	124	7.84	1.000	5.23	5.74	1.10	12.17	10.02
5 5	125	7.26	.953	2.63	6.31	2.59	12.43	10.70
5 6	126	6.85	.899	3.76	6.22	1.66	12.81	11.33
5 7	127	6.44	.845	5.09	6.22	1.22	13.32	11.95
5 8	128	6.06	.795	3.97	4.04	1.02	13.71	12.35
5 9	129	5.66	.743	3.74	4.04	1.08	14.09	12.76
5 10	130	5.25	.689	3.77	3.35	.89	14.46	13.09
5 11	131	4.84	.635	2.98	4.85	1.63	14.76	13.58
5 12	132	4.64	.609	3.15	4.09	1.30	15.08	13.98
5 13	133	4.46	.585	1.76	4.19	2.39	15.25	14.40
5 14	134	4.28	.562	.81	-1.04	-1.29	15.33	14.30
5 15	135	4.44	.583	2.87	-5.72	-2.00	15.62	13.73
5 16	136	5.15	.676	3.26	2.62	.80	15.95	13.99
5 17	137	6.42	.843	3.32	.25	.08	16.28	14.01
5 18	138	7.56	.992	3.15	4.62	1.47	16.59	14.48
5 19	139	8.50	1.000	4.47	9.53	2.13	17.04	15.43
5 20	140	9.29	1.000	7.17	12.90	1.80	17.76	16.72
5 21	141	9.52	1.000	8.41	16.18	1.92	18.60	18.34
5 22	142	9.26	1.000	5.16	2.16	.42	19.11	18.55
5 23	143	8.86	1.000	4.89	1.24	.25	19.60	18.68
5 24	144	8.86	1.000	4.26	.71	.17	20.03	18.75
5 25	145	8.88	1.000	5.59	1.50	.27	20.59	18.90
5 26	146	8.65	1.000	5.03	1.60	.32	21.09	19.06
5 27	147	8.40	1.000	5.89	-1.98	-.34	21.68	18.86
5 28	148	8.42	1.000	5.11	-7.52	-1.47	22.19	18.11
5 29	149	9.26	1.000	5.53	14.68	2.66	22.74	19.58
5 30	150	10.66	1.000	5.71	14.20	2.49	23.31	21.00
5 31	151	12.64	1.000	5.58	18.92	3.39	23.87	22.89

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T1-5

DATE	JULIAN DAY	AVAILABLE WATER	COEFFICIENT KB	PREDICTED ET	MEASURED ET	ET RATIO	CUMULATIVE PREDICTED	CUMULATIVE MEASURED
		CM		MM/DY	MM/DY		CM	CM
6 1	152	13.63	1.000	6.59	.08	.01	24.53	22.90
6 2	153	13.63	1.000	7.51	6.68	.89	25.28	23.56
6 3	154	12.61	1.000	6.27	9.96	1.59	25.91	24.56
6 4	155	11.62	1.000	3.88	8.26	2.13	26.30	25.39
6 5	156	10.63	1.000	4.89	8.64	1.77	26.79	26.25
6 6	157	10.15	1.000	3.73	3.63	.97	27.16	26.61
6 7	158	10.15	1.000	1.56	5.61	3.60	27.32	27.17
6 8	159	10.66	1.000	3.21	.86	.27	27.64	27.26
6 9	160	10.94	1.000	5.75	1.45	.25	28.21	27.40
6 10	161	11.27	1.000	5.34	-4.11	-.77	28.75	26.99
6 11	162	11.60	1.000	5.55	14.00	2.52	29.30	28.39
6 12	163	12.18	1.000	6.00	15.60	2.60	29.90	29.95
6 13	164	12.41	1.000	5.70	19.38	3.40	30.47	31.89
6 14	165	12.26	1.000	6.18	4.24	.69	31.09	32.32
6 15	166	11.73	1.000	7.16	5.77	.81	31.80	32.89
6 16	167	11.14	1.000	4.41	6.68	1.52	32.25	33.56
6 17	168	10.53	1.000	5.66	6.68	1.18	32.81	34.23
6 18	169	9.97	1.000	2.35	7.44	3.16	33.05	34.97
6 19	170	9.39	1.000	6.32	6.91	1.09	33.68	35.66
6 20	171	8.75	1.000	4.90	7.16	1.46	34.17	36.38
6 21	172	8.09	1.000	4.24	6.60	1.56	34.59	37.04
6 22	173	7.43	.975	3.53	6.05	1.71	34.95	37.64
6 23	174	6.77	.888	4.83	4.90	1.01	35.43	38.13
6 24	175	6.29	.825	4.97	2.77	.56	35.93	38.41
6 25	176	5.96	.782	4.40	.74	.17	36.37	38.49
6 26	177	5.93	.778	8.05	-1.19	-.15	37.17	38.37
6 27	178	6.06	.795	5.26	-.03	-.01	37.70	38.36
6 28	179	6.32	.829	4.64	3.63	.78	38.16	38.73
6 29	180	5.96	.782	5.12	9.83	1.92	38.67	39.71
6 30	181	4.97	.652	3.77	12.42	3.30	39.05	40.95
7 1	182	3.37	.442	2.54	11.46	4.51	39.31	42.10
7 2	183	2.23	.293	1.56	6.93	4.44	39.46	42.79
7 3	184	1.54	.202	1.24	3.91	3.14	39.59	43.18
7 4	185	1.29	.169	1.02	2.39	2.34	39.69	43.42
7 5	186	1.06	.139	.40	6.15	15.42	39.73	44.04
7 6	187	.80	.105	.12	5.82	47.18	39.74	44.62
7 7	188	.70	.092	.42	4.90	11.75	39.78	45.11
7 8	189	.75	.098	.39	.69	1.75	39.82	45.18
7 9	190	.80	.105	.51	.81	1.57	39.87	45.26
7 10	191	.70	.092	.45	1.32	2.91	39.92	45.39
7 11	192	.52	.068	.23	1.14	5.00	39.94	45.50
7 12	193	.40	.052	.21	.64	3.05	39.96	45.57
7 13	194	.35	.046	.18	.38	2.09	39.98	45.61
7 14	195	.32	.042	.13	.13	1.02	39.99	45.62

.951 CP SECONDS EXECUTION TIME.

T2A-3

XT2A3

DATE	JULIAN DAY	AVAILABLE WATER	COEFFICIENT KB	PREDICTED ET	MEASURED ET	ET RATIO	CUMULATIVE PREDICTED	CUMULATIVE MEASURED
		CM		MM/DY	MM/DY		CM	CM
4 9	99	13.70	1.000	4.10	-1.40	-.34	.41	-.14
4 10	100	13.95	1.000	2.63	.18	.07	.67	-.12
4 11	101	13.98	1.000	3.19	2.87	.90	.99	.17
4 12	102	13.65	1.000	4.03	4.67	1.16	1.40	.63
4 13	103	13.09	1.000	3.25	4.17	1.28	1.72	1.05
4 14	104	12.58	1.000	3.30	3.28	.86	2.10	1.38
4 15	105	12.43	1.000	4.79	2.77	.58	2.58	1.65
4 16	106	12.15	1.000	4.97	4.67	.94	3.08	2.12
4 17	107	11.77	1.000	4.12	4.80	1.17	3.49	2.60
4 18	108	11.00	1.000	5.52	3.84	.70	4.04	2.99
4 19	109	10.70	1.000	3.11	.41	.13	4.35	3.03
4 20	110	10.62	1.000	6.16	0.00	0.00	4.97	3.03
4 21	111	10.90	1.000	6.02	.43	.07	5.57	3.07
4 22	112	10.70	1.000	3.68	2.44	.66	5.94	3.31
4 23	113	10.50	1.000	5.70	2.37	.50	6.51	3.60
4 24	114	10.17	1.000	7.65	3.43	.45	7.27	3.94
4 25	115	9.89	1.000	3.91	3.68	.94	7.66	4.31
4 26	116	9.58	1.000	3.63	2.01	.55	8.03	4.51
4 27	117	9.17	1.000	3.73	2.01	.54	8.40	4.71
4 28	118	9.35	1.000	5.14	1.98	.38	8.91	4.91
4 29	119	8.97	1.000	4.51	5.82	1.29	9.36	5.49
4 30	120	8.57	1.000	6.50	6.30	.97	10.01	6.12
5 1	121	7.60	.997	8.13	7.09	.87	10.83	6.83
5 2	122	7.07	.928	6.75	5.74	.85	11.50	7.41
5 3	123	6.46	.848	4.30	5.33	1.24	11.93	7.94
5 4	124	5.87	.770	4.03	4.06	1.01	12.34	8.34
5 5	125	5.47	.718	1.99	5.21	2.62	12.53	8.87
5 6	126	5.24	.688	2.89	4.67	1.61	12.82	9.33
5 7	127	4.98	.654	3.96	4.67	1.18	13.22	9.80
5 8	128	4.73	.621	3.09	2.46	.80	13.53	10.05
5 9	129	4.48	.588	2.96	2.49	.84	13.83	10.30
5 10	130	4.25	.558	3.03	2.31	.76	14.13	10.53
5 11	131	3.99	.524	2.45	4.42	1.80	14.37	10.97
5 12	132	3.79	.497	2.60	3.56	1.37	14.63	11.32
5 13	133	3.56	.467	1.41	3.56	2.53	14.77	11.68
5 14	134	3.59	.471	.68	-1.73	-2.53	14.84	11.51
5 15	135	3.76	.493	2.45	-4.78	-1.95	15.09	11.03
5 16	136	4.48	.588	2.84	5.87	2.07	15.37	11.62
5 17	137	5.44	.714	2.83	6.07	2.15	15.65	12.22
5 18	138	6.48	.850	2.70	7.82	2.90	15.92	13.01
5 19	139	7.30	.958	4.31	9.91	2.30	16.35	14.00
5 20	140	7.90	1.000	7.14	11.89	1.67	17.07	15.19
5 21	141	8.21	1.000	8.40	13.41	1.60	17.91	16.53
5 22	142	8.26	1.000	5.14	-.43	-.08	18.42	16.48
5 23	143	8.18	1.000	4.84	-.61	-.13	18.91	16.42
5 24	144	8.34	1.000	4.24	-.43	-.10	19.33	16.38
5 25	145	8.44	1.000	5.59	1.17	.21	19.89	16.50
5 26	146	8.34	1.000	5.05	2.72	.54	20.39	16.77
5 27	147	7.98	1.000	5.88	3.63	.62	20.98	17.13
5 28	148	7.63	1.000	5.12	3.78	.74	21.49	17.51
5 29	149	7.24	.950	5.25	3.86	.74	22.02	17.90
5 30	150	6.84	.898	5.09	4.11	.81	22.53	18.31
5 31	151	6.46	.848	4.71	4.60	.98	23.00	18.77

T2A-3

DATE	JULIAN DAY	AVAILABLE WATER	COEFFICIENT KB	PREDICTED ET	MEASURED ET	ET RATIO	CUMULATIVE PREDICTED	CUMULATIVE MEASURED
		CM		MM/DY	MM/DY		CM	CM
6 1	152	6.00	.787	5.22	5.28	1.01	23.52	19.29
6 2	153	5.47	.718	5.42	4.14	.76	24.06	19.71
6 3	154	4.88	.640	4.00	1.14	.28	24.46	19.82
6 4	155	4.76	.625	2.43	-5.03	-2.07	24.71	19.32
6 5	156	5.14	.675	3.29	27.97	8.51	25.03	22.12
6 6	157	6.38	.837	3.12	22.10	7.08	25.35	24.33
6 7	158	8.08	1.000	1.56	26.09	16.74	25.50	26.93
6 8	159	10.19	1.000	3.21	-9.17	-2.86	25.82	26.02
6 9	160	11.64	1.000	5.78	-1.04	-.18	26.40	25.91
6 10	161	12.20	1.000	5.38	.10	.02	26.94	25.92
6 11	162	11.89	1.000	5.53	2.95	.53	27.49	26.22
6 12	163	11.61	1.000	6.00	2.87	.48	28.09	26.51
6 13	164	11.31	1.000	5.69	3.53	.62	28.66	26.86
6 14	165	11.03	1.000	6.16	4.04	.66	29.28	27.26
6 15	166	10.55	1.000	7.14	4.32	.60	29.99	27.69
6 16	167	10.11	1.000	4.41	4.30	1.09	30.43	28.17
6 17	168	9.73	1.000	5.69	4.65	.82	31.00	28.64
6 18	169	9.35	1.000	2.33	5.49	2.35	31.23	29.19
6 19	170	8.97	1.000	6.33	4.95	.78	31.87	29.68
6 20	171	8.54	1.000	4.86	5.18	1.07	32.35	30.20
6 21	172	8.08	1.000	4.24	4.62	1.09	32.78	30.66
6 22	173	7.60	.997	3.64	4.29	1.18	33.14	31.09
6 23	174	7.14	.937	5.10	3.63	.71	33.65	31.46
6 24	175	6.79	.891	5.34	3.25	.61	34.18	31.78
6 25	176	6.53	.857	4.82	3.84	.80	34.67	32.16
6 26	177	6.18	.811	8.38	5.36	.64	35.50	32.70
6 27	178	5.64	.740	4.86	6.10	1.25	35.99	33.31
6 28	179	4.91	.644	3.59	5.77	1.61	36.35	33.89
6 29	180	4.35	.571	3.75	4.32	1.15	36.72	34.32
6 30	181	3.92	.514	2.98	3.20	1.07	37.02	34.64
7 1	182	3.61	.474	2.74	2.39	.87	37.30	34.88
7 2	183	3.38	.444	2.39	1.91	.80	37.53	35.07
7 3	184	3.18	.417	2.55	1.57	.61	37.79	35.23
7 4	195	3.05	.400	2.43	1.42	.58	38.03	35.37
7 5	186	2.90	.381	1.09	5.36	4.90	38.14	35.90
7 6	187	2.77	.364	.43	5.36	12.58	38.19	36.44
7 7	188	2.72	.357	1.60	4.80	3.01	38.35	36.92
7 8	189	2.75	.361	1.46	.64	.44	38.49	36.98
7 9	190	2.77	.364	1.79	.33	.18	38.67	37.02
7 10	191	2.70	.354	1.75	.18	.10	38.85	37.04
7 11	192	2.65	.348	1.15	-.76	-.66	38.96	36.96
7 12	193	2.72	.357	1.43	-1.27	-.89	39.10	36.83
7 13	194	2.93	.385	1.54	-1.52	-.98	39.26	36.68
7 14	195	3.03	.398	1.22	-.51	-.42	39.38	36.63

.955 CP SECONDS EXECUTION TIME.

T2A-5

XT2A5

DATE	JULIAN DAY	AVAILABLE WATER	COEFFICIENT KB	PREDICTED ET	MEASURED ET	ET RATIO	CUMULATIVE PREDICTED	CUMULATIVE MEASURED
		CM		MM/DY	MM/DY		CM	CM
4 9	99	15.10	1.000	4.10	2.24	.55	.41	.22
4 10	100	14.87	1.000	2.65	2.67	1.01	.67	.49
4 11	101	14.64	1.000	3.19	2.03	.64	.99	.69
4 12	102	14.29	1.000	4.03	2.44	.61	1.40	.94
4 13	103	14.26	1.000	3.24	1.45	.45	1.72	1.08
4 14	104	13.90	1.000	3.82	2.34	.61	2.10	1.32
4 15	105	13.88	1.000	4.81	1.07	.22	2.58	1.42
4 16	106	13.57	1.000	4.94	4.32	.87	3.08	1.86
4 17	107	13.63	1.000	4.08	4.01	.98	3.49	2.26
4 18	108	12.58	1.000	5.50	5.56	1.01	4.04	2.81
4 19	109	12.38	1.000	3.07	.53	.17	4.34	2.87
4 20	110	11.95	1.000	6.14	.97	.16	4.96	2.96
4 21	111	12.43	1.000	6.01	.28	.05	5.56	2.99
4 22	112	12.08	1.000	3.67	3.25	.88	5.92	3.32
4 23	113	11.87	1.000	5.68	3.35	.59	6.49	3.65
4 24	114	11.47	1.000	7.62	4.24	.56	7.25	4.08
4 25	115	11.11	1.000	3.92	4.32	1.10	7.65	4.51
4 26	116	10.70	1.000	3.65	4.42	1.21	8.01	4.95
4 27	117	10.27	1.000	3.71	4.39	1.18	8.38	5.39
4 28	118	9.87	1.000	5.15	4.72	.92	8.90	5.86
4 29	119	9.38	1.000	4.50	5.23	1.16	9.35	6.38
4 30	120	8.85	1.000	6.55	5.56	.85	10.00	6.94
5 1	121	8.29	1.000	8.14	5.77	.71	10.82	7.52
5 2	122	7.71	1.000	7.35	5.79	.79	11.55	8.09
5 3	123	7.12	.934	4.74	5.33	1.12	12.03	8.63
5 4	124	6.56	.861	4.51	4.45	.99	12.48	9.07
5 5	125	6.11	.802	2.20	5.84	2.66	12.70	9.66
5 6	126	5.80	.761	3.21	5.44	1.70	13.02	10.20
5 7	127	5.47	.718	4.35	5.44	1.25	13.45	10.75
5 8	128	5.14	.675	3.35	3.25	.97	13.79	11.07
5 9	129	4.81	.631	3.20	3.25	1.02	14.11	11.40
5 10	130	4.51	.592	3.22	2.06	.64	14.43	11.60
5 11	131	4.18	.549	2.57	3.40	1.32	14.69	11.94
5 12	132	4.20	.551	2.85	1.35	.47	14.97	12.08
5 13	133	4.13	.542	1.63	1.73	1.06	15.14	12.25
5 14	134	4.43	.581	.83	-2.57	-3.09	15.22	11.99
5 15	135	4.74	.622	3.07	-2.69	-.88	15.53	11.72
5 16	136	5.29	.694	3.37	10.03	2.97	15.86	12.73
5 17	137	5.68	.745	2.95	10.90	3.69	16.16	13.82
5 18	138	6.01	.789	2.51	10.62	4.22	16.41	14.88
5 19	139	6.49	.852	3.81	10.54	2.77	16.79	15.93
5 20	140	7.10	.932	6.63	11.33	1.71	17.45	17.07
5 21	141	7.50	.984	8.28	12.78	1.54	18.28	18.34
5 22	142	7.58	.995	5.11	-.53	-.10	18.79	18.29
5 23	143	7.55	.991	4.81	-.84	-.17	19.27	18.21
5 24	144	7.68	1.000	4.26	-.69	-.16	19.70	18.14
5 25	145	7.83	1.000	5.55	.74	.13	20.26	18.21
5 26	146	7.76	1.000	5.01	2.39	.48	20.76	18.45
5 27	147	7.45	.978	5.72	3.43	.60	21.33	18.79
5 28	148	7.10	.932	4.74	3.66	.77	21.80	19.16
5 29	149	6.72	.882	4.83	3.76	.78	22.29	19.53
5 30	150	6.36	.835	4.76	3.86	.81	22.76	19.92
5 31	151	5.98	.785	4.38	4.06	.93	23.20	20.33

T2A-5

DATE	JULIAN DAY	AVAILABLE WATER	COEFFICIENT KB	PREDICTED ET	MEASURED ET	ET RATIO	CUMULATIVE PREDICTED	CUMULATIVE MEASURED
		CM		MM/DY	MM/DY		CM	CM
6 1	152	5.57	.731	4.81	4.80	1.00	23.68	20.81
6 2	153	5.14	.675	5.08	5.82	1.15	24.19	21.39
6 3	154	4.53	.594	3.74	7.11	1.90	24.56	22.10
6 4	155	3.82	.501	1.93	2.90	1.50	24.76	22.39
6 5	156	3.01	.395	1.92	26.92	14.01	24.95	25.08
6 6	157	3.67	.482	1.78	11.91	6.68	25.13	26.27
6 7	158	5.85	.768	1.18	10.95	9.28	25.24	27.37
6 8	159	9.51	1.000	3.19	-18.52	-5.81	25.56	25.52
6 9	160	11.85	1.000	5.74	-4.60	-.80	26.14	25.06
6 10	161	12.79	1.000	5.39	-.43	-.08	26.68	25.01
6 11	162	12.28	1.000	5.56	3.63	.65	27.23	25.38
6 12	163	12.00	1.000	5.98	3.05	.51	27.83	25.68
6 13	164	11.70	1.000	5.74	3.89	.68	28.40	26.07
6 14	165	11.36	1.000	6.14	4.19	.68	29.02	26.49
6 15	166	10.83	1.000	7.11	4.17	.59	29.73	26.91
6 16	167	10.43	1.000	4.39	4.57	1.04	30.17	27.36
6 17	168	10.09	1.000	5.67	4.85	.86	30.73	27.85
6 18	169	9.71	1.000	2.36	6.07	2.58	30.97	28.45
6 19	170	9.23	1.000	6.37	5.56	.87	31.61	29.01
6 20	171	8.72	1.000	4.90	5.61	1.15	32.10	29.57
6 21	172	8.24	1.000	4.22	4.98	1.18	32.52	30.07
6 22	173	7.73	1.000	3.62	4.42	1.22	32.88	30.51
6 23	174	7.25	.951	5.20	3.33	.64	33.40	30.84
6 24	175	6.92	.908	5.47	2.69	.49	33.95	31.11
6 25	176	6.74	.885	4.96	3.66	.74	34.44	31.48
6 26	177	6.44	.845	8.72	6.20	.71	35.31	32.10
6 27	178	5.80	.761	5.04	7.65	1.52	35.82	32.86
6 28	179	4.89	.642	3.57	7.39	2.07	36.18	33.60
6 29	180	4.15	.545	3.59	5.49	1.53	36.53	34.15
6 30	181	3.59	.471	2.73	4.06	1.49	36.81	34.56
7 1	182	3.24	.425	2.45	3.18	1.30	37.05	34.88
7 2	183	2.91	.382	2.05	2.82	1.38	37.26	35.16
7 3	184	2.63	.345	2.11	2.57	1.22	37.47	35.42
7 4	185	2.40	.315	1.92	2.44	1.27	37.66	35.66
7 5	186	2.14	.281	.80	6.12	7.61	37.74	36.27
7 6	187	1.92	.252	.29	5.61	19.23	37.77	36.83
7 7	188	1.84	.241	1.08	4.42	4.10	37.88	37.27
7 8	189	1.92	.252	1.01	0.00	0.00	37.98	37.27
7 9	190	2.04	.268	1.32	.36	.27	38.11	37.31
7 10	191	2.02	.265	1.29	1.50	1.16	38.24	37.46
7 11	192	1.81	.238	.79	2.31	2.92	38.32	37.69
7 12	193	1.59	.209	.84	2.08	2.48	38.40	37.90
7 13	194	1.31	.172	.69	1.98	2.88	38.47	38.10
7 14	195	1.18	.155	.48	.66	1.38	38.52	38.16

.962 CP SECONDS EXECUTION TIME.

T3A-3

XT3A3

DATE	JULIAN DAY	AVAILABLE WATER	COEFFICIENT KB	PREDICTED ET	MEASURED ET	ET RATIO	CUMULATIVE PREDICTED	CUMULATIVE MEASURED
		CM		MM/DY	MM/DY		CM	CM
4 9	99	13.12	1.000	4.10	2.03	.49	.41	.20
4 10	100	12.92	1.000	2.65	2.11	.80	.67	.41
4 11	101	12.71	1.000	3.20	1.57	.49	.99	.57
4 12	102	12.49	1.000	4.04	1.73	.43	1.40	.74
4 13	103	12.46	1.000	3.25	1.73	.53	1.72	.92
4 14	104	12.18	1.000	3.82	2.62	.69	2.11	1.18
4 15	105	11.98	1.000	4.80	3.33	.69	2.59	1.51
4 16	106	11.70	1.000	4.98	5.41	1.09	3.08	2.05
4 17	107	11.22	1.000	4.12	5.69	1.38	3.50	2.62
4 18	108	10.35	1.000	5.49	4.37	.80	4.04	3.06
4 19	109	9.97	1.000	3.09	.71	.23	4.35	3.13
4 20	110	9.90	1.000	6.13	1.04	.17	4.97	3.23
4 21	111	10.15	1.000	6.05	2.06	.34	5.57	3.44
4 22	112	9.67	1.000	3.68	4.22	1.15	5.94	3.86
4 23	113	9.29	1.000	5.73	.15	.03	6.51	3.88
4 24	114	8.88	1.000	7.66	-6.60	-.86	7.28	3.22
4 25	115	9.67	1.000	3.93	-6.86	-1.74	7.67	2.53
4 26	116	11.37	1.000	3.62	.81	.22	8.03	2.61
4 27	117	11.04	1.000	3.72	14.68	3.95	8.41	4.08
4 28	118	9.49	1.000	5.17	16.00	3.10	8.92	5.68
4 29	119	6.97	.915	4.15	12.42	2.99	9.34	6.92
4 30	120	6.24	.819	5.34	5.94	1.11	9.87	7.52
5 1	121	5.76	.756	6.17	5.36	.87	10.49	8.05
5 2	122	5.17	.678	4.96	5.36	1.08	10.99	8.59
5 3	123	4.64	.609	3.09	4.60	1.49	11.29	9.05
5 4	124	4.15	.545	2.87	3.53	1.23	11.58	9.40
5 5	125	3.80	.499	1.37	4.88	3.56	11.72	9.89
5 6	126	3.57	.469	1.97	4.45	2.26	11.91	10.33
5 7	127	3.34	.438	2.65	4.45	1.68	12.18	10.78
5 8	128	3.14	.412	2.04	2.26	1.11	12.38	11.01
5 9	129	2.91	.382	1.93	2.26	1.17	12.58	11.23
5 10	130	2.68	.352	1.93	1.63	.85	12.77	11.39
5 11	131	2.45	.322	1.50	3.56	2.37	12.92	11.75
5 12	132	2.40	.315	1.64	2.31	1.41	13.08	11.98
5 13	133	2.28	.299	.90	2.57	2.86	13.17	12.24
5 14	134	2.43	.319	.46	-.10	-.22	13.22	12.23
5 15	135	2.68	.352	1.74	.86	.49	13.39	12.31
5 16	136	2.68	.352	1.71	2.06	1.21	13.56	12.52
5 17	137	2.58	.339	1.33	3.25	2.44	13.70	12.85
5 18	138	2.12	.278	.88	4.65	5.30	13.78	13.31
5 19	139	1.95	.256	1.14	4.06	3.55	13.90	13.72
5 20	140	1.59	.209	1.48	3.25	2.19	14.05	14.04
5 21	141	1.28	.168	1.40	1.35	.96	14.19	14.18
5 22	142	1.18	.155	.80	-.30	-.38	14.27	14.15
5 23	143	1.18	.155	.75	-1.19	-1.58	14.34	14.03
5 24	144	1.39	.182	.77	-1.19	-1.54	14.42	13.91
5 25	145	1.54	.202	1.13	-.79	-.70	14.53	13.83
5 26	146	1.54	.202	1.02	-1.30	-1.27	14.63	13.70
5 27	147	1.61	.211	1.24	-7.87	-6.33	14.76	12.91
5 28	148	1.92	.252	1.27	-19.08	-14.99	14.89	11.00
5 29	149	3.90	.512	2.83	32.74	11.59	15.17	14.28
5 30	150	7.36	.966	5.52	28.40	5.15	15.72	17.12
5 31	151	12.26	1.000	5.60	34.44	6.15	16.28	20.56

T3A-3

DATE	JULIAN DAY	AVAILABLE WATER	COEFFICIENT KB	PREDICTED ET	MEASURED ET	ET RATIO	CUMULATIVE PREDICTED	CUMULATIVE MEASURED
		CM		MM/DY	MM/DY		CM	CM
6 1	152	15.53	1.000	6.62	-15.93	-2.41	16.94	18.97
6 2	153	17.19	1.000	7.54	-4.06	-.54	17.70	18.56
6 3	154	17.03	1.000	6.27	2.82	.45	18.32	18.84
6 4	155	16.75	1.000	3.88	3.20	.82	18.71	19.16
6 5	156	16.35	1.000	4.88	6.25	1.28	19.20	19.79
6 6	157	16.09	1.000	3.71	4.52	1.22	19.57	20.24
6 7	158	16.02	1.000	1.55	8.13	5.25	19.73	21.05
6 8	159	16.09	1.000	3.19	4.52	1.42	20.04	21.51
6 9	160	16.14	1.000	5.76	5.69	.99	20.62	22.08
6 10	161	16.02	1.000	5.37	1.93	.36	21.16	22.27
6 11	162	15.76	1.000	5.54	2.31	.42	21.71	22.50
6 12	163	15.56	1.000	5.99	2.29	.38	22.31	22.73
6 13	164	15.33	1.000	5.72	2.97	.52	22.88	23.03
6 14	165	15.08	1.000	6.15	3.48	.57	23.50	23.37
6 15	166	14.67	1.000	7.14	3.78	.53	24.21	23.75
6 16	167	14.29	1.000	4.38	4.39	1.00	24.65	24.19
6 17	168	13.93	1.000	5.66	4.34	.77	25.22	24.62
6 18	169	13.60	1.000	2.34	5.18	2.22	25.45	25.14
6 19	170	13.25	1.000	6.35	4.65	.73	26.09	25.61
6 20	171	12.84	1.000	4.91	4.88	.99	26.58	26.10
6 21	172	12.41	1.000	4.20	4.32	1.03	27.00	26.53
6 22	173	11.98	1.000	3.63	3.76	1.04	27.36	26.90
6 23	174	11.55	1.000	5.46	2.67	.49	27.90	27.17
6 24	175	11.29	1.000	5.98	1.85	.31	28.50	27.36
6 25	176	11.19	1.000	5.66	2.41	.43	29.07	27.60
6 26	177	10.99	1.000	10.35	4.37	.42	30.10	28.03
6 27	178	10.56	1.000	6.59	5.66	.86	30.76	28.60
6 28	179	9.87	1.000	5.56	5.77	1.04	31.32	29.18
6 29	180	9.29	1.000	6.58	4.65	.71	31.98	29.64
6 30	181	8.83	1.000	5.80	3.76	.65	32.56	30.02
7 1	182	8.47	1.000	5.77	3.07	.53	33.13	30.32
7 2	183	8.17	1.000	5.34	2.62	.49	33.67	30.59
7 3	184	7.91	1.000	6.13	2.29	.37	34.28	30.82
7 4	185	7.69	1.000	6.09	2.13	.35	34.89	31.03
7 5	186	7.48	.982	2.82	6.07	2.15	35.17	31.64
7 6	187	7.25	.951	1.11	6.05	5.45	35.28	32.24
7 7	188	7.15	.938	4.20	5.44	1.30	35.70	32.78
7 8	189	7.13	.936	3.78	1.19	.32	36.08	32.90
7 9	190	7.08	.929	4.56	.99	.22	36.54	33.00
7 10	191	6.97	.915	4.50	1.12	.25	36.99	33.11
7 11	192	6.82	.895	2.94	1.07	.36	37.28	33.22
7 12	193	6.75	.886	3.56	.36	.10	37.64	33.26
7 13	194	6.75	.886	3.52	0.00	0.00	37.99	33.26
7 14	195	6.75	.886	2.71	0.00	0.00	38.26	33.26

.957 CP SECONDS EXECUTION TIME.

T3A-4

XT3A4

DATE	JULIAN DAY	AVAILABLE WATER	COEFFICIENT KB	PREDICTED ET	MEASURED ET	ET RATIO	CUMULATIVE PREDICTED	CUMULATIVE MEASURED
		CM		MM/DY	MM/DY		CM	CM
4 9	99	16.44	1.000	4.11	1.75	.43	.41	.18
4 10	100	16.21	1.000	2.63	1.98	.75	.67	.37
4 11	101	16.09	1.000	3.19	.71	.22	.99	.44
4 12	102	15.83	1.000	4.05	1.32	.33	1.40	.58
4 13	103	15.98	1.000	3.26	.91	.28	1.72	.67
4 14	104	15.68	1.000	3.81	2.69	.71	2.11	.94
4 15	105	15.58	1.000	4.81	2.90	.60	2.59	1.23
4 16	106	15.22	1.000	4.96	6.30	1.27	3.08	1.86
4 17	107	14.84	1.000	4.12	5.74	1.39	3.49	2.43
4 18	108	13.70	1.000	5.49	4.04	.74	4.04	2.83
4 19	109	13.49	1.000	3.10	-1.96	-.63	4.35	2.64
4 20	110	13.62	1.000	6.12	-1.88	-.31	4.97	2.45
4 21	111	14.28	1.000	6.01	-.10	-.02	5.57	2.44
4 22	112	14.05	1.000	3.68	3.43	.93	5.94	2.78
4 23	113	13.67	1.000	5.68	8.69	1.53	6.50	3.65
4 24	114	13.27	1.000	7.62	17.45	2.29	7.27	5.40
4 25	115	11.49	1.000	3.91	17.98	4.59	7.66	7.20
4 26	116	8.54	1.000	3.61	8.41	2.33	8.02	8.04
4 27	117	7.98	1.000	3.73	-9.86	-2.64	8.39	7.05
4 28	118	9.05	1.000	5.16	-11.02	-2.14	8.91	5.95
4 29	119	11.49	1.000	4.52	-5.77	-1.28	9.36	5.37
4 30	120	11.29	1.000	6.49	4.37	.67	10.01	5.81
5 1	121	10.78	1.000	8.11	5.69	.70	10.82	6.38
5 2	122	10.19	1.000	7.34	5.99	.82	11.55	6.98
5 3	123	9.58	1.000	5.09	5.64	1.11	12.06	7.54
5 4	124	8.97	1.000	5.22	4.88	.93	12.58	8.03
5 5	125	8.49	1.000	2.77	6.38	2.30	12.86	8.67
5 6	126	8.11	1.000	4.17	6.02	1.44	13.28	9.27
5 7	127	7.73	1.000	6.08	6.02	.99	13.89	9.87
5 8	128	7.35	.965	4.82	3.81	.79	14.37	10.25
5 9	129	6.97	.915	4.63	3.81	.82	14.83	10.63
5 10	130	6.59	.865	4.71	2.64	.56	15.30	10.90
5 11	131	6.21	.815	3.83	4.57	1.19	15.69	11.35
5 12	132	6.18	.811	4.20	2.95	.70	16.11	11.65
5 13	133	5.87	.770	2.30	3.53	1.53	16.34	12.00
5 14	134	5.98	.785	1.13	.30	.27	16.45	12.03
5 15	135	6.15	.807	3.97	1.42	.36	16.85	12.17
5 16	136	6.15	.807	3.89	2.95	.76	17.23	12.47
5 17	137	6.00	.787	3.12	4.67	1.50	17.55	12.94
5 18	138	5.32	.698	2.21	6.76	3.06	17.77	13.61
5 19	139	4.99	.655	2.95	6.43	2.18	18.06	14.25
5 20	140	4.35	.571	4.10	6.05	1.48	18.47	14.86
5 21	141	3.79	.497	4.22	4.09	.97	18.89	15.27
5 22	142	3.39	.445	2.29	2.59	1.13	19.12	15.53
5 23	143	3.13	.411	1.98	1.30	.66	19.32	15.66
5 24	144	3.03	.398	1.68	.30	.18	19.49	15.69
5 25	145	3.00	.394	2.18	-1.12	-.51	19.71	15.58
5 26	146	3.06	.402	2.03	-2.90	-1.43	19.91	15.29
5 27	147	3.36	.441	2.59	-9.27	-3.58	20.17	14.36
5 28	148	3.87	.508	2.59	-18.90	-7.30	20.43	12.47
5 29	149	5.82	.764	4.18	28.65	6.85	20.85	15.33
5 30	150	9.02	1.000	5.66	25.58	4.52	21.41	17.89
5 31	151	13.47	1.000	5.60	31.85	5.69	21.97	21.08

T3A-4

DATE	JULIAN DAY	AVAILABLE WATER	COEFFICIENT KB	PREDICTED ET	MEASURED ET	ET RATIO	CUMULATIVE PREDICTED	CUMULATIVE MEASURED
		CM		MM/DY	MM/DY		CM	CM
6 1	152	16.34	1.000	6.62	-12.12	-1.83	22.63	19.86
6 2	153	17.66	1.000	7.54	.36	.05	23.39	19.90
6 3	154	17.10	1.000	6.27	8.64	1.38	24.01	20.76
6 4	155	16.24	1.000	3.88	8.56	2.21	24.40	21.62
6 5	156	15.07	1.000	4.87	9.09	1.87	24.89	22.53
6 6	157	14.54	1.000	3.71	2.77	.75	25.26	22.81
6 7	158	14.64	1.000	1.56	4.55	2.93	25.42	23.26
6 8	159	15.35	1.000	3.19	1.42	.45	25.73	23.40
6 9	160	15.65	1.000	5.76	5.41	.94	26.31	23.94
6 10	161	15.58	1.000	5.37	2.06	.38	26.85	24.15
6 11	162	15.12	1.000	5.53	2.31	.42	27.40	24.38
6 12	163	15.04	1.000	5.97	1.57	.26	28.00	24.54
6 13	164	14.89	1.000	5.69	3.25	.57	28.57	24.86
6 14	165	14.64	1.000	6.17	4.24	.69	29.18	25.29
6 15	166	14.08	1.000	7.15	4.62	.65	29.90	25.75
6 16	167	13.62	1.000	4.38	4.83	1.10	30.34	26.23
6 17	168	13.24	1.000	5.66	4.70	.83	30.90	26.70
6 18	169	12.89	1.000	2.36	5.69	2.41	31.14	27.27
6 19	170	12.45	1.000	6.33	5.18	.82	31.77	27.79
6 20	171	12.00	1.000	4.88	5.36	1.10	32.26	28.32
6 21	172	11.51	1.000	4.22	4.78	1.13	32.68	28.80
6 22	173	11.06	1.000	3.65	4.57	1.25	33.05	29.26
6 23	174	10.57	1.000	5.46	4.17	.76	33.59	29.68
6 24	175	10.14	1.000	6.03	3.56	.59	34.20	30.03
6 25	176	9.79	1.000	5.60	3.15	.56	34.76	30.35
6 26	177	9.51	1.000	10.34	2.95	.29	35.79	30.64
6 27	178	9.20	1.000	6.60	3.00	.45	36.45	30.94
6 28	179	8.92	1.000	5.55	3.10	.56	37.01	31.25
6 29	180	8.59	1.000	6.53	3.25	.50	37.66	31.58
6 30	181	8.29	1.000	5.77	3.20	.55	38.24	31.90
7 1	182	7.93	1.000	5.74	2.95	.51	38.81	32.19
7 2	183	7.65	1.000	5.39	2.51	.47	39.35	32.44
7 3	184	7.40	.971	5.92	2.24	.38	39.94	32.67
7 4	185	7.20	.945	5.74	2.08	.36	40.52	32.88
7 5	186	6.97	.915	2.64	5.82	2.20	40.78	33.46
7 6	187	6.76	.887	1.04	5.41	5.22	40.88	34.00
7 7	188	6.71	.881	3.93	4.37	1.11	41.28	34.44
7 8	189	6.81	.894	3.61	.08	.02	41.64	34.44
7 9	190	6.92	.908	4.49	.30	.07	42.09	34.47
7 10	191	6.87	.902	4.42	1.09	.25	42.53	34.58
7 11	192	6.71	.881	2.89	1.32	.46	42.82	34.71
7 12	193	6.59	.865	3.50	.99	.28	43.17	34.81
7 13	194	6.46	.848	3.38	.81	.24	43.50	34.89
7 14	195	6.41	.841	2.57	.28	.11	43.76	34.92

.962 CP SECONDS EXECUTION TIME.

APPENDIX F

Power Model Results

W1-3

.XW13

DATE	JULIAN DAY	AVAILABLE WATER	COEFFICIENT KS	PREDICTED ET	MEASURED ET	ET RATIO	CUMULATIVE PREDICTED	CUMULATIVE MEASURED
		CM		MM/DY	MM/DY		CM	CM
4 9	99	15.04	1.000	4.10	3.12	.76	.41	.31
4 10	100	14.48	.999	2.62	3.86	1.47	.67	.70
4 11	101	14.41	.999	3.18	1.12	.35	.99	.81
4 12	102	13.87	.996	4.03	.64	.16	1.39	.87
4 13	103	14.15	.998	3.27	6.30	1.93	1.72	1.50
4 14	104	14.23	.998	3.78	7.39	1.95	2.10	2.24
4 15	105	14.38	.999	4.79	8.74	1.82	2.58	3.12
4 16	106	14.30	.998	4.93	5.26	1.07	3.07	3.64
4 17	107	13.97	.997	4.09	5.87	1.44	3.48	4.23
4 18	108	12.78	.982	5.42	4.24	.78	4.02	4.65
4 19	109	12.55	.979	3.02	-2.44	-.81	4.32	4.41
4 20	110	12.70	.980	6.03	.03	.00	4.93	4.41
4 21	111	13.52	.992	6.01	1.17	.19	5.53	4.53
4 22	112	13.49	.993	3.65	4.62	1.26	5.89	4.99
4 23	113	13.31	.990	5.64	2.26	.40	6.46	5.22
4 24	114	13.09	.986	7.50	2.95	.39	7.21	5.51
4 25	115	12.83	.984	3.87	3.28	.85	7.59	5.84
4 26	116	12.53	.978	3.55	3.02	.85	7.95	6.14
4 27	117	12.20	.971	3.62	4.22	1.17	8.31	6.56
4 28	118	12.02	.965	4.99	4.06	.81	8.81	6.97
4 29	119	11.89	.962	4.33	4.52	1.04	9.24	7.42
4 30	120	11.61	.951	6.21	3.61	.58	9.86	7.78
5 1	121	11.28	.939	7.61	4.42	.58	10.62	8.23
5 2	122	10.80	.920	6.69	5.13	.77	11.29	8.74
5 3	123	10.29	.898	4.55	4.88	1.07	11.75	9.23
5 4	124	9.73	.867	4.56	10.54	2.31	12.21	10.28
5 5	125	9.35	.852	2.34	11.71	5.01	12.44	11.45
5 6	126	9.10	.829	3.48	11.20	3.22	12.79	12.57
5 7	127	8.87	.810	4.92	4.57	.93	13.28	13.03
5 8	128	8.64	.795	3.95	2.36	.60	13.67	13.27
5 9	129	8.41	.777	3.93	1.68	.43	14.07	13.43
5 10	130	8.16	.757	4.10	.36	.09	14.48	13.47
5 11	131	8.13	.756	3.55	4.34	1.22	14.83	13.90
5 12	132	8.31	.769	4.00	4.27	1.07	15.23	14.33
5 13	133	8.49	.790	2.38	6.76	2.84	15.47	15.01
5 14	134	8.46	.806	1.17	2.62	2.24	15.59	15.27
5 15	135	8.28	.767	3.78	2.77	.73	15.96	15.55
5 16	136	8.08	.751	3.65	1.70	.47	16.33	15.72
5 17	137	8.08	.754	3.00	3.35	1.12	16.63	16.05
5 18	138	7.80	.734	2.33	6.10	2.62	16.86	16.66
5 19	139	7.29	.684	3.08	6.43	2.09	17.17	17.30
5 20	140	6.63	.616	4.41	12.62	2.86	17.61	18.57
5 21	141	6.28	.579	4.88	9.30	1.90	18.10	19.50
5 22	142	6.23	.578	2.97	7.11	2.39	18.40	20.21
5 23	143	6.35	.591	2.88	-2.26	-.78	18.68	19.98
5 24	144	6.66	.624	2.66	-1.22	-.46	18.95	19.86
5 25	145	6.91	.645	3.59	-.43	-.12	19.31	19.81
5 26	146	6.71	.627	3.18	-1.24	-.39	19.63	19.69
5 27	147	6.76	.630	3.68	5.72	1.55	20.00	20.26
5 28	148	7.27	.680	3.47	1.88	.54	20.34	20.45
5 29	149	8.49	.782	4.34	-.43	-.10	20.78	20.41
5 30	150	9.68	.863	4.92	-7.14	-1.45	21.27	19.69
5 31	151	10.90	.925	5.15	-1.09	-.21	21.78	19.58

W1-3

DATE	JULIAN DAY	AVAILABLE WATER	COEFFICIENT KS	PREDICTED ET	MEASURED ET	ET RATIO	CUMULATIVE PREDICTED	CUMULATIVE MEASURED
		CM		MM/DY	MM/DY		CM	CM
6 1	152	10.62	.912	6.06	7.49	1.24	22.39	20.33
6 2	153	10.01	.880	6.64	8.79	1.32	23.05	21.21
6 3	154	8.64	.793	4.96	28.88	5.82	23.55	24.10
6 4	155	7.98	.746	2.90	24.21	8.36	23.84	26.52
6 5	156	6.94	.650	3.18	22.05	6.94	24.16	28.73
6 6	157	6.96	.655	2.44	-7.42	-3.04	24.40	27.98
6 7	158	8.08	.775	1.21	1.32	1.09	24.52	28.12
6 8	159	10.27	.901	2.86	-.10	-.03	24.81	28.11
6 9	160	11.59	.951	5.48	8.74	1.59	25.36	28.98
6 10	161	12.02	.964	5.18	1.02	.20	25.87	29.08
6 11	162	11.56	.950	5.27	3.61	.69	26.40	29.44
6 12	163	11.28	.940	5.60	3.48	.62	26.96	29.79
6 13	164	10.93	.927	5.29	4.24	.80	27.49	30.22
6 14	165	10.52	.908	5.59	3.78	.68	28.05	30.59
6 15	166	10.01	.881	6.28	2.08	.33	28.68	30.80
6 16	167	9.81	.873	3.83	.46	.12	29.06	30.85
6 17	168	9.89	.875	4.94	-.25	-.05	29.55	30.82
6 18	169	10.14	.899	2.12	1.50	.71	29.77	30.97
6 19	170	10.14	.888	5.66	3.00	.53	30.33	31.27
6 20	171	9.91	.878	4.28	4.57	1.07	30.76	31.73
6 21	172	9.43	.851	3.58	4.67	1.30	31.12	32.20
6 22	173	8.97	.822	2.98	4.39	1.47	31.42	32.64
6 23	174	8.49	.783	4.29	3.84	.89	31.85	33.02
6 24	175	8.11	.752	4.49	4.01	.89	32.30	33.42
6 25	176	7.83	.729	4.09	5.46	1.33	32.71	33.97
6 26	177	7.29	.676	7.03	8.23	1.17	33.41	34.79
6 27	178	6.48	.601	3.95	9.30	2.36	33.80	35.72
6 28	179	5.34	.482	2.68	8.38	3.13	34.07	36.56
6 29	180	4.50	.387	2.54	5.51	2.17	34.32	37.11
6 30	181	3.97	.328	1.90	3.53	1.86	34.51	37.46
7 1	182	3.69	.296	1.70	2.49	1.47	34.68	37.71
7 2	183	3.46	.271	1.44	2.36	1.63	34.83	37.95
7 3	184	3.20	.241	1.48	2.29	1.55	34.98	38.18
7 4	185	2.98	.217	1.33	2.24	1.69	35.11	38.40
7 5	186	2.77	.198	.57	5.99	10.52	35.17	39.00
7 6	187	2.54	.180	.21	5.64	26.58	35.19	39.56
7 7	188	2.47	.165	.74	4.72	6.41	35.26	40.03
7 8	189	2.52	.170	.69	.56	.81	35.33	40.09
7 9	190	2.57	.175	.87	.71	.82	35.42	40.16
7 10	191	2.47	.165	.80	1.14	1.42	35.50	40.28
7 11	192	2.32	.150	.50	.79	1.58	35.55	40.35
7 12	193	2.24	.142	.57	.36	.63	35.60	40.39
7 13	194	2.24	.142	.57	-.03	-.05	35.66	40.39

.983 CP SECONDS EXECUTION TIME.

W1-4

XWJ4

DATE	JULIAN DAY	AVAILABLE WATER	COEFFICIENT KS	PREDICTED ET	MEASURED ET	ET RATIO	CUMULATIVE PREDICTED	CUMULATIVE MEASURED
		CM		MM/DY	MM/DY		CM	CM
4 9	99	14.45	.999	4.10	.91	.22	.41	.09
4 10	100	14.34	.999	2.62	1.73	.66	.67	.26
4 11	101	14.24	.998	3.17	1.45	.46	.99	.41
4 12	102	13.91	.996	4.04	.15	.04	1.39	.42
4 13	103	13.91	.997	3.25	5.69	1.75	1.72	.99
4 14	104	14.22	.998	3.78	5.11	1.35	2.10	1.50
4 15	105	14.80	1.000	4.83	7.47	1.55	2.58	2.25
4 16	106	14.98	1.000	4.94	4.34	.88	3.07	2.69
4 17	107	14.57	.999	4.10	5.94	1.45	3.48	3.28
4 18	108	13.51	.992	5.49	3.73	.68	4.03	3.65
4 19	109	13.20	.990	3.05	-2.46	-.81	4.34	3.41
4 20	110	13.45	.992	6.12	-.13	-.02	4.95	3.39
4 21	111	14.24	.998	5.99	2.01	.34	5.55	3.59
4 22	112	14.32	.999	3.65	6.02	1.65	5.91	4.20
4 23	113	13.91	.996	5.68	4.01	.71	6.48	4.60
4 24	114	13.51	.992	7.59	3.66	.48	7.24	4.96
4 25	115	13.15	.989	3.87	3.18	.82	7.63	5.28
4 26	116	12.92	.985	3.59	1.88	.52	7.99	5.47
4 27	117	12.67	.981	3.65	4.88	1.34	8.35	5.96
4 28	118	12.67	.980	5.07	4.93	.97	8.86	6.45
4 29	119	12.62	.979	4.43	6.43	1.45	9.30	7.09
4 30	120	12.34	.972	6.36	4.19	.66	9.94	7.51
5 1	121	11.88	.959	7.78	5.49	.71	10.72	8.06
5 2	122	11.35	.942	6.86	6.12	.89	11.40	8.67
5 3	123	10.69	.917	4.68	5.94	1.27	11.87	9.27
5 4	124	10.03	.884	4.63	10.13	2.19	12.33	10.28
5 5	125	9.57	.865	2.39	11.10	4.64	12.57	11.39
5 6	126	9.29	.842	3.55	10.49	2.96	12.93	12.44
5 7	127	9.01	.820	4.94	5.03	1.02	13.42	12.94
5 8	128	8.71	.800	3.97	2.82	.71	13.82	13.22
5 9	129	8.43	.779	3.94	3.35	.85	14.21	13.56
5 10	130	8.15	.756	4.09	4.42	1.08	14.62	14.00
5 11	131	7.71	.721	3.41	9.88	2.90	14.96	14.99
5 12	132	7.10	.664	3.43	8.59	2.50	15.31	15.85
5 13	133	6.70	.633	1.91	6.86	3.60	15.50	16.53
5 14	134	6.65	.648	.94	-.53	-.56	15.59	16.48
5 15	135	6.95	.651	3.21	-1.55	-.48	15.91	16.33
5 16	136	7.23	.677	3.27	-1.50	-.46	16.24	16.18
5 17	137	7.54	.708	2.80	1.75	.63	16.52	16.35
5 18	138	7.44	.703	2.22	4.78	2.15	16.74	16.83
5 19	139	6.95	.652	2.94	4.37	1.49	17.04	17.27
5 20	140	6.50	.603	4.29	12.70	2.96	17.47	18.54
5 21	141	6.52	.604	5.08	8.89	1.75	17.97	19.42
5 22	142	7.00	.655	3.38	7.34	2.17	18.31	20.16
5 23	143	7.51	.703	3.41	-3.89	-1.14	18.65	19.77
5 24	144	7.99	.746	3.17	-1.63	-.51	18.97	19.61
5 25	145	8.17	.757	4.20	.97	.23	19.39	19.70
5 26	146	7.99	.744	3.76	1.91	.51	19.77	19.89
5 27	147	7.69	.716	4.22	11.15	2.64	20.19	21.01
5 28	148	7.61	.711	3.63	9.53	2.63	20.55	21.96
5 29	149	7.82	.728	4.00	8.59	2.15	20.95	22.82
5 30	150	7.99	.742	4.23	-3.18	-.75	21.37	22.50
5 31	151	8.20	.760	4.23	-3.94	-.93	21.80	22.11

W1-4

DATE	JULIAN DAY	AVAILABLE WATER	COEFFICIENT KS	PREDICTED ET	MEASURED ET	ET RATIO	CUMULATIVE PREDICTED	CUMULATIVE MEASURED
		CM		MM/DY	MM/DY		CM	CM
6 1	152	8.76	.801	5.32	-4.85	-.91	22.33	21.62
6 2	153	9.19	.830	6.27	-3.51	-.56	22.96	21.27
6 3	154	9.64	.860	5.41	11.33	2.09	23.50	22.41
6 4	155	9.80	.874	3.37	11.48	3.41	23.83	23.55
6 5	156	10.13	.890	4.35	13.97	3.21	24.27	24.95
6 6	157	10.53	.912	3.39	-1.50	-.44	24.61	24.80
6 7	158	11.07	.945	1.46	3.66	2.50	24.75	25.17
6 8	159	11.68	.957	3.07	2.11	.69	25.06	25.38
6 9	160	11.93	.962	5.53	5.92	1.07	25.61	25.97
6 10	161	11.80	.958	5.12	3.12	.61	26.13	26.28
6 11	162	11.27	.940	5.18	3.91	.75	26.64	26.67
6 12	163	10.99	.929	5.56	3.71	.67	27.20	27.04
6 13	164	10.64	.914	5.24	4.52	.86	27.72	27.50
6 14	165	10.18	.891	5.51	4.19	.76	28.28	27.92
6 15	166	9.64	.859	6.14	2.74	.45	28.89	28.19
6 16	167	9.37	.847	3.71	1.93	.52	29.26	28.38
6 17	168	9.34	.842	4.74	10.11	2.13	29.73	29.39
6 18	169	9.31	.852	2.01	11.89	5.92	29.94	30.58
6 19	170	9.14	.828	5.27	12.67	2.41	30.46	31.85
6 20	171	8.78	.805	3.94	5.31	1.35	30.86	32.38
6 21	172	8.25	.767	3.23	5.18	1.60	31.18	32.90
6 22	173	7.74	.727	2.63	4.60	1.75	31.44	33.36
6 23	174	7.21	.674	3.68	3.40	.93	31.81	33.70
6 24	175	6.88	.642	3.86	2.87	.74	32.20	33.99
6 25	176	6.72	.627	3.51	4.14	1.18	32.55	34.40
6 26	177	6.37	.587	6.11	7.24	1.18	33.16	35.12
6 27	178	5.63	.513	3.36	8.94	2.66	33.49	36.02
6 28	179	4.54	.393	2.20	8.69	3.96	33.71	36.89
6 29	180	3.68	.294	1.93	6.45	3.35	33.91	37.53
6 30	181	3.02	.222	1.27	4.72	3.70	34.03	38.00
7 1	182	2.61	.179	1.02	3.51	3.44	34.14	38.35
7 2	183	2.25	.142	.76	2.77	3.64	34.21	38.63
7 3	184	1.97	.115	.71	2.29	3.23	34.28	38.86
7 4	185	1.77	.097	.59	2.03	3.44	34.34	39.06
7 5	186	1.57	.081	.23	6.17	26.76	34.36	39.68
7 6	187	1.36	.065	.07	6.60	88.20	34.37	40.34
7 7	188	1.19	.051	.23	6.55	28.51	34.40	41.00
7 8	189	1.03	.040	.16	2.54	15.43	34.41	41.25
7 9	190	.86	.030	.15	2.13	14.52	34.43	41.46
7 10	191	.60	.016	.08	1.93	24.58	34.43	41.66
7 11	192	.40	.008	.03	1.14	43.66	34.44	41.77
7 12	193	.27	.004	.02	.66	39.84	34.44	41.84
7 13	194	.27	.004	.02	.05	3.05	34.44	41.84

.992 CP SECONDS EXECUTION TIME.

T1-3

XT13

DATE	JULIAN DAY	AVAILABLE WATER	COEFFICIENT KS	PREDICTED ET	MEASURED ET	ET RATIO	CUMULATIVE PREDICTED	CUMULATIVE MEASURED
		CM		MM/DY	MM/DY		CM	CM
4 9	00	14.18	.998	4.12	2.03	.49	.41	.20
4 10	100	13.95	.997	2.62	2.21	.84	.67	.42
4 11	101	13.77	.996	3.17	1.40	.44	.99	.56
4 12	102	13.52	.993	4.04	1.70	.42	1.40	.73
4 13	103	13.52	.993	3.26	1.37	.42	1.72	.87
4 14	104	13.24	.990	3.77	2.41	.64	2.10	1.11
4 15	105	13.11	.988	4.73	1.47	.31	2.57	1.26
4 16	106	12.83	.983	4.89	1.42	.29	3.06	1.40
4 17	107	12.83	.983	4.05	8.64	2.14	3.47	2.27
4 18	108	12.70	.980	5.41	6.99	1.29	4.01	2.96
4 19	109	13.24	.990	3.06	4.39	1.43	4.31	3.40
4 20	110	13.75	.995	6.10	-3.86	-.63	4.92	3.02
4 21	111	14.38	.999	6.00	-1.12	-.19	5.52	2.91
4 22	112	14.38	.999	3.65	1.98	.54	5.89	3.10
4 23	113	14.08	.997	5.70	3.20	.56	6.46	3.42
4 24	114	13.80	.995	7.57	2.74	.36	7.22	3.70
4 25	115	13.47	.992	3.91	3.33	.85	7.61	4.03
4 26	116	13.37	.991	3.61	3.30	.91	7.97	4.36
4 27	117	12.88	.985	3.68	4.32	1.17	8.34	4.79
4 28	118	12.55	.977	5.05	3.56	.70	8.84	5.15
4 29	119	12.07	.967	4.36	3.71	.85	9.28	5.52
4 30	120	11.82	.958	6.21	3.30	.53	9.90	5.85
5 1	121	11.43	.944	7.68	4.60	.60	10.67	6.31
5 2	122	11.08	.931	6.82	5.46	.80	11.35	6.85
5 3	123	10.44	.905	4.60	5.99	1.30	11.81	7.45
5 4	124	9.31	.871	4.55	5.21	1.15	12.26	7.97
5 5	125	9.28	.847	2.35	6.60	2.31	12.50	8.63
5 6	126	8.89	.815	3.44	6.20	1.80	12.84	9.25
5 7	127	8.49	.782	4.75	6.20	1.30	13.32	9.87
5 8	128	8.08	.751	3.76	4.01	1.07	13.69	10.28
5 9	129	7.68	.717	3.63	4.01	1.11	14.06	10.68
5 10	130	7.29	.681	3.72	3.23	.87	14.43	11.00
5 11	131	6.89	.645	3.04	4.57	1.50	14.73	11.46
5 12	132	6.71	.627	3.27	3.66	1.12	15.06	11.82
5 13	133	6.58	.622	1.86	3.43	1.84	15.24	12.17
5 14	134	6.46	.629	.90	0.00	0.00	15.34	12.17
5 15	135	6.74	.630	3.09	-.76	-.25	15.64	12.09
5 16	136	6.96	.652	3.16	7.14	2.26	15.96	12.80
5 17	137	7.12	.670	2.65	8.97	3.39	16.22	13.70
5 18	138	6.76	.638	2.02	9.86	4.87	16.43	14.69
5 19	139	6.61	.618	2.78	16.15	5.80	16.70	16.30
5 20	140	6.66	.619	4.44	15.62	3.52	17.15	17.86
5 21	141	6.63	.615	5.19	15.42	2.97	17.67	19.41
5 22	142	6.46	.602	3.08	.81	.26	17.98	19.49
5 23	143	6.35	.591	2.88	.03	.01	18.26	19.49
5 24	144	6.41	.599	2.53	.03	.01	18.52	19.49
5 25	145	6.46	.601	3.33	.28	.08	18.85	19.52
5 26	146	6.35	.591	2.99	-.10	-.03	19.15	19.51
5 27	147	6.30	.584	3.43	-3.07	-.89	19.49	19.20
5 28	148	6.51	.607	3.09	-7.06	-2.29	19.80	18.50
5 29	149	7.27	.679	3.75	25.76	6.86	20.18	21.07
5 30	150	8.44	.778	4.44	25.22	5.68	20.62	23.60
5 31	151	9.94	.878	4.89	27.79	5.68	21.11	26.37

T1-3

DATE	JULIAN DAY	AVAILABLE WATER	COEFFICIENT KS	PREDICTED ET	MEASURED ET	ET RATIO	CUMULATIVE PREDICTED	CUMULATIVE MEASURED
		CM		MM/DY	MM/DY		CM	CM
6 1	152	10.90	.924	6.11	-3.07	-.50	21.72	26.07
6 2	153	11.28	.939	7.04	2.11	.30	22.43	26.28
6 3	154	10.88	.924	5.78	6.12	1.06	23.00	26.89
6 4	155	10.27	.899	3.47	6.07	1.75	23.35	27.50
6 5	156	9.43	.849	4.13	7.62	1.84	23.76	28.26
6 6	157	9.05	.827	3.07	3.30	1.08	24.07	28.59
6 7	158	9.10	.848	1.32	5.74	4.36	24.20	29.16
6 8	159	9.56	.862	2.75	1.68	.61	24.48	29.33
6 9	160	9.81	.871	4.99	3.10	.62	24.98	29.64
6 10	161	9.96	.880	4.72	-1.19	-.25	25.45	29.52
6 11	162	10.01	.882	4.89	10.92	2.23	25.94	30.61
6 12	163	10.16	.890	5.35	11.61	2.17	26.47	31.78
6 13	164	10.19	.892	5.12	13.16	2.57	26.98	33.09
6 14	165	10.04	.883	5.44	2.46	.45	27.53	33.34
6 15	166	9.73	.865	6.20	2.79	.45	28.15	33.62
6 16	167	9.45	.852	3.74	3.45	.92	28.52	33.96
6 17	168	9.20	.833	4.73	3.68	.78	28.99	34.33
6 18	169	8.95	.828	1.94	5.13	2.65	29.19	34.84
6 19	170	8.59	.789	4.99	5.51	1.10	29.69	35.39
6 20	171	8.11	.754	3.67	6.35	1.73	30.05	36.03
6 21	172	7.50	.704	2.96	6.10	2.06	30.35	36.64
6 22	173	6.89	.649	2.36	5.38	2.28	30.59	37.18
6 23	174	6.28	.583	3.18	3.94	1.24	30.90	37.57
6 24	175	5.90	.542	3.25	2.95	.91	31.23	37.87
6 25	176	5.72	.523	2.95	3.89	1.32	31.52	38.25
6 26	177	5.39	.484	5.00	6.71	1.34	32.02	38.93
6 27	178	4.73	.413	2.72	7.75	2.85	32.30	39.70
6 28	179	3.69	.296	1.65	6.27	3.80	32.46	40.33
6 29	180	3.08	.228	1.50	2.29	1.53	32.61	40.56
6 30	181	2.85	.204	1.17	-.05	-.04	32.73	40.55
7 1	182	3.00	.220	1.26	-.74	-.59	32.85	40.48
7 2	183	3.08	.229	1.23	.20	.16	32.98	40.50
7 3	184	3.05	.225	1.38	.84	.61	33.11	40.58
7 4	185	2.95	.214	1.31	1.17	.90	33.24	40.70
7 5	186	2.82	.203	.59	5.16	8.78	33.30	41.21
7 6	187	2.72	.201	.23	5.23	22.54	33.33	41.74
7 7	188	2.67	.185	.84	4.72	5.65	33.41	42.21
7 8	189	2.72	.191	.77	.56	.73	33.49	42.27
7 9	190	2.75	.194	.95	.48	.50	33.58	42.31
7 10	191	2.70	.188	.93	.94	1.01	33.68	42.41
7 11	192	2.57	.176	.59	1.04	1.78	33.73	42.51
7 12	193	2.47	.165	.66	.76	1.15	33.80	42.59
7 13	194	2.37	.155	.62	.64	1.04	33.86	42.65
7 14	195	2.34	.153	.47	.20	.43	33.91	42.67

1.004 CP SECONDS EXECUTION TIME.

T1-5

XT15

DATE	JULIAN DAY	AVAILABLE WATER	COEFFICIENT KS	PREDICTED ET	MEASURED ET	ET RATIO	CUMULATIVE PREDICTED	CUMULATIVE MEASURED
		CM		MM/DY	MM/DY		CM	CM
4 10	100	13.45	.993	2.62	2.41	.92	.26	.24
4 11	101	13.30	.991	3.17	1.83	.58	.58	.42
4 12	102	12.97	.986	3.97	2.34	.59	.98	.66
4 13	103	12.89	.985	3.22	1.85	.57	1.30	.84
4 14	104	12.59	.979	3.72	2.90	.78	1.67	1.13
4 15	105	12.44	.975	4.67	1.60	.34	2.14	1.29
4 16	106	12.06	.966	4.79	.56	.12	2.62	1.35
4 17	107	12.13	.968	3.98	7.16	1.80	3.01	2.07
4 18	108	12.28	.971	5.38	5.49	1.02	3.55	2.61
4 19	109	13.63	.994	3.06	4.65	1.52	3.86	3.08
4 20	110	14.21	.998	6.11	-.89	-.15	4.47	2.99
4 21	111	14.60	.999	6.03	2.74	.45	5.07	3.26
4 22	112	13.88	.996	3.66	5.26	1.44	5.44	3.79
4 23	113	13.40	.991	5.66	4.39	.78	6.00	4.23
4 24	114	13.02	.985	7.48	3.68	.49	6.75	4.60
4 25	115	12.61	.979	3.84	4.17	1.09	7.14	5.01
4 26	116	12.41	.976	3.53	4.01	1.14	7.49	5.41
4 27	117	11.88	.962	3.57	4.67	1.31	7.84	5.88
4 28	118	11.47	.948	4.90	4.45	.91	8.33	6.33
4 29	119	10.99	.930	4.20	5.00	1.19	8.75	6.83
4 30	120	10.56	.909	5.94	5.51	.93	9.35	7.38
5 1	121	9.97	.878	7.14	6.58	.92	10.06	8.04
5 2	122	9.34	.840	6.11	7.16	1.17	10.67	8.75
5 3	123	8.58	.790	4.00	6.96	1.74	11.07	9.45
5 4	124	7.84	.731	3.82	5.74	1.50	11.46	10.02
5 5	125	7.26	.689	1.90	6.81	3.58	11.65	10.70
5 6	126	6.85	.643	2.69	6.22	2.31	11.91	11.33
5 7	127	6.44	.598	3.60	6.22	1.73	12.27	11.95
5 8	128	6.06	.561	2.80	4.04	1.44	12.55	12.35
5 9	129	5.66	.518	2.61	4.04	1.55	12.82	12.76
5 10	130	5.25	.472	2.58	3.35	1.30	13.07	13.09
5 11	131	4.84	.428	2.00	4.85	2.42	13.27	13.58
5 12	132	4.64	.404	2.09	4.09	1.95	13.48	13.98
5 13	133	4.46	.389	1.17	4.19	3.59	13.60	14.40
5 14	134	4.28	.382	.55	-1.04	-1.89	13.66	14.30
5 15	135	4.44	.382	1.88	-5.72	-3.04	13.84	13.73
5 16	136	5.15	.462	2.23	2.62	1.18	14.07	13.09
5 17	137	6.42	.601	2.37	.25	.11	14.30	14.01
5 18	138	7.56	.713	2.27	4.62	2.04	14.53	14.48
5 19	139	8.50	.786	3.51	9.53	2.72	14.88	15.43
5 20	140	9.29	.837	6.00	12.90	2.15	15.48	16.72
5 21	141	9.52	.851	7.16	16.18	2.26	16.20	18.34
5 22	142	9.26	.838	4.32	2.16	.50	16.63	18.55
5 23	143	8.86	.811	3.96	1.24	.31	17.02	18.68
5 24	144	8.86	.813	3.46	.71	.21	17.37	18.75
5 25	145	8.88	.811	4.53	1.50	.33	17.82	18.90
5 26	146	8.65	.795	4.00	1.60	.40	18.22	19.06
5 27	147	8.40	.775	4.56	-1.98	-.43	18.68	18.86
5 28	148	8.42	.778	3.98	-7.52	-1.89	19.08	18.11
5 29	149	9.26	.837	4.63	14.68	3.17	19.54	19.58
5 30	150	10.66	.915	5.22	14.20	2.72	20.06	21.00
5 31	151	12.64	.979	5.47	18.92	3.46	20.61	22.89

T1-5

DATE	JULIAN DAY	AVAILABLE WATER	COEFFICIENT KS	PREDICTED ET	MEASURED ET	ET RATIO	CUMULATIVE PREDICTED	CUMULATIVE MEASURED
		CM		MM/DY	MM/DY		CM	CM
6 1	152	13.63	.994	6.55	.08	.01	21.26	22.90
6 2	153	13.63	.993	7.46	6.68	.90	22.01	23.56
6 3	154	12.61	.978	6.13	9.96	1.62	22.62	24.56
6 4	155	11.62	.954	3.71	8.26	2.23	22.99	25.39
6 5	156	10.63	.914	4.47	8.64	1.93	23.44	26.25
6 6	157	10.15	.893	3.33	3.63	1.09	23.77	26.61
6 7	158	10.15	.907	1.42	5.61	3.96	23.92	27.17
6 8	159	10.66	.919	2.95	.86	.29	24.21	27.26
6 9	160	10.94	.927	5.33	1.45	.27	24.74	27.40
6 10	161	11.27	.940	5.02	-4.11	-.82	25.25	26.99
6 11	162	11.60	.952	5.28	14.00	2.65	25.78	28.39
6 12	163	12.18	.968	5.81	15.60	2.69	26.36	29.95
6 13	164	12.41	.974	5.55	19.38	3.49	26.91	31.89
6 14	165	12.26	.970	6.00	4.24	.71	27.51	32.32
6 15	166	11.73	.955	6.84	5.77	.84	28.19	32.89
6 16	167	11.14	.937	4.13	6.68	1.62	28.61	33.56
6 17	168	10.53	.909	5.15	6.68	1.30	29.12	34.23
6 18	169	9.97	.890	2.09	7.44	3.55	29.33	34.97
6 19	170	9.39	.844	5.34	6.91	1.29	29.86	35.66
6 20	171	8.75	.803	3.93	7.16	1.82	30.26	36.38
6 21	172	8.09	.754	3.20	6.60	2.06	30.58	37.04
6 22	173	7.43	.699	2.53	6.05	2.39	30.83	37.64
6 23	174	6.77	.632	3.43	4.90	1.43	31.18	38.13
6 24	175	6.29	.583	3.51	2.77	.79	31.53	38.41
6 25	176	5.96	.549	3.09	.74	.24	31.84	38.49
6 26	177	5.93	.542	5.61	-1.19	-.21	32.40	38.37
6 27	178	6.06	.558	3.69	-.03	-.01	32.76	38.36
6 28	179	6.32	.587	3.28	3.63	1.11	33.09	38.73
6 29	180	5.96	.548	3.59	9.83	2.74	33.45	39.71
6 30	181	4.97	.441	2.55	12.42	4.88	33.71	40.95
7 1	182	3.37	.260	1.50	11.46	7.66	33.86	42.10
7 2	183	2.23	.140	.75	6.93	9.26	33.93	42.79
7 3	184	1.54	.078	.48	3.91	8.15	33.98	43.18
7 4	185	1.29	.058	.35	2.39	6.79	34.01	43.42
7 5	186	1.06	.042	.12	6.15	50.86	34.03	44.04
7 6	187	.30	.026	.03	5.82	193.61	34.03	44.62
7 7	188	.70	.021	.10	4.90	51.40	34.04	45.11
7 8	189	.75	.024	.09	.69	7.32	34.05	45.18
7 9	190	.80	.026	.13	.81	6.27	34.06	45.26
7 10	191	.70	.021	.10	1.32	12.70	34.07	45.39
7 11	192	.52	.013	.04	1.14	27.21	34.08	45.50
7 12	193	.40	.008	.03	.64	19.98	34.08	45.57
7 13	194	.35	.006	.03	.38	15.10	34.08	45.61
7 14	195	.32	.005	.02	.13	7.97	34.08	45.62

.999 CP SECONDS EXECUTION TIME.

T2A-3

XT2A3

DATE	JULIAN DAY	AVAILABLE WATER	COEFFICIENT KS	PREDICTED ET	MEASURED ET	ET RATIO	CUMULATIVE PREDICTED	CUMULATIVE MEASURED
		CM		MM/DY	MM/DY		CM	CM
4 9	99	13.70	.995	4.08	-1.40	-.34	.41	-.14
4 10	100	13.95	.997	2.62	.18	.07	.67	-.12
4 11	101	13.98	.997	3.18	2.87	.90	.90	.17
4 12	102	13.65	.994	4.01	4.67	1.17	1.39	.63
4 13	103	13.09	.988	3.21	4.17	1.30	1.71	1.05
4 14	104	12.58	.979	3.72	3.28	.88	2.08	1.38
4 15	105	12.43	.975	4.67	2.77	.59	2.55	1.65
4 16	106	12.15	.968	4.81	4.67	.97	3.03	2.12
4 17	107	11.77	.958	3.95	4.80	1.22	3.43	2.60
4 18	108	11.00	.930	5.13	3.84	.75	3.94	2.99
4 19	109	10.70	.921	2.86	.41	.14	4.22	3.03
4 20	110	10.62	.912	5.62	0.00	0.00	4.79	3.03
4 21	111	10.90	.925	5.57	.43	.08	5.34	3.07
4 22	112	10.70	.920	3.39	2.44	.72	5.68	3.31
4 23	113	10.50	.907	5.17	2.87	.56	6.20	3.60
4 24	114	10.17	.889	6.80	3.43	.50	6.88	3.94
4 25	115	9.89	.879	3.44	3.68	1.07	7.22	4.31
4 26	116	9.58	.862	3.13	2.01	.64	7.54	4.51
4 27	117	9.17	.835	3.12	2.01	.64	7.85	4.71
4 28	118	9.35	.844	4.34	1.98	.46	8.28	4.91
4 29	119	8.97	.820	3.69	5.82	1.58	8.65	5.49
4 30	120	8.57	.787	5.12	6.30	1.23	9.16	6.12
5 1	121	7.60	.706	5.76	7.09	1.23	9.74	6.83
5 2	122	7.07	.658	4.79	5.74	1.20	10.22	7.41
5 3	123	6.46	.602	3.05	5.33	1.75	10.52	7.94
5 4	124	5.87	.540	2.82	4.06	1.44	10.80	8.34
5 5	125	5.47	.505	1.40	5.21	3.72	10.94	8.87
5 6	126	5.24	.474	1.99	4.67	2.34	11.14	9.33
5 7	127	4.98	.442	2.68	4.67	1.74	11.41	9.80
5 8	128	4.73	.415	2.06	2.46	1.19	11.62	10.05
5 9	129	4.48	.387	1.95	2.49	1.28	11.81	10.30
5 10	130	4.25	.360	1.95	2.31	1.18	12.01	10.53
5 11	131	3.99	.331	1.55	4.42	2.85	12.16	10.97
5 12	132	3.79	.308	1.61	3.56	2.21	12.32	11.32
5 13	133	3.56	.286	.86	3.56	4.13	12.41	11.68
5 14	134	3.59	.299	.43	-1.73	-3.99	12.45	11.51
5 15	135	3.76	.305	1.51	-4.78	-3.16	12.61	11.03
5 16	136	4.48	.387	1.87	5.87	3.15	12.79	11.62
5 17	137	5.44	.497	1.97	6.07	3.08	12.99	12.22
5 18	138	6.48	.610	1.94	7.82	4.04	13.18	13.01
5 19	139	7.30	.685	3.08	9.91	3.22	13.49	14.00
5 20	140	7.90	.733	5.23	11.89	2.27	14.01	15.19
5 21	141	8.21	.757	6.36	13.41	2.11	14.65	16.53
5 22	142	8.26	.765	3.93	-.43	-.11	15.04	16.48
5 23	143	8.18	.760	3.68	-.61	-.17	15.41	16.42
5 24	144	8.34	.774	3.28	-.43	-.13	15.74	16.38
5 25	145	8.44	.779	4.35	1.17	.27	16.17	16.50
5 26	146	8.34	.772	3.89	2.72	.70	16.56	16.77
5 27	147	7.98	.741	4.36	3.63	.83	17.00	17.13
5 28	148	7.63	.713	3.65	3.78	1.04	17.36	17.51
5 29	149	7.24	.677	3.74	3.86	1.03	17.74	17.90
5 30	150	6.84	.638	3.62	4.11	1.13	18.10	18.31
5 31	151	6.46	.601	3.34	4.60	1.38	18.43	18.77

T2A-3

DATE	JULIAN DAY	AVAILABLE WATER	COEFFICIENT KS	PREDICTED ET	MEASURED ET	ET RATIO	CUMULATIVE PREDICTED	CUMULATIVE MEASURED
		CM		MM/DY	MM/DY		CM	CM
6 1	152	6.00	.552	3.66	5.28	1.44	18.80	19.29
6 2	153	5.47	.494	3.73	4.14	1.11	19.17	19.71
6 3	154	4.88	.430	2.69	1.14	.42	19.44	19.82
6 4	155	4.76	.421	1.64	-5.03	-3.07	19.61	19.32
6 5	156	5.14	.461	2.25	27.97	12.45	19.83	22.12
6 6	157	6.38	.598	2.23	22.10	9.92	20.05	24.33
6 7	158	8.08	.775	1.21	26.09	21.62	20.17	26.93
6 8	159	10.19	.897	2.88	-9.17	-3.19	20.46	26.02
6 9	160	11.64	.953	5.50	-1.04	-.19	21.01	25.91
6 10	161	12.20	.969	5.21	.10	.02	21.53	25.92
6 11	162	11.89	.961	5.31	2.95	.56	22.06	26.22
6 12	163	11.61	.952	5.71	2.87	.50	22.64	26.51
6 13	164	11.31	.941	5.36	3.53	.66	23.17	26.86
6 14	165	11.03	.930	5.73	4.04	.70	23.74	27.26
6 15	166	10.55	.908	6.49	4.32	.67	24.39	27.69
6 16	167	10.11	.890	3.92	4.80	1.22	24.78	28.17
6 17	168	9.73	.866	4.93	4.65	.94	25.28	28.64
6 18	169	9.35	.854	1.99	5.49	2.75	25.48	29.19
6 19	170	8.97	.816	5.16	4.95	.96	25.99	29.68
6 20	171	8.54	.788	3.83	5.18	1.35	26.38	30.20
6 21	172	8.08	.753	3.20	4.62	1.45	26.70	30.66
6 22	173	7.60	.714	2.61	4.29	1.65	26.96	31.09
6 23	174	7.14	.668	3.63	3.63	1.00	27.32	31.46
6 24	175	6.79	.633	3.79	3.25	.86	27.70	31.78
6 25	176	6.53	.608	3.42	3.84	1.12	28.04	32.16
6 26	177	6.18	.568	5.87	5.36	.91	28.63	32.70
6 27	178	5.64	.514	3.37	6.10	1.81	28.96	33.31
6 28	179	4.91	.434	2.42	5.77	2.39	29.21	33.89
6 29	180	4.35	.370	2.43	4.32	1.78	29.45	34.32
6 30	181	3.92	.322	1.86	3.20	1.72	29.64	34.64
7 1	182	3.61	.287	1.66	2.39	1.44	29.80	34.88
7 2	183	3.38	.262	1.41	1.91	1.36	29.94	35.07
7 3	184	3.18	.239	1.46	1.57	1.07	30.09	35.23
7 4	185	3.05	.225	1.37	1.42	1.04	30.23	35.37
7 5	186	2.90	.212	.61	5.36	8.78	30.29	35.90
7 6	187	2.77	.206	.24	5.36	22.18	30.31	36.44
7 7	188	2.72	.191	.85	4.80	5.63	30.40	36.92
7 8	189	2.75	.194	.79	.64	.81	30.48	36.98
7 9	190	2.77	.196	.97	.33	.34	30.57	37.02
7 10	191	2.70	.188	.93	.18	.19	30.66	37.04
7 11	192	2.65	.185	.61	-.76	-1.25	30.73	36.96
7 12	193	2.72	.191	.77	-1.27	-1.65	30.80	36.83
7 13	194	2.93	.214	.86	-1.52	-1.77	30.89	36.68
7 14	195	3.03	.226	.70	-.51	-.73	30.96	36.63

.996 CP SECONDS EXECUTION TIME.

T2A-5

XT2A5

DATE	JULIAN DAY	AVAILABLE WATER	COEFFICIENT KS	PREDICTED ET	MEASURED ET	ET RATIO	CUMULATIVE PREDICTED	CUMULATIVE MEASURED
		CM		MM/DY	MM/DY		CM	CM
4 9	99	15.10	1.000	4.10	2.24	.55	.41	.22
4 10	100	14.87	1.000	2.65	2.67	1.01	.67	.49
4 11	101	14.64	1.000	3.19	2.03	.64	.99	.69
4 12	102	14.29	.998	4.02	2.44	.61	1.40	.94
4 13	103	14.26	.998	3.24	1.45	.45	1.72	1.08
4 14	104	13.90	.996	3.80	2.34	.62	2.10	1.32
4 15	105	13.88	.996	4.79	1.07	.22	2.58	1.42
4 16	106	13.57	.993	4.91	4.32	.88	3.07	1.86
4 17	107	13.63	.994	4.06	4.01	.99	3.47	2.26
4 18	108	12.58	.978	5.38	5.56	1.03	4.01	2.81
4 19	109	12.38	.976	3.00	.53	.18	4.31	2.87
4 20	110	11.95	.962	5.90	.97	.16	4.90	2.96
4 21	111	12.43	.974	5,86	.28	.05	5.49	2.99
4 22	112	12.08	.968	3.56	3.25	.91	5.84	3.32
4 23	113	11.87	.960	5.46	3.35	.61	6.39	3.65
4 24	114	11.47	.946	7.21	4.24	.59	7.11	4.08
4 25	115	11.11	.936	3.67	4.32	1.18	7.48	4.51
4 26	116	10.70	.920	3.36	4.42	1.32	7.81	4.95
4 27	117	10.27	.899	3.33	4.39	1.32	8.15	5.39
4 28	118	9.87	.875	4.51	4.72	1.05	8.60	5.86
4 29	119	9.38	.847	3.81	5.23	1.37	8.98	6.38
4 30	120	8.85	.808	5.29	5.56	1.05	9.51	6.94
5 1	121	8.29	.764	6.22	5.77	.93	10.13	7.52
5 2	122	7.71	.716	5.27	5.79	1.10	10.66	8.09
5 3	123	7.12	.666	3.38	5.33	1.58	10.99	8.63
5 4	124	6.56	.612	3.21	4.45	1.39	11.31	9.07
5 5	125	6.11	.575	1.58	5.84	3.71	11.47	9.66
5 6	126	5.80	.535	2.26	5.44	2.41	11.70	10.20
5 7	127	5.47	.496	3.01	5.44	1.81	12.00	10.75
5 8	128	5.14	.461	2.29	3.25	1.42	12.23	11.07
5 9	129	4.81	.424	2.15	3.25	1.51	12.44	11.40
5 10	130	4.51	.389	2.12	2.06	.97	12.65	11.60
5 11	131	4.18	.353	1.65	3.40	2.06	12.82	11.94
5 12	132	4.20	.354	1.83	1.35	.74	13.00	12.08
5 13	133	4.13	.351	1.06	1.73	1.63	13.11	12.25
5 14	134	4.43	.400	.57	-2.57	-4.49	13.17	11.99
5 15	135	4.74	.416	2.05	-2.69	-1.31	13.37	11.72
5 16	136	5.29	.478	2.32	10.03	4.32	13.60	12.73
5 17	137	5.68	.523	2.07	10.90	5.26	13.81	13.82
5 18	138	6.01	.562	1.79	10.62	5.93	13.99	14.88
5 19	139	6.49	.606	2.71	10.54	3.88	14.26	15.93
5 20	140	7.10	.661	4.71	11.33	2.41	14.73	17.07
5 21	141	7.50	.697	5.86	12.78	2.18	15.32	18.34
5 22	142	7.58	.708	3.64	-.53	-.15	15.68	18.29
5 23	143	7.55	.706	3.43	-.84	-.24	16.02	18.21
5 24	144	7.68	.719	3.06	-.69	-.23	16.33	18.14
5 25	145	7.83	.729	4.04	.74	.18	16.74	18.21
5 26	146	7.76	.724	3.63	2.39	.66	17.10	18.45
5 27	147	7.45	.695	4.07	3.43	.84	17.51	18.79
5 28	148	7.10	.665	3.38	3.66	1.08	17.84	19.16
5 29	149	6.72	.627	3.44	3.76	1.09	18.19	19.53
5 30	150	6.36	.591	3.37	3.86	1.15	18.52	19.92
5 31	151	5.98	.551	3.08	4.06	1.32	18.83	20.33

T2A-5

DATE	JULIAN DAY	AVAILABLE WATER	COEFFICIENT KS	PREDICTED ET	MEASURED ET	ET RATIO	CUMULATIVE PREDICTED	CUMULATIVE MEASURED
		CM		MM/DY	MM/DY		CM	CM
6 1	152	5.57	.506	3.33	4.80	1.44	19.16	20.81
6 2	153	5.14	.458	3.45	5.82	1.69	19.51	21.39
6 3	154	4.53	.391	2.45	7.11	2.90	19.75	22.10
6 4	155	3.82	.313	1.21	2.90	2.40	19.88	22.39
6 5	156	3.01	.221	1.08	26.92	24.99	19.98	25.08
6 6	157	3.67	.297	1.10	11.91	10.85	20.09	26.27
6 7	158	5.85	.562	.86	10.95	12.68	20.18	27.37
6 8	159	9.51	.859	2.74	-18.52	-6.76	20.45	25.52
6 9	160	11.85	.959	5.50	-4.60	-.84	21.00	25.06
6 10	161	12.79	.982	5.29	-.43	-.08	21.53	25.01
6 11	162	12.28	.971	5.40	3.63	.67	22.07	25.38
6 12	163	12.00	.964	5.76	3.05	.53	22.65	25.68
6 13	164	11.70	.955	5.48	3.89	.71	23.20	26.07
6 14	165	11.36	.943	5.79	4.19	.72	23.78	26.49
6 15	166	10.83	.921	6.55	4.17	.64	24.43	26.91
6 16	167	10.43	.906	3.98	4.57	1.15	24.83	27.36
6 17	168	10.09	.886	5.03	4.85	.96	25.33	27.85
6 18	169	9.71	.876	2.06	6.07	2.94	25.54	28.45
6 19	170	9.23	.834	5.31	5.56	1.05	26.07	29.01
6 20	171	8.72	.801	3.92	5.61	1.43	26.46	29.57
6 21	172	8.24	.766	3.23	4.98	1.54	26.78	30.07
6 22	173	7.73	.726	2.63	4.42	1.68	27.05	30.51
6 23	174	7.25	.678	3.70	3.33	.90	27.42	30.84
6 24	175	6.92	.646	3.89	2.69	.69	27.81	31.11
6 25	176	6.74	.629	3.52	3.66	1.04	28.16	31.48
6 26	177	6.44	.594	6.13	6.20	1.01	28.77	32.10
6 27	178	5.80	.531	3.51	7.65	2.18	29.12	32.86
6 28	179	4.89	.432	2.40	7.39	3.07	29.36	33.60
6 29	180	4.15	.347	2.29	5.49	2.40	29.59	34.15
6 30	181	3.59	.285	1.65	4.06	2.46	29.76	34.56
7 1	182	3.24	.246	1.42	3.18	2.24	29.90	34.88
7 2	183	2.91	.210	1.13	2.82	2.50	30.01	35.16
7 3	184	2.63	.180	1.11	2.57	2.32	30.12	35.42
7 4	185	2.40	.157	.95	2.44	2.56	30.22	35.66
7 5	186	2.14	.133	.38	6.12	16.06	30.26	36.27
7 6	187	1.92	.115	.13	5.61	42.11	30.27	36.83
7 7	188	1.84	.104	.46	4.42	9.52	30.32	37.27
7 8	189	1.92	.111	.45	0.00	0.00	30.36	37.27
7 9	190	2.04	.122	.60	.36	.60	30.42	37.31
7 10	191	2.02	.120	.59	1.50	2.56	30.48	37.46
7 11	192	1.81	.102	.34	2.31	6.83	30.51	37.69
7 12	193	1.59	.082	.33	2.08	6.29	30.55	37.90
7 13	194	1.31	.060	.24	1.98	8.25	30.57	38.10
7 14	195	1.18	.050	.16	.66	4.24	30.59	38.16

.997 CP SECONDS EXECUTION TIME.

T3A-3

XT3A3

DATE	JULIAN DAY	AVAILABLE WATER	COEFFICIENT KS	PREDICTED ET	MEASURED ET	ET RATIO	CUMULATIVE PREDICTED	CUMULATIVE MEASURED
		CM		MM/DY	MM/DY		CM	CM
4 9	99	13.12	.988	4.05	2.03	.50	.41	.20
4 10	100	12.92	.986	2.61	2.11	.81	.67	.41
4 11	101	12.71	.982	3.14	1.57	.50	.98	.57
4 12	102	12.49	.977	3.95	1.73	.44	1.38	.74
4 13	103	12.46	.977	3.18	1.73	.54	1.69	.92
4 14	104	12.18	.970	3.71	2.62	.71	2.06	1.18
4 15	105	11.98	.964	4.63	3.33	.72	2.53	1.51
4 16	106	11.70	.955	4.76	5.41	1.14	3.00	2.05
4 17	107	11.22	.940	3.87	5.69	1.47	3.39	2.62
4 18	108	10.35	.900	4.94	4.37	.88	3.88	3.06
4 19	109	9.97	.886	2.74	.71	.26	4.16	3.13
4 20	110	9.90	.875	5.37	1.04	.19	4.69	3.23
4 21	111	10.15	.889	5.38	2.06	.38	5.23	3.44
4 22	112	9.67	.867	3.19	4.22	1.32	5.55	3.86
4 23	113	9.29	.839	4.81	.15	.03	6.03	3.88
4 24	114	8.88	.809	6.19	-6.60	-1.07	6.65	3.22
4 25	115	9.67	.866	3.41	-6.86	-2.01	6.99	2.53
4 26	116	11.37	.946	3.42	.81	.24	7.33	2.61
4 27	117	11.04	.934	3.47	14.68	4.23	7.68	4.08
4 28	118	9.49	.852	4.40	16.00	3.63	8.12	5.68
4 29	119	6.97	.653	2.97	12.42	4.18	8.42	6.92
4 30	120	6.24	.577	3.76	5.94	1.58	8.79	7.52
5 1	121	5.76	.525	4.29	5.36	1.25	9.22	8.05
5 2	122	5.17	.461	3.37	5.36	1.59	9.56	8.59
5 3	123	4.64	.405	2.05	4.60	2.24	9.77	9.05
5 4	124	4.15	.349	1.84	3.53	1.92	9.95	9.40
5 5	125	3.80	.314	.86	4.88	5.65	10.04	9.89
5 6	126	3.57	.284	1.20	4.45	3.72	10.15	10.33
5 7	127	3.34	.257	1.55	4.45	2.87	10.31	10.78
5 8	128	3.14	.236	1.16	2.26	1.94	10.43	11.01
5 9	129	2.91	.211	1.06	2.26	2.13	10.53	11.23
5 10	130	2.68	.186	1.02	1.63	1.60	10.63	11.39
5 11	131	2.45	.163	.76	3.56	4.68	10.71	11.75
5 12	132	2.40	.157	.82	2.31	2.83	10.79	11.98
5 13	133	2.28	.147	.44	2.57	5.84	10.84	12.24
5 14	134	2.43	.166	.24	-.10	-.42	10.86	12.23
5 15	135	2.68	.186	.92	.86	.93	10.95	12.31
5 16	136	2.68	.186	.90	2.06	2.28	11.04	12.52
5 17	137	2.58	.176	.69	3.25	4.68	11.11	12.85
5 18	138	2.12	.131	.41	4.65	11.28	11.15	13.31
5 19	139	1.95	.114	.51	4.06	7.96	11.20	13.72
5 20	140	1.59	.082	.58	3.25	5.57	11.26	14.04
5 21	141	1.28	.058	.48	1.35	2.81	11.31	14.18
5 22	142	1.18	.050	.26	-.30	-1.15	11.34	14.15
5 23	143	1.18	.050	.25	-1.19	-4.34	11.36	14.03
5 24	144	1.39	.066	.28	-1.19	-4.25	11.39	13.91
5 25	145	1.54	.078	.43	-.79	-1.82	11.43	13.83
5 26	146	1.54	.078	.39	-1.30	-3.29	11.47	13.70
5 27	147	1.61	.084	.49	-7.87	-15.96	11.52	12.91
5 28	148	1.92	.111	.56	-19.08	-33.99	11.58	11.00
5 29	149	3.90	.320	1.77	32.74	18.53	11.75	14.28
5 30	150	7.36	.687	3.93	28.40	7.23	12.15	17.12
5 31	151	12.26	.971	5.44	34.44	6.34	12.69	20.56

T3A-3

DATE	JULIAN DAY	AVAILABLE WATER	COEFFICIENT KS	PREDICTED ET	MEASURED ET	ET RATIO	CUMULATIVE PREDICTED	CUMULATIVE MEASURED
		CM		MM/DY	MM/DY		CM	CM
6 1	152	15.53	1.000	6.62	-15.93	-2.41	13.35	18.97
6 2	153	17.19	1.000	7.54	-4.06	-.54	14.11	18.56
6 3	154	17.03	1.000	6.27	2.82	.45	14.73	18.84
6 4	155	16.75	1.000	3.88	3.20	.82	15.12	19.16
6 5	156	16.35	1.000	4.88	6.25	1.28	15.61	19.79
6 6	157	16.09	1.000	3.71	4.52	1.22	15.98	20.24
6 7	158	16.02	1.000	1.55	8.13	5.25	16.14	21.05
6 8	159	16.09	1.000	3.19	4.52	1.42	16.45	21.51
6 9	160	16.14	1.000	5.76	5.69	.99	17.03	22.08
6 10	161	16.02	1.000	5.37	1.93	.36	17.57	22.27
6 11	162	15.76	1.000	5.54	2.31	.42	18.12	22.50
6 12	163	15.56	1.000	5.99	2.29	.38	18.72	22.73
6 13	164	15.33	1.000	5.72	2.97	.52	19.29	23.03
6 14	165	15.08	1.000	6.15	3.48	.57	19.91	23.37
6 15	166	14.67	1.000	7.14	3.78	.53	20.62	23.75
6 16	167	14.29	.998	4.38	4.39	1.00	21.06	24.19
6 17	168	13.93	.996	5.64	4.34	.77	21.62	24.62
6 18	169	13.60	.995	2.32	5.18	2.23	21.86	25.14
6 19	170	13.25	.989	6.28	4.65	.74	22.48	25.61
6 20	171	12.84	.983	4.82	4.88	1.01	22.97	26.10
6 21	172	12.41	.975	4.09	4.32	1.06	23.38	26.53
6 22	173	11.98	.965	3.50	3.76	1.07	23.73	26.90
6 23	174	11.55	.950	5.19	2.67	.51	24.24	27.17
6 24	175	11.29	.940	5.62	1.85	.33	24.81	27.36
6 25	176	11.19	.937	5.30	2.41	.45	25.34	27.60
6 26	177	10.99	.926	9.59	4.37	.46	25.30	28.03
6 27	178	10.56	.909	5.99	5.66	.95	25.90	28.60
6 28	179	9.87	.874	4.86	5.77	1.19	27.38	29.18
6 29	180	9.29	.838	5.52	4.65	.84	27.93	29.64
6 30	181	8.83	.807	4.68	3.76	.80	28.40	30.02
7 1	182	8.47	.781	4.50	3.07	.68	28.85	30.32
7 2	183	8.17	.758	4.05	2.62	.65	29.26	30.59
7 3	184	7.91	.735	4.50	2.29	.51	29.71	30.82
7 4	185	7.69	.716	4.36	2.13	.49	30.14	31.03
7 5	186	7.48	.708	2.03	6.07	2.99	30.35	31.64
7 6	187	7.25	.714	.83	6.05	7.26	30.43	32.24
7 7	188	7.15	.671	3.00	5.44	1.81	30.73	32.78
7 8	189	7.13	.670	2.70	1.19	.44	31.00	32.90
7 9	190	7.08	.663	3.25	.99	.30	31.33	33.00
7 10	191	6.97	.653	3.21	1.12	.35	31.65	33.11
7 11	192	6.82	.644	2.12	1.07	.51	31.86	33.22
7 12	193	6.75	.634	2.55	.36	.14	32.11	33.26
7 13	194	6.75	.634	2.52	0.00	0.00	32.37	33.26
7 14	195	6.75	.638	1.95	0.00	0.00	32.56	33.26

.997 CP SECONDS EXECUTION TIME.

T3A-4

XT3A4

DATE	JULIAN DAY	AVAILABLE WATER	COEFFICIENT KS	PREDICTED ET	MEASURED ET	ET RATIO	CUMULATIVE PREDICTED	CUMULATIVE MEASURED
		CM		MM/DY	MM/DY		CM	CM
4 9	99	16.44	1.000	4.11	1.75	.43	.41	.18
4 10	100	16.21	1.000	2.63	1.98	.75	.67	.37
4 11	101	16.09	1.000	3.19	.71	.22	.99	.44
4 12	102	15.83	1.000	4.05	1.32	.33	1.40	.58
4 13	103	15.98	1.000	3.26	.91	.28	1.72	.67
4 14	104	15.68	1.000	3.81	2.69	.71	2.11	.94
4 15	105	15.58	1.000	4.81	2.90	.60	2.59	1.23
4 16	106	15.22	1.000	4.96	6.30	1.27	3.08	1.86
4 17	107	14.84	1.000	4.12	5.74	1.39	3.49	2.43
4 18	108	13.70	.994	5.46	4.04	.74	4.04	2.83
4 19	109	13.49	.993	3.08	-1.96	-.64	4.35	2.64
4 20	110	13.62	.993	6.08	-1.38	-.31	4.96	2.45
4 21	111	14.28	.998	6.00	-.10	-.02	5.56	2.44
4 22	112	14.05	.997	3.67	3.43	.93	5.92	2.78
4 23	113	13.67	.994	5.65	8.69	1.54	6.49	3.65
4 24	114	13.27	.989	7.54	17.45	2.32	7.24	5.40
4 25	115	11.49	.950	3.72	17.98	4.33	7.61	7.20
4 26	116	8.54	.791	2.86	8.41	2.94	7.90	8.04
4 27	117	7.98	.747	2.79	-9.86	-3.54	8.18	7.05
4 28	118	9.05	.824	4.25	-11.02	-2.59	8.60	5.95
4 29	119	11.49	.949	4.29	-5.77	-1.34	9.03	5.37
4 30	120	11.29	.940	6.10	4.37	.72	9.64	5.81
5 1	121	10.78	.918	7.45	5.69	.76	10.39	6.38
5 2	122	10.19	.890	6.53	5.99	.92	11.04	6.98
5 3	123	9.58	.858	4.37	5.64	1.29	11.48	7.54
5 4	124	8.97	.818	4.27	4.88	1.14	11.90	8.03
5 5	125	9.49	.792	2.19	6.38	2.91	12.12	8.67
5 6	126	8.11	.756	3.15	6.02	1.91	12.44	9.27
5 7	127	7.73	.720	4.38	6.02	1.38	12.88	9.87
5 8	128	7.35	.688	3.44	3.81	1.11	13.22	10.25
5 9	129	6.97	.652	3.30	3.81	1.15	13.55	10.63
5 10	130	6.59	.614	3.35	2.64	.79	13.89	10.90
5 11	131	6.21	.577	2.71	4.57	1.68	14.16	11.35
5 12	132	6.18	.573	2.96	2.95	1.00	14.45	11.65
5 13	133	5.87	.548	1.64	3.53	2.16	14.62	12.00
5 14	134	5.98	.578	.83	.30	.36	14.70	12.03
5 15	135	6.15	.570	2.80	1.42	.51	14.98	12.17
5 16	136	6.15	.571	2.75	2.95	1.07	15.26	12.47
5 17	137	6.00	.557	2.21	4.67	2.11	15.48	12.94
5 18	138	5.32	.487	1.54	6.76	4.39	15.63	13.61
5 19	139	4.99	.445	2.00	6.43	3.21	15.83	14.25
5 20	140	4.35	.370	2.65	6.05	2.28	16.10	14.86
5 21	141	3.79	.306	2.59	4.09	1.58	16.36	15.27
5 22	142	3.39	.263	1.35	2.59	1.91	16.49	15.53
5 23	143	3.13	.235	1.13	1.30	1.15	16.60	15.66
5 24	144	3.03	.224	.95	.30	.32	16.70	15.69
5 25	145	3.00	.220	1.22	-1.12	-.92	16.82	15.58
5 26	146	3.06	.227	1.14	-2.90	-2.53	16.93	15.29
5 27	147	3.36	.259	1.52	-9.27	-6.10	17.09	14.36
5 28	148	3.87	.317	1.62	-18.90	-11.69	17.25	12.47
5 29	149	5.82	.534	2.93	28.65	9.79	17.54	15.33
5 30	150	9.02	.821	4.65	25.58	5.50	18.01	17.89
5 31	151	13.47	.992	5.55	31.85	5.74	18.56	21.08

T3A-4

DATE	JULIAN DAY	AVAILABLE WATER	COEFFICIENT KS	PREDICTED ET	MEASURED ET	ET RATIO	CUMULATIVE PREDICTED	CUMULATIVE MEASURED
		CM		MM/DY	MM/DY		CM	CM
6 1	152	16.34	1.000	6.62	-12.12	-1.83	19.22	19.86
6 2	153	17.66	1.000	7.54	.36	.05	19.98	19.90
6 3	154	17.10	1.000	6.27	8.64	1.38	20.60	20.76
6 4	155	16.24	1.000	3.88	8.56	2.21	20.99	21.62
6 5	156	15.07	1.000	4.87	9.09	1.87	21.48	22.53
6 6	157	14.54	.999	3.70	2.77	.75	21.85	22.81
6 7	158	14.64	1.000	1.56	4.55	2.93	22.01	23.26
6 8	159	15.35	1.000	3.19	1.42	.45	22.32	23.40
6 9	160	15.65	1.000	5.76	5.41	.94	22.90	23.94
6 10	161	15.58	1.000	5.37	2.06	.38	23.44	24.15
6 11	162	15.12	1.000	5.53	2.31	.42	23.99	24.38
6 12	163	15.04	1.000	5.97	1.57	.26	24.59	24.54
6 13	164	14.89	1.000	5.69	3.25	.57	25.16	24.86
6 14	165	14.64	.999	6.17	4.24	.69	25.77	25.29
6 15	166	14.08	.997	7.13	4.62	.65	26.49	25.75
6 16	167	13.62	.994	4.35	4.83	1.11	26.92	26.23
6 17	168	13.24	.989	5.60	4.70	.84	27.48	26.70
6 18	169	12.89	.986	2.33	5.69	2.44	27.71	27.27
6 19	170	12.45	.975	6.17	5.18	.84	28.33	27.79
6 20	171	12.00	.964	4.71	5.36	1.14	28.80	28.32
6 21	172	11.51	.950	4.01	4.78	1.19	29.20	28.80
6 22	173	11.06	.935	3.41	4.57	1.34	29.54	29.26
6 23	174	10.57	.911	4.97	4.17	.84	30.04	29.68
6 24	175	10.14	.889	5.36	3.56	.66	30.58	30.03
6 25	176	9.79	.870	4.87	3.15	.65	31.07	30.35
6 26	177	9.51	.849	8.78	2.95	.34	31.94	30.64
6 27	178	9.20	.832	5.49	3.00	.55	32.49	30.94
6 28	179	8.92	.814	4.52	3.10	.69	32.94	31.25
6 29	180	8.59	.789	5.15	3.25	.63	33.46	31.58
6 30	181	8.29	.767	4.42	3.20	.72	33.90	31.90
7 1	182	7.93	.737	4.23	2.95	.70	34.32	32.19
7 2	183	7.65	.714	3.85	2.51	.65	34.71	32.44
7 3	184	7.40	.690	4.21	2.24	.53	35.13	32.67
7 4	185	7.20	.672	4.08	2.08	.51	35.54	32.88
7 5	186	6.97	.661	1.91	5.82	3.05	35.73	33.46
7 6	187	6.76	.667	.78	5.41	6.94	35.81	34.00
7 7	188	6.71	.628	2.80	4.37	1.56	36.09	34.44
7 8	189	6.81	.640	2.58	.08	.03	36.35	34.44
7 9	190	6.92	.648	3.20	.30	.09	36.67	34.47
7 10	191	6.87	.643	3.15	1.09	.35	36.98	34.58
7 11	192	6.71	.633	2.07	1.32	.64	37.19	34.71
7 12	193	6.59	.618	2.50	.99	.40	37.44	34.81
7 13	194	6.46	.605	2.41	.81	.34	37.68	34.89
7 14	195	6.41	.604	1.85	.28	.15	37.86	34.92

1.007 CP SECONDS EXECUTION TIME.