DOCUMENTATION of PROSPER
A Model of
Atmosphere-Soil-Plant Water Flow

R. A. Goldstein
J. B. Mankin
R. J. Luxmoore

PUBLICATION NO. 529
Environmental Sciences Division
Oak Ridge National Laboratory
DOCUMENTATION OF PROSPER: A MODEL OF ATMOSPHERE-SOIL-PLANT WATER FLOW

R. A. Goldstein, J. B. Mankin, and R. J. Luxmoore

Research supported by the Eastern Deciduous Forest Biome, US-IBP, funded by the National Science Foundation under Interagency Agreement AG 199, 40-193-69 with the Atomic Energy Commission - Oak Ridge National Laboratory.

FEBRUARY 1974

OAK RIDGE NATIONAL LABORATORY
Oak Ridge Tennessee 37830
operated by
UNION CARBIDE CORPORATION
for the
U. S. ATOMIC ENERGY COMMISSION
DOCUMENTATION OF PROSPER: A MODEL OF ATMOSPHERE-SOIL-PLANT WATER FLOW

R. A. Goldstein, J. B. Mankin, and R. J. Luxmoore

ABSTRACT

A phenomenological model, PROSPER, has been developed that simulates atmosphere-plant-soil moisture relations on a day-to-day basis. The model is explained in detail, and a computer program of the model is listed. Computer output resulting from an application of PROSPER to a forested watershed is also presented.

INTRODUCTION

Water is one of the major factors governing the structure and function of ecosystems on micro and regional scales, and it is a major factor governing structure of ecosystems (e.g., forest, grassland, desert) on a global scale. This leads to great emphasis on the study of water dynamics at a number of scales. Watersheds are a particularly important scale since they are a well-defined geographical unit for ecosystem studies. PROSPER was developed to provide a model that can be coupled to a model of stand vegetation development and provide a detailed description of water fluxes in a hydrologic transport model.

In a previous paper Goldstein and Mankin (1972b) discussed the concept of space-time compatibility in ecological modeling. Their general thesis was that temporal and spatial resolutions of ecological models are not independent. For a given process, models based on relatively small spatial units require correspondingly small units of time. If the spatial units are made larger, then the temporal units should be larger. To illustrate the point, it required approximately 110 hr of computer time to simulate the molecular dynamics of 216 molecules of water for a simulation time of approximately $2 \times 10^{-12}$ sec (Rahman and Stillinger 1971). It is impractical at our present level of technology to try to extend a study of this detail to study water dynamics on a watershed scale, and it also does not focus on the relevant ecological effects of water on the watershed level. Excellent codes exist for computation of soil water dynamics based on the numerical solutions of Darcy's Equation (Freeze 1971, Reeves and Duguid 1973). These codes do not model vegetational effects and evapotranspiration.

PROSPER was originally reported on at the 1972 Summer Simulation Conference in San Diego (Goldstein and Mankin 1972a). Since that time, several changes have been made in the model and its computer implementation as a result of applications of the model. Many individuals have expressed interest in acquiring more information about the development
and application of PROSPER. Therefore, this report has been produced with the sole objective of documentation and no attempt will be made to interpret the results of the application which is included.

PROSPER applies a water balance to a stand of vegetation with the soil divided into several layers. A hypothetical evapotranspiration surface is defined which homogenizes the plant and litter characteristics. We hypothesize that a model that simulates water dynamics on a day-to-day basis and uses either mean or total daily environmental input conditions does not require a detailed description of canopy geometry. Canopy geometry is, however, taken into consideration in the albedo term for solar radiation. Evapotranspiration is, therefore, conceptualized as taking place from a surface (Fig. 1) which is a combination of both ground surface and vegetation canopy surface. A combined energy balance-aerodynamic method is used to derive an equation for evapotranspiration as a function of a resistance to vapor transfer which is characteristic of the evapotranspiration surfaces. This resistance is a function of the water potential of the surface which is analogous to the relationship between stomatal resistance and leaf water potential. A mass balance is applied to the water flowing through soil and plant. The flow of water within and between soil and plant is a function of soil conductivity, soil water potential, root characteristics for each soil level and surface water potential. Soil conductivity and soil water potential are functions of volumetric soil water content. By setting liquid water flow to the evapotranspiration surface equal to vapor flow away from the surface, surface water potential, surface resistance to vapor transfer, evaporation from the litter surface, and transpiration through the plant can be calculated. PROSPER also calculates daily volumetric water content of the different soil layers and predicts lateral flow from each of the layers as well as drainage below the soil profile.

In following sections, we discuss derivation, implementation, simulation procedure and application of PROSPER. It is essential to not confuse the computer program by which PROSPER is implemented with the actual model as shown in Fig. 1. The computer program is one of a number of possible representations of the model. In writing the program, the authors must make certain decisions about how to calculate matric water potentials, resistances to flow and conductivities. Although the authors have a rationale for guiding them in making these choices, the choices are not fixed by the framework of the model. Another user of the model may substitute what he considers to be more appropriate calculations based upon his own needs for those calculations made by the authors. The authors' choices were governed by what they considered appropriate for Walker Branch Watershed, which was their initial subject for application. For applying the model to other Eastern Deciduous Forest Biome study sites, it is probable that some of the implementation procedures will have to be modified.
Fig. 1. Schematic of PROSPER.
DERIVATION OF PROSPER

PROSPER is designed for accuracy on the order of a week, but a basic time increment of a day is used to insure desired predictive capability. Errors incurred during one time increment are smoothed by the integration process. During periods of high water fluxes, excessive error is incurred using an integration time increment of a day. Therefore, the integration time increment is decreased during these periods.

By using a combined energy balance-aerodynamic method (Cowan and Milthorpe 1968, Tanner 1968), we derive an equation for vapor flow, $F_v$, from the evapotranspiration surface. By applying the law of conservation of mass to the water and Darcy's law, we derive an equation for liquid water flow, $F_w$, to the evapotranspiration surface. Assuming the system to be in steady state, we equate $F_v$ and $F_w$ and solve for evapotranspiration.

If we apply an energy balance at the evapotranspiration surface, then,

$$R_N = L_v F_v + H + G,$$

where $R_N$ is the net radiation (solar plus long wave) absorbed by the surface per day, $L_v$ is the latent heat of vaporization for water, $L_v F_v$ is the daily latent heat energy loss from the surface, $H$ is the daily sensible heat energy leaving the surface and $G$ is the daily amount of heat energy transferred from the surface to the soil.

From aerodynamic considerations,

$$F_v = \frac{\rho_1^* - \rho_2^*}{r_a + r_x} = \frac{\rho_1^* - \rho_2^*}{r_a} - \frac{\rho_2 - \rho_2^*}{r_a + r_x},$$

where $\rho_1$ is water vapor density of the evapotranspiration surface, $\rho_2$ is water vapor density at a reference level above the canopy, $r_a$ is resistance to transfer of water vapor between levels 1 and 2 (Fig. 1), $r_x$ is resistance of the evapotranspiration surface to release of vapor and the asterisk signifies saturation vapor density. It is assumed that the air within the evapotranspiration surface is saturated, the evapotranspiration surface has a characteristic water potential, $\Psi_x$, and that

$$r_x = g_1(\Psi_x).$$
The quantity \( r_a \) is given by \( r_a = 3.3 \varepsilon^{3/4} v^{-5} \), where \( \varepsilon \) is the characteristic length of the leaf (cm) and \( v \) is wind speed (cm/sec).

From aerodynamic considerations, the rate of transfer of heat energy by convection from the evapotranspiration surface is,

\[
H = \frac{[\sigma c_p \rho (T_1 - T_2)]}{r_a},
\]

where \( \sigma \) is the ratio of convection area to evapotranspiration area, \( c_p \) is the specific heat of air at constant pressure, \( \rho \) is the density of air, \( T_1 \) is the temperature of the air at constant pressure, \( T_2 \) is the temperature of the evapotranspiration surface, \( r_1 \) is the resistance to the transfer of sensible heat between levels 1 and 2.

Combining Eqs. (1), (2), and (4) gives

\[
F_v = \left[ \frac{(R_N - G) \Delta}{\sigma c_p \rho} + \frac{\rho_2^* + \rho_2}{r_a} \right] \sqrt{\frac{r_a + r_1}{r_a + \frac{L_v \Delta}{\sigma c_p \rho}}}.
\]

where

\[
\Delta = \frac{\rho_2^* - \rho_1^*}{T_1 - T_2} \frac{d\rho^*}{dT}
\]

and from the ideal gas law

\[
\frac{d\rho^*}{dT} = \frac{1}{R_v} \frac{de^*}{dT}
\]

where \( R_v \) is the gas constant for water vapor, and \( e^* \) is saturation vapor pressure. The net radiation is

\[
R_N = R_S(1 - \alpha) + R_{NL}
\]

where \( R_s \) is the solar radiation incident on the surface, \( \alpha \) is the albedo for solar radiation and \( R_{NL} \) is the net long wave radiation absorbed by the surface.
According to Eq. (5), \( F_V \) is a function of \( r_X \) which is in turn a function of \( \psi_X \), the water potential of the evapotranspiration surface which depends on the moisture status of the soil. The water balance approach and an electrical analog (Fig. 1) are used to model soil water dynamics and calculate water flow to the evapotranspiration surface. The electrical analog to water movement in vegetation has been used previously (Slatyer 1967). There has been some dispute over the capacity of the electrical analog to adequately describe what is a nonlinear, heterogeneous process (Cowan and Milthorpe 1968). For the purpose of describing water dynamics over a large vegetated area, such as a forest stand, we feel that the electric analog adequately portrays the major mechanisms governing the movement of water through the soil-plant continuum. The electrical analog forms a framework for a logical statement of the model, but it is not essential to the model. Another framework, such as a compartment model, could be used without affecting the basic model. The electrical analog allows consideration of the heterogeneity of soil and vegetation types over a watershed by using parallel models for homogeneous subareas of the watershed.

The soil is conceptualized to consist of \( n \) homogeneous layers. Flow of water between any two points in the analog circuit is assumed to be directly proportional to the difference in water potential between the points and inversely proportional to the resistance to water flow between the points. The potentials and resistances determining the flow of water through soil and vegetation are:

\[
\begin{align*}
\psi_X &= \text{water potential of evapotranspiration surface}, \\
\psi_i &= \text{water potential of soil layer } i, \\
r_{s_i} &= \text{resistance of soil in layer } i, \\
r_{s_{ij}} &= \text{resistance between soil layers } i \text{ and } j, \\
r_{r_i} &= \text{root resistance of layer } i, \\
r_{r_{si}} &= \text{resistance between soil and roots of layer } i, \\
r_L &= \text{litter resistance}, \\
r_P &= \text{aboveground plant resistance, and} \\
\psi_i &= \psi_{m_i} + \psi_{g_i},
\end{align*}
\]

where \( \psi_m \) is the matric potential and \( \psi_g \) is the gravitational potential. The term \( \psi_{m_i} \) is a function of the volumetric water content of layer \( i \), \( \theta_i \), given by

\[
\psi_{m_i} = g_2(\theta_i).
\]  

(The nature of this function is discussed in the next section.) The gravitational potential is given by
\[ \psi_{\text{gi}} = \sum_{j=1}^{i-1} d_j + d_i/2 \]  

where \( d_i \) is the thickness of layer \( i \). The soil resistance is given by

\[ r_{s_i} = (d_i/2)/K_{s_i} \]  

where \( K_{s_i} \) is the soil conductivity of layer \( i \) and is a function of the volumetric water content of layer \( i \) given by

\[ K_{s_i} = g_{s_i}(\theta_i). \]  

(The nature of this function is discussed in the section on application of the model.) The soil resistance between soil layers is given by

\[ r_{s_{ij}} = r_{s_i} + r_{s_j}. \]  

The resistance of the roots to the flow of water is given by

\[ r_{r_i} = (d_i/2)/(\delta_i K_{r_i}), \]  

where \( \delta_i \) is the cross-sectional area of roots in layer \( i \) per unit area of soil and \( K_{r_i} \) is root conductivity of layer \( i \). The resistance between the roots and soil in layer \( i \) is given by

\[ r_{r_{si}} = (d_i \delta_i)/(f_i FK_{s_i}), \]  

where \( F \) is the leaf area index of the canopy and \( f_i \) is the fraction in layer \( i \) of root surface area through which water is absorbed. For lack of detailed information, it is assumed that the velocity of water intake through the roots is equal to the velocity of water flow to the atmosphere. Therefore, it is assumed that the active area of the roots through which water is absorbed is approximately equal to the active transpiration area of the canopy. This function will be modified as more information becomes available.

By applying standard techniques for solving circuit problems (Seshu and Balabanian 1963), we can solve for \( F_w \), the amount of water flowing to the evapotranspiration surface, which is a function of \( \psi_x \).
\[ F_W = f_1(\psi_X). \] (16)

In addition to deriving the above relationship for \( F_W \), relationships for the net change in volumetric water content of each of the soil layers, \( \Delta \theta_i \), can be derived. By equating \( F_W \) and \( F'_V \) [Eqs. (5) and (16)] and using Eq. (3), \( \psi_X \) can be calculated. Then \( r_X, F_V, \) and \( \Delta \theta_i \) for all \( i \) can be calculated.

**IMPLEMENTATION OF PROSPER**

We emphasize that the implementation of PROSPER which encompasses the choosing of explicit functions or means of calculation for resistances, conductivities, and potentials is independent of the derived framework of the model. Users of the model should feel free to substitute other functions and means of calculation which they feel are better suited for the ecosystems to which they intend to apply PROSPER. An application of PROSPER to a new system, hence not only requires selecting new values for the model's parameters but also a critical reexamination of the methods of calculating resistances, conductivities, and potentials.

In the current documentation of the model, soil hydraulic conductivity is calculated by the method outlined by Green and Corey (1971). This method is based on the soil pore interaction model of Marshall (1958) and Millington and Quirk (1959). In this procedure, the matric water potential \( \psi_{m_i} = g_{2i}(\theta_i) \) and the saturated hydraulic conductivity for each soil layer, \( i \), are read into subroutine SOIL and used to calculate a table of water content, matric potential, and hydraulic conductivity values representative of the soil layer. These table values are transferred to subroutine TABLOK where, for any given value of soil water content, the equivalent values of matric potential and hydraulic conductivity are determined from the table values by linear interpolation. Further details of this method can be obtained in another documentation (Luxmoore 1973).

In a previous implementation of the model (Goldstein and Mankin 1972a) the soil water conductivity and matric water potential were calculated by empirical relationships. This procedure is recommended where simple formulae can be used to accurately express soil water conductivity and matric water potential as functions of soil water content.

Surface resistance to vapor flow was calculated by

\[
\begin{align*}
    r_X &= R_X + (r_c - R_X)e^{h(\psi_c - \psi_X)}, & |\psi_X| < |\psi_c| \\
    r_X &= r_c, & |\psi_X| \geq |\psi_c|
\end{align*}
\] (18)
We based our hypothesis of this functional relationship on studies of the literature of plant water relationships. The parameter $\psi_C$ is the critical surface water potential at which the surface attains its maximum resistance, $r_C$ ($r_C > R_X$). By application of the stomatal resistance-leaf water potential analogy, $r_C$ is analogous to cuticle resistance. Both $R_X$ and $h$ are empirically determined constants; $R_X$ is analogous to stomatal resistance when the vegetation is fully hydrated.

SIMULATION PROCEDURE

The computational steps by which PROSPER simulates water dynamics for a single day are:

1. Precipitation for the day enters the system. If there is no precipitation, the simulation proceeds to step 2. The precipitation initially enters the interception storage compartment (Fig. 1). The interception compartment has a maximum storage capacity which is a function of leaf area index. When the interception compartment is full, any additional precipitation becomes throughfall.

2. If the intercept storage compartment does not contain any water, i.e., if $\theta_0 = 0$, when the simulation proceeds to step 3. If $\theta_0 > 0$, then $F_v(r_X = 0)$ is calculated from Eq. (5). Since $r_a$ is the only resistance to evaporation of intercepted water, $r_X$ is set to zero in Eq. (5). If $\theta_0 \geq F_v(r_X = 0)$, then an amount of water equal to $F_v(r_X = 0)$ is evaporated from the interception storage compartment, $F_w$ is set to zero and the simulation proceeds to step 3. If $F_v(r_X = 0) > \theta_0$ then all of $\theta_0$ is evaporated and an amount of energy equal to $L_v \theta_0$ (where $L_v$ is the latent heat of vaporization for water) is subtracted from the total net radiation for the day, $R_N$. The adjusted value of $R_N$ will be used instead of the total net radiation in Eq. (4) in step 3.

3. At this point, the simulation enters a loop to calculate soil water transferred to the atmosphere by evapotranspiration, and soil water redistribution and drainage. In the original implementation of PROSPER (Goldstein and Mankin 1972a), the looping structure was not incorporated into the computer program. The saturated soil water conductivities used in the original implementation were based on data for agricultural soils (Miller and Klute 1967). For these values (on the order of 1 cm/day) a single calculation of soil water movement in a day using total daily throughfall and solar radiation was adequate. However, saturated soil water conductivities have been found to be two to three orders of magnitude greater for forest soils than for agricultural soils (Peters et al. '969, Freeland 1956, Longwell et al. 1963). For these high values of soil water conductivity, single daily calculations produce numerical instabilities. This necessitates the inclusion of the loop structure which makes N iterations in calculating the daily water movement. The number of
passes through the loop, \( N \), is dependent upon throughfall, layer thickness, maximum saturated soil water conductivity, and \( N \) for the previous day.

4. Upon entering the loop, soil water potentials, conductivities and resistances are calculated for the soil layers. One \( N \)th of the daily throughfall and net radiation are used to calculated \( F_v \) by the procedure outlined in the previous section, unless \( F_w = F_v \) has been set to zero in step 2, in which case the depletion of soil water by evapotranspiration is zero. Also calculated are \( \psi_X \) and \( \Delta \theta_i \) for all \( i \). The volumetric soil moisture content of each level, \( \theta_i \), is readjusted by \( \Delta \theta_i \). If the moisture in any level exceeds saturation, the excess is removed by lateral flow. The amount of water in the bottom layer exceeding field capacity drains at a rate equal to the hydraulic conductivity.

5. If the program has not passed through the loop \( N \) times at this point, the simulation returns to step 3 and goes through the loop again. If the simulation has gone through the loop \( N \) times, then the daily total of evapotranspiration, lateral flow from each soil layer, and drainage are calculated by summing the amounts calculated in each of the \( N \) passes through the loop.

6. The simulation proceeds to the next day and returns to step 1.

**Input Description**

Input data are read in the three subroutines PARAM, S\( \Phi \)IL, and ENDATA. The input to S\( \Phi \)IL is described in another publication (Luxmoore 1973). The program is now set up to read data from PARAM, S\( \Phi \)IL, and ENDATA in that order. However, the order of these may be changed according to the application of the user. The application described in this publication was designed to compute the water cycle for several years of environmental data.

The computer program of PROSPER documented in this publication divides the soil into five layers: two in the root zone and three below the root zone.

The input cards to PARAM are:

1. Title Card
   Format: 20A4
   This card should be used to identify the application.

2. List: LLDAY
   Format: I2
LLDAY = 0, daily values will not be printed.
≠ 0, daily values will be printed.

3 & 4. List: DL(5), THETA(5), FC(5)
Format: 8G10.3

DL = The five soil layer thicknesses in cm.

THETA = The initial moisture contents in cm for the five soil layers.

FC = The field capacities of the five soil layers in fraction of total volume of each layer.

5. List: PAIR, CPO, XL, V
Format: 8G10.3

PAIR = Air pressure in bars.

CPO = Specific heat in cal/g°C.

XL = Average length of leaf in cm.

V = Wind velocity in cm/sec.

6. List: AT(2), ARAT(2), GM, GV
Format: 8G10.3

AT = Root cross-sectional area/unit area of soil for the two soil layers containing roots.

ARAT = Fraction of roots in each of the two soil layers.

GM = Mean energy flow from ground to surface in langley/day.

GV = Mean peak variation in energy flow from ground to surface in langley/day.

7. List: ALBVEG, CANON, CANOFF, SIMIN, SIMAX, ALMIN, ALMAX
Format: 8G10.3

ALBVEG = Albedo of the vegetation.

CANON = The day (number of days from 1 January) at which the canopy vegetation has emerged 50%.
CANOFF = The day (number of days from 1 January) at which 50% of the canopy vegetation has died.

SIMIN = Maximum interception storage during the winter in cm.

SIMAX = Maximum interception storage during the summer in cm.

ALMIN = Leaf area index during winter.

ALMAX = Leaf area index during summer.

The input cards to ENDATA are:

1. **Title card:**

   **Format:** 20A4

   In the present application this card is used to describe the environmental data.

2. **List:** LASTDY (12), MOBEG

   **Format:** 13I5

   LASTDY = The number of days (starting with January) in each of the twelve months.

   MOBEG = The month in which the simulation is to begin.

3-38. **List:** IMO, IDY, RP

   **Format:** 9X, I2, I1, 11D6.3

   IMO = The numeric value of the month.

   IDY = The card number for the month (1, 2, or 3). Each month has three cards.

   RP = The daily precipitation in inches.

39-74. **List:** IMO, IDY, RP

   **Format:** 9X, I2, I1, 11D6.3

   IMO = Same as above.

   IDY = Same as above.

   RP = The total daily solar radiation in langleys/day
75-110. List: IMO, IDY, RP

Format: 9X, I2, I1, 11D6.3

IMO = Same as above.
IDY = Same as above.
RP = The average vapor pressure +4 hr from solar noon in millibars.

11-146. List: IMO, IDY, RP

Format: 9X, I2, I1, 11D6.3

IMO = Same as above.
IDY = Same as above.
RP = The average air temperature +4 hr from solar noon in degrees Fahrenheit.

SAMPLE APPLICATION

As a means of illustrating the printed output of the computer program, we present a sample application of PROSPER to Walker Branch Watershed, a 97.5-ha oak-hickory watershed on the U.S.-Atomic Energy Commission Oak Ridge Reservation in East Tennessee. [A general description of Walker Branch Watershed can be found in Grigal and Goldstein (1971)]. Parameter values (which are read in PARAM) are listed in the output. PROSPER was used to simulate water relations during 1970. Meteorological data (which are read in ENDATA) used for environmental inputs were taken in the town of Oak Ridge several miles from the watershed. These data include daily solar radiation, mean air temperature during the interval +4 hr from solar noon, and mean atmospheric vapor pressure +4 hr from solar noon. Daily precipitation data were taken from Walker Branch Watershed. Note that vapor density which is a required input to the model can be derived from either vapor pressure, relative humidity, dew point or wet bulb temperature data. The annual distribution of heat exchange with the ground was estimated with a sine function based on data from Van Wijk and De Vries (1966). The simulation is started on January 1, and the initial soil water potentials were determined from computations with the 1969 Walker Branch Watershed meteorological data.
FUTURE REFINEMENTS

Several modifications of the model and computer program are being considered. The program could be made more versatile by modifying it to allow the division of the soil into more than the two layers in the root zone required by the present version. This modification will be necessary when applied to areas where the root systems are deeper than they are on Walker Branch Watershed. From a computational point of view, it would be preferable to divide the soil into compartments of equal thickness in order to avoid biasing soil resistance values. For the example in this input, that would mean dividing the second soil layer into two identical layers. PROSPER may also be extended to account for lateral transport of water by compartmentalizing the soil horizontally as well as vertically, effects of slope and aspect, and more detailed phenology.

SYNTHESIS WITH OTHER MODELS

PROSPER was developed not only to be applied by itself but also to be an integral part of the Watershed Transport Model (Huff 1972) being developed, under the direction of Dale Huff, by the Eastern Deciduous Forest Biome of the International Biological Program. The Watershed Transport Model includes explicit representation of both stream and groundwater systems. It also simulates snowmelt and infiltration. The integration of PROSPER and WTM has been completed; however, there are studies which only require the application of PROSPER. It is more efficient in these cases to apply PROSPER by itself, than to work with the more complex structure of the larger model. PROSPER was also developed to be applied in conjunction with TEEM, a terrestrial ecosystem energy model (O'Neill, Goldstein, Shugart, and Mankin 1972) being developed by the Eastern Deciduous Forest Biome.

ACKNOWLEDGMENTS

The authors would like to thank the Systems Ecology Group of the Environmental Sciences Division for stimulating discussions on the modeling of environmental systems. Discussions with W. F. Harris on the effect of roots were very beneficial. We would like to thank G. S. Henderson and J. D. Sheppard for their discussions on Walker Branch Watershed hydrology and for their critical review of the manuscript. The criticism of C. E. Murphy and D. D. Huff has had a major influence on our work. Special thanks is reserved for S. B. Watson for improvement in the numerical techniques used in the program.


LEVEL 21.6 (DEC 72) O5/360 FORTRAN H

COMPILER OPTIONS - NAME: MAIN, UPT-02, LINECNT-60, SIZE-0000K.
SOURCE: EBCDIC, LIST, NODECK, LOAD=MAP, NOEDIT, NOID, N3XREF

ISN 0002  IMPLICIT REAL*4 (A-H, I-O)
ISN 0003  DIMENSION SIMDN(13), WIMIN(13), FTMCM(11), PKFMON(13), GWMON(13), 
           SWMON(13), NPMON(13), ALMON(13), FMLCN(13), SEVMON(13), 
           RKFMON(13), FZFMON(13), SFDMON(13)
ISN 0004  COMMON/SERVI/PRECIP(366), TEMP(366), VIAR(366), VAPOR(366), WIND(366)
ISN 0005  COMMON/FUXES/SMAP2, FILTER, DRUM, ODRAIN, SI, QI
ISN 0006  COMMON/THINGS/ALBVEG, CANON, CANOFF, SIMIN, SIMAX, ALMIN, ALMAX
ISN 0007  COMMON/HM0/DREL, PAIR, CP0, RA, RX, SIGMA, XLV, GM, GV, H1
ISN 0008  COMMON/SEDCH1/DLS1, AT1(2), FC15, THETA5)
ISN 0009  COMMON/SCES/PLATES(20), LASTCY(12), MBEG, LLDAY
ISN 0010  COMMON/SP0L/PSI(5)
ISN 0011  COMMON/FLOOD/POINT(5)
ISN 0012  COMMON/FLOOD/I/N/TIME

C INPUT DATA FOR PROSPER (UNITS IN WHICH THE DATA ARE READ)
C SUPROUTINE ENDATA---READS THE ENVIRONMENTAL DATA
C LASTCY(12) AN ARRAY CONTAINING NUMBER OF DAYS IN EACH MONTH
C MBEG MONTH FOR WHICH THE SIMULATION STARTS
C * PRECIP(366) TOTAL DAILY PRECIPITATION (INCHES PER DAY)
C * SOLAR(366) TOTAL DAILY SOLAR RADIATION (LY/DAY)
C * VAPOR(366) MEAN DAILY VAPOR PRESSURE (MILLIBARS)
C * TEMP(366) MEAN DAILY AIR TEMPERATURE (DEGREES)
C * FC15 FIELD CAPACITY OF EACH SOIL LAYER (FRACTION OF LAYER)
C * THETA5 WATER CONTENT IN EACH SOIL LAYER (CM)
C THE FOLLOWING PARAMETERS ARE READ IN PROSPER:
C * DIL(5) THICKNESS OF EACH SOIL LAYER (CM)
C * RAINFALL STORM DURATION (CM)
C * WIND VELOCITY (CM/SEC)
C * AT1(2) ROOT CROSS SECTIONAL AREA/UNIT AREA SOIL
C * ARAT(2) FRACTION OF ROOTS IN LAYER
C * GM MEAN ENERGY FLOW FROM GROUND TO SURFACE (LY/DAY)
C * GV MEAN PEAK VARIATION IN ENERGY FLOW FROM GROUND TO SURFACE
C * SURFACE (LY/DAY)
C * ALBVEG ALBEDO OF VEGETATION
C * SIMIN MAX. INTERCEPTION STORAGE DURING WINTER (CM)
C * SIMAX MAX. INTERCEPTION STORAGE DURING SUMMER (CM)
C * ALMIN LEAF AREA INDEX DURING WINTER
C * ALMAX LEAF AREA INDEX DURING SUMMER
C THE FOLLOWING PARAMETERS ARE SET IN PROSPER:
C * SIGMA RATIO OF CONVECTIVE TO EVAPOTRANSPIRATION AREA
C * CANON DAY LEAVES START TO EMERGE
C * CANOFF DAY MAJOR LEAF FALL STARTS
C THE FOLLOWING PARAMETERS ARE CALCULATED IN EVAL:
C R1 RESISTANCE BETWEEN SOIL LAYERS TO WATER FLOW
C R2 RESISTANCE BETWEEN SOIL AND ROOT IN LAYER 2 + ROOT
C R3 RESISTANCE BETWEEN LAYERS 2 AND 1
C R4 RESISTANCE TO WATER FLOW IN LAYER 1+LITTER RESISTANCE
C R5 RESISTANCE BETWEEN SOIL AND ROOT IN LAYER 1
C EX SURFACE RESISTANCE
C THE FOLLOWING PARAMETER IS COMPUTED IN EVAP--
C    RA  BOUNDARY LAYER RESISTANCE (CM/DAY)
C
C    * INDICATES PARAMETERS WHICH SHOULD BE ESTIMATED AT EACH SITE
C
ISN 0013  NERR=1
ISN 0014  READ IN SYSTEM PARAMETERS
ISN 0015  CALL PARAM
ISN 0016  G W A T E R = 10.
C  CALCULATE SOIL PARAMETERS
C  NOTE--MORE INPUT DATA READ AT THIS POINT
C  CALL SOIL-
C  THE PROGRAM RECYCLES TO STATEMENT 10 WITH THE OPTION OF PERFORMING
C  CALCULATIONS WITH NEW ENVIRONMENTAL DATA SETS. THIS GIVES THE
C  OPTION OF CALCULATIONS FOR MULTIPLE YEARS FOR A SINGLE RUN.
C  READ ENVIRONMENTAL DATA
ISN 0017  10 CALL ENDATA(NERR)
ISN 0018  IF (NEPL.EQ.0) GO TO 120
ISN 0019  DO 20 K=1,366
ISN 0020  TEMP(K)=TEMP(K)*.5
ISN 0021  CONTINUE
ISN 0022  20 CONTINUE
ISN 0023  SWRF1=0.00
ISN 0024  SWRF2=0.00
ISN 0025  DRUN=0.00
ISN 0026  DDRAIN=0.00
ISN 0027  ET=1.0-L-2
ISN 0028  SI=0.00
ISN 0029  I=0
ISN 0030  T=E.0
ISN 0031  F=FC51*OLI51
C  FAKE SOIL WATER DATA
C
ISN 0032  VP31-VP21
ISN 0033  VP41-VP21
ISN 0034  VP51-VP21
ISN 0035  DO 30 K=1,366
ISN 0036  30 S(K)=VP(K)*DLI(K)
ISN 0037  WRITE(51,10000)
ISN 0038  IF (LLDAY.NE.0) WRITE(51,10100)
ISN 0039  WRITE(51,10200)
ISN 0040  DO 100 MO=1,13
ISN 0041  100 SIMC(MO)=0.00
ISN 0042  OIMC(MO)=0.00
ISN 0043  GIMC(MO)=0.00
ISN 0044  ETMC(MO)=0.00
ISN 0045  PREM(MO)=0.00
ISN 0046  FLMC(MO)=0.00
ISN 0047  DRAMC(MO)=0.00
ISN 0048  SWMC(MO)=0.00
ISN 0049  RNMF(MO)=0.00
ISN 0050  SNMF(MO)=0.00
ISN 0051  BALMC(MO)=0.00
ISN 0052  SFMC(MO)=0.00
ISN 0053  RMFC(MO)=0.00
ISN 0054  RFMC(MO)=0.00
ISN 0055  WRITE(51,10300)
C PROSPR IS THE SUBROUTINE IN WHICH THE WATER FLOWS ARE CALCULATED.

IF (LLDAY.EQ.0) GO TO 70
WRITE(5),ILODODD,1,FILT,QL1,ET,PSL,SEV,SEV,DP,THETA
CONTINUE
70
1,1
WRITE(5),ILODODD,1,FILT,QL1,ET,PSL,SEV,DP,THETA
CONTINUE
10
1,1
IF (LLDAY.EQ.0) GO TO 70
WRITE(5),ILODODD,1,FILT,QL1,ET,PSL,SEV,DP,THETA
CONTINUE
10
1,1
STOP
C
ISN 0117  RAL=PREWK*ETOTK*OUT-SSTORE-SINT  MAIN 865
ISN 0118  STMCN(MO)=THETA(1)+THETA(2)-SINTNL +THETA(3)+THETA(4)+  MAIN 870
ISN 0119  THETA(5)  MAIN 875
ISN 0119  SIMON(MO)=SI-SINTNL  MAIN 880
ISN 0120  FALMON(MO)=PREMON(MO)-ETMCN(MO)-Q1CN(MO)-SIM2N(MO)-  MAIN 885
ISN 0121  RFMON(MC)-DNMON(MC)-STMCN(MC)-SEVMON(MC)  MAIN 890
ISN 0122  ETOT*ETMCN(MO)+SEVMON(MO)+Q1CN(MO)  MAIN 895
ISN 0122  PRINT 10800, PREWK,FLTWK,2INK,ETWK,SEVWK,ETOT,K  MAIN 900
ISN 0123  OUTFLD=RFMON(MO)+DNMON(MC)  MAIN 905
ISN 0124  PRINT 10900, DRAIN,OUT,SSTORE,BAL  MAIN 910
ISN 0125  90 CONTINUE  MAIN 915
ISN 0126  PRINT 11000,M0  MAIN 920
ISN 0127  PRINT 11000, PREMON(MO),FLTMEN(MO),Q1MN(MO),ETWN(MO),  MAIN 925
ISN 0128  SEVMON(MO),ETOT  MAIN 930
ISN 0128  PRINT 10900, ORNMON(MO),OUTFLO,SWTMON(MO),BAMON(MO)  MAIN 935
ISN 0129  100 CONTINUE  MAIN 940
ISN 0130  PRINT 11100  MAIN 945
ISN 0131  BALANC=0.00  MAIN 950
ISN 0132  PTCAL=0.00  MAIN 955
ISN 0133  ETCTA=0.00  MAIN 960
ISN 0134  TIMEP=0.00  MAIN 965
ISN 0135  SI=0.00  MAIN 970
ISN 0136  FIL=0.00  MAIN 975
ISN 0137  DRAIN=0.00  MAIN 980
ISN 0138  TNCF=0.00  MAIN 985
ISN 0139  SOIL=0.00  MAIN 990
ISN 0140  SEVAP=0.00  MAIN 995
ISN 0141  YRFIL=0.00  MAIN1000
ISN 0142  YRRF=0.00  MAIN1005
ISN 0143  YRNSF=0.00  MAIN1010
ISN 0144  00 110 J=1,13  MAIN1015
ISN 0145  PTD=PTOTAL+PREMON(J)  MAIN1020
ISN 0146  ETOTAL=ETOTAL+ETMON(J)  MAIN1025
ISN 0147  TICEP=TICEP+Q1MON(J)  MAIN1030
ISN 0148  SI=SI+SIMON(J)  MAIN1035
ISN 0149  FILT+FLTMON(J)  MAIN1040
ISN 0150  DRAIN=DRAIN+DNMON(J)  MAIN1045
ISN 0151  TNCF=TNCF+RFMON(J)  MAIN1050
ISN 0152  SEVAP=SEVAP+SEVMON(J)  MAIN1055
ISN 0153  YRFIL=YYRFIL+RFMON(J)  MAIN1060
ISN 0154  YRRF=YYRF+RFMON(J)  MAIN1065
ISN 0155  YRNSF=YYRNSF+SFMON(J)  MAIN1070
ISN 0156  SOIL=SOIL+SOILWT+SWTMON(J)  MAIN1075
ISN 0157  BALANC=BALANC+BALMON(J)  MAIN1080
ISN 0158  110 CONTINUE  MAIN1085
ISN 0159  ETC=ETOTAL+SEVAP+TICEP  MAIN1090
ISN 0160  PRINT 10800, PTD,FLT, TICEP,ETOTAL,SEVAP,ETOT  MAIN1095
ISN 0161  OUTFLD=TNCF+DRAIN  MAIN1100
ISN 0162  PRINT 10900, DRAIN,OUTFLD,SOILWT,BALANC  MAIN1105
ISN 0163  GO TO 10  MAIN1110
ISN 0164  120 CONTINUE  MAIN1115
ISN 0165  STOP  MAIN1120
ISN 0166  1000 FORMAT(T1,'OUTPUT DESCRIPTION')  MAIN1125
ISN 0167  1010 FORMAT(T1,'VALUES FOR Each JULIAN DATE(CAY) ARE PRINTED FOR INFR+BAMON')  MAIN1130
"'ETRAN,' INTERCEPTION STORAGE, TRANSPIRATION(ET), PLANET WATER'+"  MAIN1135
"'T1,' POTENTIAL(PSI), SOIL EVAPORATION, DRAINAGE, AND THE WATER'+"  MAIN1140
"'CONTENTS OF THE FIVE LAYERS. THE PLANET WATER POTENTIAL '+"  MAIN1145
"'UNITS ARE BARS. ALL OTHER UNITS ARE CENTIMETERS.')"  MAIN1150
10200 FORMAT(*1,'WEEKLY, MONTHLY AND ANNUAL SUMMARIES ARE PRINTED', MAIN1155
, FOR PRECIPITATION, INFILTRATION, INTERCEPTION EVAPORATION', MAIN1160
, ' TRANSPERSION, SOIL EVAPORATION, TOTAL EVAPORATION, DRAINAGE', MAIN1165
, ' CUTFLOW, SOIL STORAGE AND MASS BALANCE, ALL VALUES ARE ', MAIN1170
, ' IN CENTIMETERS,') MAIN1175
10300 FORMAT(*1,'PROSPER, A MODEL OF ATMOSPHERE-SOIL-PLANT WATER FLOW', MAIN1180
10400 FORMAT(*1,'0,0,10,0,MONTH ',13) MAIN1185
10500 FORMAT(*1,'DAY INFILT INCEPT ETICM! PSICM! SOIL EVAP OR', MAIN1190
, 'AINAGE SOIL 2 SOIL 3 SOIL 4 SOIL 5') MAIN1195
10600 FORMAT(*1,'13,11,26,2, 9(IPG11.4)) MAIN1200
10700 FORMAT(*1,'WEEKLY SUMMARY FOR WEEK ',11) MAIN1205
10800 FORMAT(*1,'0 PRECIPITATION INFILTRATION INTERCEPT-ET TRANSPiration', MAIN1210
, 'ETICM SOIL EVAP TOTAL ET/(1,1,8(IPG15.5))') MAIN1215
10900 FORMAT(*1,'O DRAINAGE CUTFLOW SOIL STORAGE', MAIN1220
, 'AINAGE/(1,1,8(IPG15.5))') MAIN1225
11000 FORMAT(*1,'MONTHLY WATER BUDGET (CM) FOR MONTH ',12) MAIN1230
11100 FORMAT(*1,'ANNUAL WATER BUDGET (CM)') MAIN1235
11200 END MAIN1240
ISN 0054  S=RFZ=0.0
ISN 0055  NPRE=1
ISN 0056  GO TO 60
ISN 0057  50 RN=RN-HT * S1
ISN 0058  Q1=S1
ISN 0059  S1=0.0
ISN 0060  RN=RN-G
ISN 0061  IF (RNNAV.LT.0.0) THEN NRAD=1
ISN 0062  60 CONTINUE
ISN 0063  NPRE=1
ISN 0064  NP=1
ISN 0065  NFAC=30//DL(1)
ISN 0066  IITER=12*(100\*NFAC *NDRN)
ISN 0067  XDIS=ITER
ISN 0068  PRE=P/XDIS
ISN 0069  PREC=0.
ISN 0070  ETOTAL=0.
ISN 0071  STOTAL=0.
ISN 0072  RUNIT=0.
ISN 0073  ORUN=0.
ISN 0074  SM Tot=0.
ISN 0075  SRFCT=0.
ISN 0076  SRF2=0.
ISN 0077  DO 260 IDIS=1,ITER
ISN 0078  0RUN=0.
ISN 0079  IF (IDIS.EQ.ITER) THEN PRE=P-PREC
ISN 0080  K=1,5
ISN 0081  DO 70 K=1,5
ISN 0082  70 CHETAK(I)=THETA(I)/DL(I)
ISN 0083  C CALCULATE STATIC POTENTIAL OF THE SOIL LAYERS.
ISN 0084  CALL TABLOK(CHETAK,PSM,ZS)
ISN 0085  C DATA ARE NOT AVAILABLE AT PRESENT FOR LAYERS 1 TO 5. IN THE
ISN 0086  PRESENT VERSION THESE LAYERS ARE CONSIDERED TO HAVE THE
ISN 0087  SAME CHARACTERISTICS AS THOSE IN LAYER 2.
ISN 0088  C
ISN 0089  CALL TABLOK(CHETAK,PSM,ZS)
ISN 0090  C CALCULATE TOTAL SOIL WATER POTENTIAL
ISN 0091  X=X+0.
ISN 0092  DO 80 K=1,5
ISN 0093  80 PSI(K)=-PSM(K)-DL(K)/2-XXX
ISN 0094  XXX=XXX+DL(K)
ISN 0095  C CALCULATE ELECTRICAL ANALOG RESISTANCE TERMS.
ISN 0096  ZS1=ZS1
ISN 0097  ZS2=ZS2
ISN 0098  DO 90 K=1,5
ISN 0099  90 RS(1)=-DL(1)/2-ZS(K)
ISN 0100  RS1=DL(1)/2-AT(I(1))*ZS1
ISN 0101  RS2=DL(2)/2-AT(I(2))*ZS2
ISN 0102  IF (PSI(K).GT.PSI(K+1)) GO TO 100
RSLBL(K) = RSL(K+1)

GO TO 110

RSLBL(K) = RSL(K)

CONTINUE

R1 = RSLBL1

R2 = RSL2 + (R2 * R1 / 2)

R3 = R1

C R4 IS THE ABOVE GROUND PLANT RESISTANCE FROM ESTIMATE BY COWAN, 1965.

C TRANSPORT OF WATER IN THE SOIL-PLANT-ATMOSPHERE SYSTEM.

J. APPL. ECOL. 2, 221-239

R4 = 50000 + R + R2 / 2.

C SOLVE FOR SURFACE WATER POTENTIAL = PNP

CALL SOLVP1(Y)

PWP = Y

IF (PWP, GT, PSI(N)) GO TO 120

C CALCULATE EVAPOTRANSPIRATION = ET

CALL SURREVY(N)

ET = 6

GO TO 130

C CALCULATE SOIL EVAPORATION = SEV

ET = ET/XCIS

SEV = PSI(N) - PNP / (R3 + R1) * XCIS

C CALCULATE PLANT TRANSPIRATION

ET = ET - SEV

C CALCULATE WATER FLUXES

SWRF1 = ET / (R2 / (R2 + R3))

SWRF2 = ET / SWRF1

CONTINUE

C CALCULATE SOIL WATER CONTENT

DG = 170 X 1.4

SWBL(K) = (PSI(K) - PSI(K+1)) / (MSBL(K))

THETA1 = THETA1 - SWBL1 / XCIS - SWRF1 / PRE - SEV

THETA2 = THETA2 - SWBL2 / XCIS - SWRF2

THETA3 = THETA3 - SWBL3 / XCIS - SWRF3

THETA4 = THETA4 - SWBL4 / XCIS

THETA5 = THETA5 - SWBL5 / XCIS

FLN = PSI(L) - SWBL1 - SWBL2 - SWBL3 - SWBL4 - SWBL5 / XCIS

IF (THETA1 LE 0) GO TO 110

C WHEN THE SCIL LAYERS ARE SATURATED, THEY CANNOT ACCEPT ANY MORE

C WATER. IN THIS CASE, THE WATER IS REMOVED FROM THE SYSTEM

C AND GROUPED UNDER A GENERAL TERM OF RUNOFF.

C CALCULATE RUNOFF FROM FIRST LAYER.

FF = THETA1 - 511

DRUN = FF / XCIS

THETA1 = THETA1 - DRUN

PROS 575

PROS 580

PROS 585

PROS 590

PROS 595

PROS 600

PROS 605

PROS 610

PROS 615

PROS 616

PROS 620

PROS 623

PROS 630

PROS 635

PROS 640

PROS 645

PROS 650

PROS 655

PROS 660

PROS 665

PROS 670

PROS 675

PROS 680

PROS 685

PROS 690

PROS 695

PROS 700

PROS 705

PROS 710

PROS 715

PROS 720

PROS 725

PROS 730

PROS 735

PROS 740

PROS 745

PROS 750

PROS 755

PROS 760

PROS 765

PROS 770

PROS 775

PROS 780

PROS 785

PROS 790

PROS 795

PROS 800

PROS 805

PROS 810

PROS 815

PROS 820

PROS 825

PROS 830

PROS 835

PROS 840

PROS 845

PROS 850

PROS 855
ISN 0154 190 IF (THETA(2).LE.SI(2)) GO TO 200
C CALCULATE RUNOFF FROM SECOND LAYER.
   FF=THETA(2)-SI(2)
   DRUN=DRUN+FF/XDIS
   T=THETA(2)=THETA(2)-FF/XDIS
   PROS 860
   PROS 865
   PROS 870
   PROS 875
   PROS 880
   PROS 885
   PROS 890
   PROS 895
   PROS 900
   PROS 905
   PROS 910
   PROS 915
   PROS 920
   PROS 925
   PROS 930
   PROS 935
   PROS 940
   PROS 945
   PROS 950
   PROS 955
   PROS 960
   PROS 965
   PROS 970
   PROS 975
   PROS 980
   PROS 985
   PROS 990
   PROS 995
   PROS1000
   PROS1005
   PROS1010
   PROS1015
   PROS1020
   PROS1025
   PROS1030
   PROS1035
   PROS1040
   PROS1045
   PROS1050
   PROS1055
   PROS1060
   PROS1065
   PROS1070
   PROS1075
   PROS1080
   PROS1085
   PROS1090
   PROS1095
   PROS1100
   PROS1105
   PROS1110
COMPILER OPTIONS - NAME= MAIN, OPT=2, LINECNT=60, SIZE=0000K,
SOURCE=EDCIG, NOLIST, NODATE, LOAD, MAP, NODEV1D, NOD1P, NOD1F

ISN 0002
SUBROUTINE EVP(Y,P) EVAL 0
C SUBROUTINE EVAL DEFINES THE RESISTANCE PARAMETERS FOR THE ELECTRICAL EVAL 5
C ANALOG AND IT ESTIMATES EVAPOTRANSPERSION EVAL 10
ISN 0003
IMPLICIT REAL*8 (A-H,O-Z) EVAL 15
ISN 0004
COMMON/RESIST/R1,R2,R3,R4,R5,R6,R7,R8,R9,R10,R11,R12,R13,R14,R15,
COMMON/RELPAIR/R16,R17,R18,R19,R20,R21,R22,R23,R24,R25,R26,R27,R28,
COMMON/RELPAIR/R29,R30,R31,R32,R33,R34,R35,R36,R37,R38,R39,R40,R41,
COMMON/SOLPOT/ PS1(1) EVAL 20
ISN 0005
COMMON MU/ID/RELPAIR,CP0,CP1,CP2,CP3,CP4,CP5,CP6,CP7,CP8,CP9,CP10,CP11,
COMMON/RELPAIR/R12,R13,R14,R15,R16,R17,R18,R19,R20,R21,R22,R23,R24,
COMMON/SOLPOT/ PS1(1) EVAL 25
ISN 0006
COMMON /BLOCK/ R1,R2,R3,R4,R5,R6,R7,R8,R9,R10,R11,R12,R13,R14,R15,
COMMON /SOLPOT/ PS1(1) EVAL 30
ISN 0007
COMMON /SOLPOT/ PS1(1) EVAL 35

C COMPUTE SURFACE RESISTANCE
ISN 0008
PPP=3.810-4*Y+1.501 EVAL 40
ISN 0009
IF (PPP.LT.0.00) GO TO 10 EVAL 45
ISN 0010
IF (PPP.GT.1.501) GO TO 20 EVAL 50
ISN 0011
PPP=PPP+1.501 EVAL 55
ISN 0012
PPP=PPP+1.501 EVAL 60
ISN 0013
GO TO 30 EVAL 65
ISN 0014
10 RRR=3.802 EVAL 70
ISN 0015
GO TO 30 EVAL 75
ISN 0016
20 RRR=2.000+TM EVAL 80
ISN 0017
GO TO 30 EVAL 85
ISN 0018
C DETERMINE ELECTRICAL ANALOG PARAMETERS EVAL 90
ISN 0019
RR=RR*RR EVAL 95
ISN 0020
ISN 0021
ISN 0022
ISN 0023
RT=RT*RT EVAL 100
ISN 0024
ISN 0025
ISN 0026
ISN 0027
ISN 0028
ISN 0029
C DETERMINE EVAPOTRANSPERSION EVAL 105
ISN 0030
CALL EVP(EV,PT,TT,EE) EVAL 110
ISN 0031
PPP=(Y*(RR+PS1(1))/O+RRC+PS1(2))/EVRD+RRA+RRC/D-E EVAL 115
ISN 0032
RETURN EVAL 120
ISN 0033
END EVAL 125
LEVEL 21.6 (DEC 72)  
5/360 FORTRAN  

COMPI RER OPTIONS - NAME= MAIN,OPT=02,LINCN T=60,SIZE=0000K, 
SOURCE,EDCIC,NOEDIT,NODECK,LOAD,MAP,NEDIT,NDIO,NOREF 

 THIS FORTRAN PROGRAM DISTINGUISH THE EVAPORATION DEMAND FROM 
C ENVIRONMENTAL PARAMETERS 

C SET TRUE EVAP DETERMINES THE EVAPORATION DEMAND FROM 
EVAP 0 
EVAP 5 
EVAP 10 
EVAP 15 
EVAP 20 
EVAP 25 
EVAP 30 
EVAP 35 
EVAP 40 
EVAP 45 
EVAP 50 
EVAP 55 
EVAP 60 
EVAP 65 
EVAP 70 
EVAP 75 
EVAP 80 
EVAP 85 
EVAP 90 
EVAP 95 
EVAP 100 
EVAP 105 
EVAP 110 
EVAP 115 
EVAP 120 
EVAP 125 
EVAP 130 
EVAP 135 
EVAP 140 
EVAP 145 
EVAP 150 
EVAP 155 
EVAP 160 
EVAP 165 
EVAP 170 
EVAP 175 
EVAP 180 
EVAP 185 
EVAP 190 
EVAP 195 
EVAP 200 

G=3,3C0*XL**.300/V**.500 
T=6+273,1600 

C THE SATURATION VAPOR PRESSURE (ATM) AND ITS DERIVATIVE WITH RESPECT 
C TO TEMPERATURE (ATM/DEGREES KELVIN) ARE COMPUTED IN SATVP 
C USING THE GOFF-GRATCH FORMULA 
C ESTAR= SATURATION VAPOR PRESSURE 
C OVT=DERIVATIVE OF SATURATION VAPOR PRESSURE WITH RESPECT TO 
C TEMPERATURE. 

C CONTINUE 

C REL=REL(PAIR=ESTAR/ESTAR*(PAIR-E)) 
C RHC5AT=1.0D*ESTAR/(1.461D0+TT) 
C RH54=1.0D*ESTAR/(1.461D0+TT) 
C MIXSAT=622D0*ESTAR/(PAIR=ESTAR) 
C MIXREL=REL*MIXSAT 
C RHCAT=1.0D*PAIR/(1.00+MIX)*(2.870+1*(1.00+1.61DO+MIX)**2) 
C CP=CPO*(1.00+800*MIX) 
C HT=5.97D0+0.56D0*TEMP(TII) 
C ET=EVAPORATION DEMAND 
C ET=(G-RH)+D(TA/SIGMA*(CP*RH0AIR)+8.64G*(RHOSAT-RH0)/RA) 
C RX/RA+HT *DELTA/(SIGMA*CP*RH0AIR) 
C IF (ET<0.0D0) ET=0. 
C RETURN 
C END
DOUBLE PRECISION FUNCTION GROUND(*,GV,T)

DATA P1/3.1415926535898/

C * 132, PHYSICS OF PLANT ENVIRONMENT
C BY H. R. VAN WIJN
C

GROUND=GM*GV+DSIN(Z.*DO+PI*(T-9.1611/3.6502))
RETURN
END
SUBROUTINE SATVFIT(PV, DPVDT)
C SUBROUTINE SATVFIT COMPUTES THE SATURATION VAPOR PRESSURE AND ITS
C DERIVATIVES WITH RESPECT TO TEMP. USING THE GOFF-GRATCH FORMULA.
C PV = SATURATION VAPOR PRESSURE
C DPVDT = DERIVATIVE OF SATURATION VAPOR PRESSURE WITH RESPECT TO TEMP.

IMPLICIT REAL*8(A-H,O-Z)

DATA C1E/.4492900/
IF (T.LT.2.731602) T=2.731602
T5=3.731602/T
DT5=3.731602/T**2
A=-7.9029800*(T5-1.00)
B=5.0280680*DLOG10(TS)
CC=1.134401*(1.00-TS)
C10=1.01**(1.00)
CC10=1.01**CC
CC10=(CC10-1.00)
DCC0T=-1.134401*TS
DL0=DLOG10(TS)
DCTA=1.381600*C10*CC10=DL0*C0C0T
D0=-3.49149*(T5-1.00)
D3=1.01**(3.00)
D03=1.01**DD
D0=8.132800*03*(003-1.00)
DDDT=-3.4914900*DT50
DDDT=8.132800*C030D30DL0*DDDT
P*=A*B*C*D
DPDT=DADT+0BDT+DCDT+DDDT
PV=1.01**P
DPVDPV=DLDL0*DPDT
RETURN
END
C SUBROUTINE SUBREV CALCULATES EVAPOTRANSPIRATION

IMPLICIT REAL*8 (A-H,O-Z)
COMMON/RESIST/R1,R2,R3,R4,K5,RP1,RA,RRA,RRB,RRC,RPR,RQ,RLIT

RT1=RT1*K5/D
RT2=R1*R2/D
RT3=R2*R5/D+RR
RT4=RT1+RT3+RT1*RLIT
RR=RT2+RT1*RT3/D
RRP=(R3+KLIT)*RT2/D
RRC=(R3+KLIT)*RT1/D
D=RRA+RRC
B=RA-(PRA*PSI(1)+RRC*PSI(2)+D)/(PRA*PRA+RRC/D)
RETURN
END
SUBROUTINE SOLVOLY
C SOLVOLY SOLVES FOR THE ROOTS OF A NONLINEAR EQUATION USING
C LINEAR FRACTIONAL ITERATION
C WESTLEY,G.W.,AND J.A.WATTS,1970THE COMPUTING TECHNOLOGY
C CENTER NUMERICAL ANALYSIS LIBRARY,CTC-30
REAL*8A(1:4),G(1)
DATA I,0,D/0/-1
DIMENSION X(301),FX(30)

4B(1S(X,X1,X3,X2,X1,Y3+Y2,Y1)=X3+(Y1*Y2+Y3)(X3-X1)*(X2-X3))/ (Y1*Y2)

1=1

X(1)=0
CALL EVAL(X(1),FX(1))
IF (FX(1).LT.0.D0) GO TO 20

X(2)=X(1)
FX(2)=FX(1)
10 CONTINUE
X(1)=X(2)+200.D0
CALL EVAL(X(1),FX(1))
IF (FX(1).LT.0.D0) AND (FX(2).GE.0.D0) GO TO 10

X(2)=X(1)
FX(2)=FX(1)
1=1+1

GU TO 10

20 CONTINUE
X(2)=X(1)-200.D0
CALL EVAL(X(2),FX(2))
IF (FX(1).LT.0.D0) AND (FX(2).GT.0.D0) GO TO 30

X(1)=X(2)
FX(1)=FX(2)

1=1+1
GO TO 20

30 CONTINUE
X(3)=X(1)+X(2)/2.0
CALL EVAL(X(3),FX(3))
NIT=NIT+1
DO 40 I=1,NIT

II=I

X(1)=ABS(X(1)-X(I-1))X(I-2),X(I-3),FX(I-1),FX(I-2),FX(I-3))
CALL EVAL(X(1),FX(1))
IF (FABS(FX(1)).LE.1.0D-5) GO TO 50

40 CONTINUE
PRINT 10000
50 CONTINUE
RETURN
FORMAT('GERRCA')
END
SUBROUTINE ENDSITE(NERR)
C SUBROUTINE ENDATA IS THE INPUT FOR ENVIRONMENTAL DATA.
C ENDATA HAS BEEN WRITTEN TO BE COMPATIBLE WITH THE WATERSHED
C TRANSPORT MODEL UNDER DEVELOPMENT BY D.D. HUFF OF THE LAKE
C MNGPA SITE, EASTERN DECIDUOUS FOREST HOME, IBP
C LASTDY IS AN ARRAY CONTAINING THE NUMBER OF DAYS IN EACH MONTH
C MOBJG IS THE MONTH NUMERICAL IN WHICH THE SIMULATION STARTS
C NOTE--MOBJG IS ALWAYS SET TO 1 IN THIS PROGRAM
C THE DATA ARE READ IN THE ORDER--
C 1. DAILY TOTAL PRECIPITATION(INCHES)
C 2. DAILY TOTAL SOLAR RADIATION(MILLJANAEYS)
C 3. DAYTIME MEAN VAPOR PRESSURE(KILOBARAS)
C 4. DAYTIME MEAN TEMPERATURE(DEGREES FAHRENHEIT)
C THE DATA ARE ON CARDS CONTAINING THE FOLLOWING INFORMATION--
C 1. IMD THE NUMERICAL VALUE OF THE MONTH
C 2. IDY THE CARD NUMBER FOR THE MONTH (1,2, OR 3)
C 3. DBS A DAT CARD NUMBER FOR THE fibrinogen PROBLEM DEFINITION.
C CASEID WILL BE THE READING UPON OUTPUT.

READ(50,10000) CASEID
READ(51,10100) CASEID
READ(50,10200,END=210) LASTDY,MOBJG
READ(51,10300) MOBJG,LASTDY
KD = 0
MODMD = 0
READ(50,10400) IMD,ID,RP
NO = NODMD+1
IF (IDY.GT.2) GO TO 30
DO 20 I=1,11
KD = KD+1
20 PRECIP(KD) = RP(I)*2.5400
DO 40 I=1,10
KD = KD+1
DO 40 I=1,25
IF (NCP.GE.36) GO TO 50
GO TO 10
40 PRECIP(KD) = RP(I)*2.5400
50 KD = KD+1
MODMD = 0
WRITE(51,10500) PRECIP
READ(50,10400) IMD,ID,RP
NO = NO+1
IF (IDY.GT.2) GO TO 80
DO 80 I=1,11
KD = KD+1
80 KD = KD+1
GO TO 60
READ(50,10400) IMD,ID,RP
NO = NO+1
IF (IDY.GT.2) GO TO 80
DO 80 I=1,11
KD = KD+1
80 KD = KD+1
GO TO 60
ISN 0042  90  SOLAR(KDAY)=RP(I)
ISN 0043  IF (INOMC.GE.36) GO TO 100
ISN 0045  GD AT 60
ISN 0046  100  KDAY = 0
ISN 0047  NOOM=0
ISN 0048  WRITE(51,10400) SOLAR
ISN 0049  110  READ(50,10400) IMDY,RP
ISN 0050  NOOM=NCMD+1
ISN 0051  IF (IMDY.GT.2) GO TO 130
ISN 0053  DO 120  I=1,11
ISN 0054  KDAY=KDAY+1
C      RP(I)=(RP(I)-3.201)*5.00/9.00)+27.301
C      R1=5.793D2*1.001*1.002*732D-100*RP(I)+1.978D0
C      VAPOR(KDAY)=6.11D-3*EXP(R1)
ISN 0055  120  VAPOR(KDAY)=RP(I)*10.001
ISN 0056  GO TO 110
ISN 0057  130  LAST = LASTY(I) + 22
ISN 0058  DO 140  I=1, LAST
ISN 0059  KDAY=KDAY+1
C      RP(I)=(RP(I)-3.201)*5.00/9.00)+27.301
C      R1=5.793D2*1.001*1.002*732D-100*RP(I)+1.978D0
C      VAPOR(KDAY)=6.11D-3*EXP(R1)
ISN 0060  140  VAPOR(KDAY)=RP(I)*10.001
ISN 0061  IF (NOOMC.GE.36) GO TO 150
ISN 0063  GO TO 110
ISN 0064  150  KDAY = 0
ISN 0065  NOOM=0
ISN 0066  WRITE(51,10700) VAPOR
ISN 0067  160  READ(50,10400) IMDY,RP
ISN 0068  NOOMC=NCMD+1
ISN 0069  IF (IMDY.GT.2) GO TO 180
ISN 0071  DO 170  I=1,11
ISN 0072  KDAY=KDAY+1
C      TEMF(KDAY)=(RP(I)+32.000)*5.00/9.00
ISN 0073  170  GO TO 160
ISN 0075  180  KDAY=KDAY+1
C      TEMF(KDAY)=(RP(I)+32.000)*5.00/9.00
ISN 0077  KDAY=KDAY+1
C      TEMF(KDAY)=(RP(I)+32.000)*5.00/9.00
ISN 0079  IF (NOOMC.GE.36) GO TO 200
ISN 0081  GO TO 160
ISN 0082  200  KDAY = 0
ISN 0083  NOOM=0
ISN 0084  WRITE(51,10800) TEMF
ISN 0085  RETURN
ISN 0086  210  NEXK=0
ISN 0087  RETURN
ISN 0088  10000 FORMA(2044)
ISN 0089  10100 FORMA(T1,*,2044)
ISN 0090  10200 FORMA(1515)
ISN 0091  10300 FORMA(T1,50 DAYS PER MONTH. SIMULATION BEGINNING WITH MONTH +1,13)/ENDA 530
C      (11,12,133)
C      FORMA(9X,12,11,1106,3)
ISN 0092  10400 FORMA(T1,*,2044)
ISN 0093  10500 FORMA(T1,*,2044)
ISN 0094  10600 FORMA(T1,50 SCALAR (LANGLEY PER DAY)/(T1,*,10(E10.5,2X))
C      TEMF(KDAY)=(RP(I)+32.000)*5.00/9.00
ISN 0095  10700 FORMA(T1,*,2044)
ISN 0096  10800 FORMA(T1,*,2044)
ISN 0097  END
### FULLERTON "FVC" 2 WALKER BRANCH

<table>
<thead>
<tr>
<th>CLASS</th>
<th>PRESSURE</th>
<th>THETA</th>
<th>CALCULATED X</th>
<th>SAT MATCH</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1.000</td>
<td>0.126</td>
<td>0.784-02</td>
<td>1.188-02</td>
</tr>
<tr>
<td>2</td>
<td>0.800</td>
<td>0.238</td>
<td>0.448-02</td>
<td>0.448-02</td>
</tr>
<tr>
<td>3</td>
<td>0.800</td>
<td>0.238</td>
<td>0.448-02</td>
<td>0.448-02</td>
</tr>
<tr>
<td>4</td>
<td>0.800</td>
<td>0.238</td>
<td>0.448-02</td>
<td>0.448-02</td>
</tr>
<tr>
<td>5</td>
<td>0.800</td>
<td>0.238</td>
<td>0.448-02</td>
<td>0.448-02</td>
</tr>
<tr>
<td>6</td>
<td>0.800</td>
<td>0.238</td>
<td>0.448-02</td>
<td>0.448-02</td>
</tr>
<tr>
<td>7</td>
<td>0.800</td>
<td>0.238</td>
<td>0.448-02</td>
<td>0.448-02</td>
</tr>
<tr>
<td>8</td>
<td>0.800</td>
<td>0.238</td>
<td>0.448-02</td>
<td>0.448-02</td>
</tr>
<tr>
<td>9</td>
<td>0.800</td>
<td>0.238</td>
<td>0.448-02</td>
<td>0.448-02</td>
</tr>
<tr>
<td>10</td>
<td>0.800</td>
<td>0.238</td>
<td>0.448-02</td>
<td>0.448-02</td>
</tr>
<tr>
<td>11</td>
<td>0.800</td>
<td>0.238</td>
<td>0.448-02</td>
<td>0.448-02</td>
</tr>
<tr>
<td>12</td>
<td>0.800</td>
<td>0.238</td>
<td>0.448-02</td>
<td>0.448-02</td>
</tr>
<tr>
<td>13</td>
<td>0.800</td>
<td>0.238</td>
<td>0.448-02</td>
<td>0.448-02</td>
</tr>
<tr>
<td>14</td>
<td>0.800</td>
<td>0.238</td>
<td>0.448-02</td>
<td>0.448-02</td>
</tr>
<tr>
<td>15</td>
<td>0.800</td>
<td>0.238</td>
<td>0.448-02</td>
<td>0.448-02</td>
</tr>
<tr>
<td>16</td>
<td>0.800</td>
<td>0.238</td>
<td>0.448-02</td>
<td>0.448-02</td>
</tr>
<tr>
<td>17</td>
<td>0.800</td>
<td>0.238</td>
<td>0.448-02</td>
<td>0.448-02</td>
</tr>
<tr>
<td>18</td>
<td>0.800</td>
<td>0.238</td>
<td>0.448-02</td>
<td>0.448-02</td>
</tr>
<tr>
<td>19</td>
<td>0.800</td>
<td>0.238</td>
<td>0.448-02</td>
<td>0.448-02</td>
</tr>
<tr>
<td>20</td>
<td>0.800</td>
<td>0.238</td>
<td>0.448-02</td>
<td>0.448-02</td>
</tr>
<tr>
<td>21</td>
<td>0.800</td>
<td>0.238</td>
<td>0.448-02</td>
<td>0.448-02</td>
</tr>
<tr>
<td>22</td>
<td>0.800</td>
<td>0.238</td>
<td>0.448-02</td>
<td>0.448-02</td>
</tr>
<tr>
<td>23</td>
<td>0.800</td>
<td>0.238</td>
<td>0.448-02</td>
<td>0.448-02</td>
</tr>
<tr>
<td>24</td>
<td>0.800</td>
<td>0.238</td>
<td>0.448-02</td>
<td>0.448-02</td>
</tr>
<tr>
<td>25</td>
<td>0.800</td>
<td>0.238</td>
<td>0.448-02</td>
<td>0.448-02</td>
</tr>
<tr>
<td>26</td>
<td>0.800</td>
<td>0.238</td>
<td>0.448-02</td>
<td>0.448-02</td>
</tr>
<tr>
<td>27</td>
<td>0.800</td>
<td>0.238</td>
<td>0.448-02</td>
<td>0.448-02</td>
</tr>
<tr>
<td>28</td>
<td>0.800</td>
<td>0.238</td>
<td>0.448-02</td>
<td>0.448-02</td>
</tr>
<tr>
<td>29</td>
<td>0.800</td>
<td>0.238</td>
<td>0.448-02</td>
<td>0.448-02</td>
</tr>
<tr>
<td>30</td>
<td>0.800</td>
<td>0.238</td>
<td>0.448-02</td>
<td>0.448-02</td>
</tr>
<tr>
<td>31</td>
<td>0.800</td>
<td>0.238</td>
<td>0.448-02</td>
<td>0.448-02</td>
</tr>
<tr>
<td>32</td>
<td>0.800</td>
<td>0.238</td>
<td>0.448-02</td>
<td>0.448-02</td>
</tr>
<tr>
<td>33</td>
<td>0.800</td>
<td>0.238</td>
<td>0.448-02</td>
<td>0.448-02</td>
</tr>
<tr>
<td>34</td>
<td>0.800</td>
<td>0.238</td>
<td>0.448-02</td>
<td>0.448-02</td>
</tr>
<tr>
<td>35</td>
<td>0.800</td>
<td>0.238</td>
<td>0.448-02</td>
<td>0.448-02</td>
</tr>
<tr>
<td>36</td>
<td>0.800</td>
<td>0.238</td>
<td>0.448-02</td>
<td>0.448-02</td>
</tr>
<tr>
<td>37</td>
<td>0.800</td>
<td>0.238</td>
<td>0.448-02</td>
<td>0.448-02</td>
</tr>
<tr>
<td>38</td>
<td>0.800</td>
<td>0.238</td>
<td>0.448-02</td>
<td>0.448-02</td>
</tr>
<tr>
<td>39</td>
<td>0.800</td>
<td>0.238</td>
<td>0.448-02</td>
<td>0.448-02</td>
</tr>
<tr>
<td>40</td>
<td>0.800</td>
<td>0.238</td>
<td>0.448-02</td>
<td>0.448-02</td>
</tr>
<tr>
<td>41</td>
<td>0.800</td>
<td>0.238</td>
<td>0.448-02</td>
<td>0.448-02</td>
</tr>
<tr>
<td>42</td>
<td>0.800</td>
<td>0.238</td>
<td>0.448-02</td>
<td>0.448-02</td>
</tr>
<tr>
<td>43</td>
<td>0.800</td>
<td>0.238</td>
<td>0.448-02</td>
<td>0.448-02</td>
</tr>
<tr>
<td>44</td>
<td>0.800</td>
<td>0.238</td>
<td>0.448-02</td>
<td>0.448-02</td>
</tr>
<tr>
<td>45</td>
<td>0.800</td>
<td>0.238</td>
<td>0.448-02</td>
<td>0.448-02</td>
</tr>
<tr>
<td>46</td>
<td>0.800</td>
<td>0.238</td>
<td>0.448-02</td>
<td>0.448-02</td>
</tr>
<tr>
<td>47</td>
<td>0.800</td>
<td>0.238</td>
<td>0.448-02</td>
<td>0.448-02</td>
</tr>
<tr>
<td>48</td>
<td>0.800</td>
<td>0.238</td>
<td>0.448-02</td>
<td>0.448-02</td>
</tr>
<tr>
<td>49</td>
<td>0.800</td>
<td>0.238</td>
<td>0.448-02</td>
<td>0.448-02</td>
</tr>
<tr>
<td>50</td>
<td>0.800</td>
<td>0.238</td>
<td>0.448-02</td>
<td>0.448-02</td>
</tr>
</tbody>
</table>

**INPUT DATA FOR THE ABOVE OUTPUT**
<table>
<thead>
<tr>
<th>i</th>
<th>Theta</th>
<th>Pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1.25</td>
<td>13000.0</td>
</tr>
<tr>
<td>2</td>
<td>1.55</td>
<td>10000.0</td>
</tr>
<tr>
<td>3</td>
<td>1.75</td>
<td>8617.2</td>
</tr>
<tr>
<td>4</td>
<td>1.85</td>
<td>5334.8</td>
</tr>
<tr>
<td>5</td>
<td>2.15</td>
<td>10000.0</td>
</tr>
<tr>
<td>6</td>
<td>2.45</td>
<td>5.0</td>
</tr>
<tr>
<td>7</td>
<td>2.65</td>
<td>5.0</td>
</tr>
<tr>
<td>8</td>
<td>2.70</td>
<td>0.0</td>
</tr>
</tbody>
</table>

### Input Data for the Above Output

- **Fullerton Field**
- **RZET**
- **Walker Ranch**
- **Number of Wells**: 9
- **Well Size**: 3,000 ft
- **Factor**: 0.90
- **VSMH**: 0.013586
- **RSMH**: 0.011386
- **Temp**: 15.0°C
- **Exponent**: 2.0
- **Gravity**: 9.810
- **API**: 2.09660

### Calculation Data

<table>
<thead>
<tr>
<th>Grass</th>
<th>Pressure</th>
<th>Theta</th>
<th>Calculated</th>
<th>Match</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1226.7</td>
<td>0.26</td>
<td>1226.15</td>
<td>1.26</td>
</tr>
<tr>
<td>2</td>
<td>1257.1</td>
<td>0.119</td>
<td>1257.05</td>
<td>1.20</td>
</tr>
<tr>
<td>3</td>
<td>1218.1</td>
<td>0.119</td>
<td>1218.02</td>
<td>1.20</td>
</tr>
<tr>
<td>4</td>
<td>012.9</td>
<td>0.194</td>
<td>012.75</td>
<td>0.19</td>
</tr>
<tr>
<td>5</td>
<td>016.2</td>
<td>0.175</td>
<td>016.05</td>
<td>0.17</td>
</tr>
<tr>
<td>6</td>
<td>010.2</td>
<td>0.194</td>
<td>010.02</td>
<td>0.19</td>
</tr>
<tr>
<td>7</td>
<td>013.9</td>
<td>0.211</td>
<td>013.9</td>
<td>0.21</td>
</tr>
<tr>
<td>8</td>
<td>010.0</td>
<td>0.203</td>
<td>010.0</td>
<td>0.20</td>
</tr>
<tr>
<td>9</td>
<td>014.5</td>
<td>0.204</td>
<td>014.45</td>
<td>0.20</td>
</tr>
<tr>
<td>10</td>
<td>019.5</td>
<td>0.204</td>
<td>019.45</td>
<td>0.20</td>
</tr>
<tr>
<td>11</td>
<td>015.5</td>
<td>0.210</td>
<td>015.5</td>
<td>0.21</td>
</tr>
<tr>
<td>12</td>
<td>008.5</td>
<td>0.213</td>
<td>008.5</td>
<td>0.21</td>
</tr>
<tr>
<td>13</td>
<td>008.5</td>
<td>0.215</td>
<td>008.5</td>
<td>0.21</td>
</tr>
<tr>
<td>14</td>
<td>008.5</td>
<td>0.220</td>
<td>008.5</td>
<td>0.22</td>
</tr>
<tr>
<td>15</td>
<td>008.5</td>
<td>0.222</td>
<td>008.5</td>
<td>0.22</td>
</tr>
<tr>
<td>16</td>
<td>008.5</td>
<td>0.225</td>
<td>008.5</td>
<td>0.22</td>
</tr>
<tr>
<td>17</td>
<td>008.5</td>
<td>0.227</td>
<td>008.5</td>
<td>0.22</td>
</tr>
<tr>
<td>18</td>
<td>008.5</td>
<td>0.230</td>
<td>008.5</td>
<td>0.23</td>
</tr>
<tr>
<td>19</td>
<td>008.5</td>
<td>0.232</td>
<td>008.5</td>
<td>0.23</td>
</tr>
<tr>
<td>20</td>
<td>008.5</td>
<td>0.234</td>
<td>008.5</td>
<td>0.23</td>
</tr>
<tr>
<td>21</td>
<td>008.5</td>
<td>0.236</td>
<td>008.5</td>
<td>0.23</td>
</tr>
<tr>
<td>22</td>
<td>008.5</td>
<td>0.238</td>
<td>008.5</td>
<td>0.23</td>
</tr>
<tr>
<td>23</td>
<td>008.5</td>
<td>0.240</td>
<td>008.5</td>
<td>0.24</td>
</tr>
<tr>
<td>24</td>
<td>008.5</td>
<td>0.242</td>
<td>008.5</td>
<td>0.24</td>
</tr>
<tr>
<td>25</td>
<td>008.5</td>
<td>0.244</td>
<td>008.5</td>
<td>0.24</td>
</tr>
<tr>
<td>26</td>
<td>008.5</td>
<td>0.246</td>
<td>008.5</td>
<td>0.24</td>
</tr>
<tr>
<td>27</td>
<td>008.5</td>
<td>0.248</td>
<td>008.5</td>
<td>0.24</td>
</tr>
<tr>
<td>28</td>
<td>008.5</td>
<td>0.250</td>
<td>008.5</td>
<td>0.25</td>
</tr>
<tr>
<td>29</td>
<td>008.5</td>
<td>0.252</td>
<td>008.5</td>
<td>0.25</td>
</tr>
<tr>
<td>30</td>
<td>008.5</td>
<td>0.254</td>
<td>008.5</td>
<td>0.25</td>
</tr>
<tr>
<td>31</td>
<td>008.5</td>
<td>0.256</td>
<td>008.5</td>
<td>0.25</td>
</tr>
<tr>
<td>32</td>
<td>008.5</td>
<td>0.258</td>
<td>008.5</td>
<td>0.25</td>
</tr>
<tr>
<td>33</td>
<td>008.5</td>
<td>0.260</td>
<td>008.5</td>
<td>0.26</td>
</tr>
<tr>
<td>34</td>
<td>008.5</td>
<td>0.262</td>
<td>008.5</td>
<td>0.26</td>
</tr>
<tr>
<td>35</td>
<td>008.5</td>
<td>0.264</td>
<td>008.5</td>
<td>0.26</td>
</tr>
<tr>
<td>36</td>
<td>008.5</td>
<td>0.266</td>
<td>008.5</td>
<td>0.26</td>
</tr>
<tr>
<td>37</td>
<td>008.5</td>
<td>0.268</td>
<td>008.5</td>
<td>0.26</td>
</tr>
<tr>
<td>38</td>
<td>008.5</td>
<td>0.270</td>
<td>008.5</td>
<td>0.27</td>
</tr>
<tr>
<td>39</td>
<td>008.5</td>
<td>0.272</td>
<td>008.5</td>
<td>0.27</td>
</tr>
<tr>
<td>40</td>
<td>008.5</td>
<td>0.274</td>
<td>008.5</td>
<td>0.27</td>
</tr>
<tr>
<td>41</td>
<td>008.5</td>
<td>0.276</td>
<td>008.5</td>
<td>0.27</td>
</tr>
<tr>
<td>42</td>
<td>008.5</td>
<td>0.278</td>
<td>008.5</td>
<td>0.27</td>
</tr>
<tr>
<td>43</td>
<td>008.5</td>
<td>0.280</td>
<td>008.5</td>
<td>0.28</td>
</tr>
<tr>
<td>44</td>
<td>008.5</td>
<td>0.282</td>
<td>008.5</td>
<td>0.28</td>
</tr>
<tr>
<td>45</td>
<td>008.5</td>
<td>0.284</td>
<td>008.5</td>
<td>0.28</td>
</tr>
<tr>
<td>46</td>
<td>008.5</td>
<td>0.286</td>
<td>008.5</td>
<td>0.28</td>
</tr>
</tbody>
</table>

### Note

- The above data is for the output of the calculation.
### Output Description

Values for each section category are recorded for infiltration, interception storage, transpiration rates, and other potential losses. Soil evaporation, change, and the water contents of the five layers, the net water initial units are based. All other units are converted.

#### Weekly Summary and Annual Summary areprinted for precipitation, evaporation, interception, transpiration, soil evaporation, total evaporation, drainage, outflow, soil storage, and mass balance. All values are in centimeters.

#### Week 1

<table>
<thead>
<tr>
<th>Day</th>
<th>Infiltration (cm)</th>
<th>Precipitation (cm)</th>
<th>Evaporation (cm)</th>
<th>Drainage (cm)</th>
<th>Outflow (cm)</th>
<th>Water Storage Balance (cm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>2</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>3</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>4</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>5</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>6</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>7</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
</tbody>
</table>

#### Week 2

<table>
<thead>
<tr>
<th>Day</th>
<th>Infiltration (cm)</th>
<th>Precipitation (cm)</th>
<th>Evaporation (cm)</th>
<th>Drainage (cm)</th>
<th>Outflow (cm)</th>
<th>Water Storage Balance (cm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>9</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>10</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>11</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>12</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>13</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>14</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
</tbody>
</table>

#### Week 3

<table>
<thead>
<tr>
<th>Day</th>
<th>Infiltration (cm)</th>
<th>Precipitation (cm)</th>
<th>Evaporation (cm)</th>
<th>Drainage (cm)</th>
<th>Outflow (cm)</th>
<th>Water Storage Balance (cm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>15</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>16</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>17</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>18</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>19</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>20</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>21</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
</tbody>
</table>

#### Week 4

<table>
<thead>
<tr>
<th>Day</th>
<th>Infiltration (cm)</th>
<th>Precipitation (cm)</th>
<th>Evaporation (cm)</th>
<th>Drainage (cm)</th>
<th>Outflow (cm)</th>
<th>Water Storage Balance (cm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>22</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>23</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>24</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>25</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>26</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>27</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
</tbody>
</table>
### Monthly Water Balance (ECM) for Month 3

<table>
<thead>
<tr>
<th>Date</th>
<th>Precipitation</th>
<th>Evapotranspiration</th>
<th>Interception</th>
<th>Transpiration</th>
<th>Soil Evap</th>
<th>Total ET</th>
</tr>
</thead>
<tbody>
<tr>
<td>March 1</td>
<td>15.37</td>
<td>14.95</td>
<td>0.06</td>
<td>0.07</td>
<td>0.02</td>
<td>1.07</td>
</tr>
</tbody>
</table>

**Soil Storage**

<table>
<thead>
<tr>
<th>Date</th>
<th>Outflow</th>
<th>Soil Storage</th>
<th>Balance</th>
</tr>
</thead>
<tbody>
<tr>
<td>March 1</td>
<td>16.69</td>
<td>14.43</td>
<td>0.24</td>
</tr>
</tbody>
</table>

**Klamath Branch Precipitation Rate**

| Date       | 1.07         |

#### Weekly Summary for Week 1

<table>
<thead>
<tr>
<th>Date</th>
<th>Precipitation</th>
<th>Interception</th>
<th>Transpiration</th>
<th>Soil Evap</th>
<th>Total ET</th>
</tr>
</thead>
<tbody>
<tr>
<td>March 1</td>
<td>15.37</td>
<td>14.95</td>
<td>0.06</td>
<td>0.07</td>
<td>0.02</td>
</tr>
</tbody>
</table>

**Soil Storage**

<table>
<thead>
<tr>
<th>Date</th>
<th>Outflow</th>
<th>Soil Storage</th>
<th>Balance</th>
</tr>
</thead>
<tbody>
<tr>
<td>March 1</td>
<td>16.69</td>
<td>14.43</td>
<td>0.24</td>
</tr>
</tbody>
</table>

**Klamath Branch Precipitation Rate**

| Date       | 1.07         |

#### Weekly Summary for Week 2

<table>
<thead>
<tr>
<th>Date</th>
<th>Precipitation</th>
<th>Interception</th>
<th>Transpiration</th>
<th>Soil Evap</th>
<th>Total ET</th>
</tr>
</thead>
<tbody>
<tr>
<td>March 1</td>
<td>15.37</td>
<td>14.95</td>
<td>0.06</td>
<td>0.07</td>
<td>0.02</td>
</tr>
</tbody>
</table>

**Soil Storage**

<table>
<thead>
<tr>
<th>Date</th>
<th>Outflow</th>
<th>Soil Storage</th>
<th>Balance</th>
</tr>
</thead>
<tbody>
<tr>
<td>March 1</td>
<td>16.69</td>
<td>14.43</td>
<td>0.24</td>
</tr>
</tbody>
</table>

**Klamath Branch Precipitation Rate**

| Date       | 1.07         |

#### Weekly Summary for Week 3

<table>
<thead>
<tr>
<th>Date</th>
<th>Precipitation</th>
<th>Interception</th>
<th>Transpiration</th>
<th>Soil Evap</th>
<th>Total ET</th>
</tr>
</thead>
<tbody>
<tr>
<td>March 1</td>
<td>15.37</td>
<td>14.95</td>
<td>0.06</td>
<td>0.07</td>
<td>0.02</td>
</tr>
</tbody>
</table>

**Soil Storage**

<table>
<thead>
<tr>
<th>Date</th>
<th>Outflow</th>
<th>Soil Storage</th>
<th>Balance</th>
</tr>
</thead>
<tbody>
<tr>
<td>March 1</td>
<td>16.69</td>
<td>14.43</td>
<td>0.24</td>
</tr>
</tbody>
</table>

**Klamath Branch Precipitation Rate**

| Date       | 1.07         |

#### Weekly Summary for Week 4

<table>
<thead>
<tr>
<th>Date</th>
<th>Precipitation</th>
<th>Interception</th>
<th>Transpiration</th>
<th>Soil Evap</th>
<th>Total ET</th>
</tr>
</thead>
<tbody>
<tr>
<td>March 1</td>
<td>15.37</td>
<td>14.95</td>
<td>0.06</td>
<td>0.07</td>
<td>0.02</td>
</tr>
</tbody>
</table>

**Soil Storage**

<table>
<thead>
<tr>
<th>Date</th>
<th>Outflow</th>
<th>Soil Storage</th>
<th>Balance</th>
</tr>
</thead>
<tbody>
<tr>
<td>March 1</td>
<td>16.69</td>
<td>14.43</td>
<td>0.24</td>
</tr>
</tbody>
</table>

**Klamath Branch Precipitation Rate**

| Date       | 1.07         |
### Monthly Water Budget Summary

#### Month: 9

<table>
<thead>
<tr>
<th>DRAINAGE</th>
<th>OUTFLOW</th>
<th>SOIL STORAGE</th>
<th>BALANCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.238461</td>
<td>0.49630</td>
<td>0.379240</td>
<td>1.200300</td>
</tr>
</tbody>
</table>

#### Precipitation Breakdown: Month 9

<table>
<thead>
<tr>
<th>PRECIPITATION</th>
<th>INFILTRATION</th>
<th>INTERCEPTET</th>
<th>TRANSPARATION</th>
<th>SOIL EVAP</th>
<th>TOTAL ET</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.5286</td>
<td>0.68720</td>
<td>0.21400</td>
<td>1.298600-90</td>
<td>0.40860</td>
<td>0.29005</td>
</tr>
</tbody>
</table>

#### Weekly Summary for Week 1

<table>
<thead>
<tr>
<th>DRAINAGE</th>
<th>OUTFLOW</th>
<th>SOIL STORAGE</th>
<th>BALANCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.215000</td>
<td>2.21200</td>
<td>0.310900</td>
<td>1.801900</td>
</tr>
</tbody>
</table>

#### Weekly Summary for Week 2

<table>
<thead>
<tr>
<th>DRAINAGE</th>
<th>OUTFLOW</th>
<th>SOIL STORAGE</th>
<th>BALANCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.215000</td>
<td>2.21200</td>
<td>0.310900</td>
<td>1.801900</td>
</tr>
</tbody>
</table>

#### Weekly Summary for Week 3

<table>
<thead>
<tr>
<th>DRAINAGE</th>
<th>OUTFLOW</th>
<th>SOIL STORAGE</th>
<th>BALANCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.215000</td>
<td>2.21200</td>
<td>0.310900</td>
<td>1.801900</td>
</tr>
</tbody>
</table>

#### Weekly Summary for Week 4

<table>
<thead>
<tr>
<th>DRAINAGE</th>
<th>OUTFLOW</th>
<th>SOIL STORAGE</th>
<th>BALANCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.215000</td>
<td>2.21200</td>
<td>0.310900</td>
<td>1.801900</td>
</tr>
</tbody>
</table>
### Weekly Summary for Week 1

<table>
<thead>
<tr>
<th>Date</th>
<th>Precipitation</th>
<th>Infiltration</th>
<th>Intercept-ET</th>
<th>Transpiration</th>
<th>Soil Evap</th>
<th>Total ET</th>
</tr>
</thead>
<tbody>
<tr>
<td>7-3-1985</td>
<td>0.130</td>
<td>0.119</td>
<td>0.070</td>
<td>0.0</td>
<td>0.000</td>
<td>0.269</td>
</tr>
<tr>
<td>7-4-1985</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
</tr>
<tr>
<td>7-5-1985</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
</tr>
<tr>
<td>7-6-1985</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
</tr>
<tr>
<td>7-7-1985</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
</tr>
</tbody>
</table>

### Weekly Summary for Week 2

<table>
<thead>
<tr>
<th>Date</th>
<th>Precipitation</th>
<th>Infiltration</th>
<th>Intercept-ET</th>
<th>Transpiration</th>
<th>Soil Evap</th>
<th>Total ET</th>
</tr>
</thead>
<tbody>
<tr>
<td>7-8-1985</td>
<td>0.119</td>
<td>0.119</td>
<td>0.070</td>
<td>0.0</td>
<td>0.000</td>
<td>0.269</td>
</tr>
<tr>
<td>7-9-1985</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
</tr>
<tr>
<td>7-10-1985</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
</tr>
<tr>
<td>7-11-1985</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
</tr>
<tr>
<td>7-12-1985</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
</tr>
</tbody>
</table>

### Weekly Summary for Week 3

<table>
<thead>
<tr>
<th>Date</th>
<th>Precipitation</th>
<th>Infiltration</th>
<th>Intercept-ET</th>
<th>Transpiration</th>
<th>Soil Evap</th>
<th>Total ET</th>
</tr>
</thead>
<tbody>
<tr>
<td>7-13-1985</td>
<td>0.130</td>
<td>0.119</td>
<td>0.070</td>
<td>0.0</td>
<td>0.000</td>
<td>0.269</td>
</tr>
<tr>
<td>7-14-1985</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
</tr>
<tr>
<td>7-15-1985</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
</tr>
<tr>
<td>7-16-1985</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
</tr>
<tr>
<td>7-17-1985</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
</tr>
</tbody>
</table>

### Weekly Summary for Week 4

<table>
<thead>
<tr>
<th>Date</th>
<th>Precipitation</th>
<th>Infiltration</th>
<th>Intercept-ET</th>
<th>Transpiration</th>
<th>Soil Evap</th>
<th>Total ET</th>
</tr>
</thead>
<tbody>
<tr>
<td>7-18-1985</td>
<td>0.130</td>
<td>0.119</td>
<td>0.070</td>
<td>0.0</td>
<td>0.000</td>
<td>0.269</td>
</tr>
<tr>
<td>7-19-1985</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
</tr>
<tr>
<td>7-20-1985</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
</tr>
<tr>
<td>7-21-1985</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
</tr>
<tr>
<td>7-22-1985</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
</tr>
</tbody>
</table>
### Monthly Water Budget (ECM) for Month 5

<table>
<thead>
<tr>
<th>Drainage</th>
<th>Outflow</th>
<th>Soil Storage</th>
<th>Balance</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.3081</td>
<td>2.4826</td>
<td>2.5923</td>
<td>0.0842</td>
</tr>
</tbody>
</table>

### Precipitation Implication

#### Monthly Total

<table>
<thead>
<tr>
<th>Month</th>
<th>Precipitation</th>
<th>Evaporation</th>
<th>Total ET</th>
<th>Soil Evap.</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>1.4232</td>
<td>0.4305</td>
<td>1.8537</td>
<td>0.7145</td>
</tr>
</tbody>
</table>

#### Weekly Summary for Week 1

<table>
<thead>
<tr>
<th>Drainage</th>
<th>Outflow</th>
<th>Soil Storage</th>
<th>Balance</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.3081</td>
<td>2.4826</td>
<td>2.5923</td>
<td>0.0842</td>
</tr>
</tbody>
</table>

#### Weekly Summary for Week 2

<table>
<thead>
<tr>
<th>Drainage</th>
<th>Outflow</th>
<th>Soil Storage</th>
<th>Balance</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.3081</td>
<td>2.4826</td>
<td>2.5923</td>
<td>0.0842</td>
</tr>
</tbody>
</table>

#### Weekly Summary for Week 3

<table>
<thead>
<tr>
<th>Drainage</th>
<th>Outflow</th>
<th>Soil Storage</th>
<th>Balance</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.3081</td>
<td>2.4826</td>
<td>2.5923</td>
<td>0.0842</td>
</tr>
</tbody>
</table>

#### Weekly Summary for Week 4

<table>
<thead>
<tr>
<th>Drainage</th>
<th>Outflow</th>
<th>Soil Storage</th>
<th>Balance</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.3081</td>
<td>2.4826</td>
<td>2.5923</td>
<td>0.0842</td>
</tr>
</tbody>
</table>
### Monthly Water Budget (in.)

**Month:** 7

<table>
<thead>
<tr>
<th>Day</th>
<th>Initial Soil Moisture (in.)</th>
<th>Initial Plant Water Use (in.)</th>
<th>Total Water Use (in.)</th>
<th>Runoff (in.)</th>
<th>Soil Storage (in.)</th>
<th>Balance (in.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>2</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>3</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>4</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>5</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>6</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>7</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
</tbody>
</table>

**Weekly Summary for Week 1**

<table>
<thead>
<tr>
<th>Day</th>
<th>Precipitation (in.)</th>
<th>Infiltration (in.)</th>
<th>Intercept-ET (in.)</th>
<th>Transpiration (in.)</th>
<th>Soil Evap (in.)</th>
<th>Total ET (in.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>2</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>3</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>4</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>5</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>6</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>7</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
</tbody>
</table>

**Weekly Summary for Week 2**

<table>
<thead>
<tr>
<th>Day</th>
<th>Precipitation (in.)</th>
<th>Infiltration (in.)</th>
<th>Intercept-ET (in.)</th>
<th>Transpiration (in.)</th>
<th>Soil Evap (in.)</th>
<th>Total ET (in.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>2</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>3</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>4</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>5</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>6</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>7</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
</tbody>
</table>

**Weekly Summary for Week 3**

<table>
<thead>
<tr>
<th>Day</th>
<th>Precipitation (in.)</th>
<th>Infiltration (in.)</th>
<th>Intercept-ET (in.)</th>
<th>Transpiration (in.)</th>
<th>Soil Evap (in.)</th>
<th>Total ET (in.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>2</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>3</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>4</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>5</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>6</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>7</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
</tbody>
</table>

**Weekly Summary for Week 4**

<table>
<thead>
<tr>
<th>Day</th>
<th>Precipitation (in.)</th>
<th>Infiltration (in.)</th>
<th>Intercept-ET (in.)</th>
<th>Transpiration (in.)</th>
<th>Soil Evap (in.)</th>
<th>Total ET (in.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>2</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>3</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>4</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>5</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>6</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>7</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>DRAINAGE</td>
<td>QOUNT</td>
<td>SOIL STORAGE</td>
<td>BALANCE</td>
<td>( 7,340 \times 10^{-3} )</td>
<td></td>
<td></td>
</tr>
<tr>
<td>----------</td>
<td>-------</td>
<td>--------------</td>
<td>---------</td>
<td>---------------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2,340</td>
<td>2,400</td>
<td>2,400</td>
<td>-2,190</td>
<td>2,340</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

MONTHLY WATER BUDGET (CM) FOR WEEK 3

<table>
<thead>
<tr>
<th>PRECIPITATION</th>
<th>INFILTRATION</th>
<th>INTERCEPT-ET</th>
<th>TRANSPARATION</th>
<th>SOIL DEP</th>
<th>TOTAL ET</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,346</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>1,346</td>
</tr>
</tbody>
</table>

WEEKLY SUMMARY FOR WEEK 3

<table>
<thead>
<tr>
<th>PRECIPITATION</th>
<th>INFILTRATION</th>
<th>INTERCEPT-ET</th>
<th>TRANSPARATION</th>
<th>SOIL DEP</th>
<th>TOTAL ET</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.400</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>2.400</td>
</tr>
</tbody>
</table>

WEEKLY SUMMARY FOR WEEK 2

<table>
<thead>
<tr>
<th>PRECIPITATION</th>
<th>INFILTRATION</th>
<th>INTERCEPT-ET</th>
<th>TRANSPARATION</th>
<th>SOIL DEP</th>
<th>TOTAL ET</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.340</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>2.340</td>
</tr>
</tbody>
</table>

WEEKLY SUMMARY FOR WEEK 1

<table>
<thead>
<tr>
<th>PRECIPITATION</th>
<th>INFILTRATION</th>
<th>INTERCEPT-ET</th>
<th>TRANSPARATION</th>
<th>SOIL DEP</th>
<th>TOTAL ET</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.400</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>2.400</td>
</tr>
</tbody>
</table>

WEEKLY SUMMARY FOR WEEK 4

<table>
<thead>
<tr>
<th>PRECIPITATION</th>
<th>INFILTRATION</th>
<th>INTERCEPT-ET</th>
<th>TRANSPARATION</th>
<th>SOIL DEP</th>
<th>TOTAL ET</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
</tr>
</tbody>
</table>
### Monthly Water Budget Eben P. Month B

#### Precipitation Infiltration Interception Transpiration Soil Evapo Total ET

<table>
<thead>
<tr>
<th>Day</th>
<th>Precipitation (mm)</th>
<th>Infiltration (mm)</th>
<th>Interception (mm)</th>
<th>Transpiration (mm)</th>
<th>Soil Evapo (mm)</th>
<th>Total ET (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>225</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>226</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>227</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>228</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>229</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>230</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
</tbody>
</table>

#### Weekly Summary for Week 1

<table>
<thead>
<tr>
<th>Day</th>
<th>Precipitation (mm)</th>
<th>Infiltration (mm)</th>
<th>Interception (mm)</th>
<th>Transpiration (mm)</th>
<th>Soil Evapo (mm)</th>
<th>Total ET (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>222</td>
<td>0.12</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.12</td>
</tr>
<tr>
<td>233</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>234</td>
<td>1.58</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>1.58</td>
</tr>
<tr>
<td>235</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>236</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>237</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
</tbody>
</table>

#### Weekly Summary for Week 2

<table>
<thead>
<tr>
<th>Day</th>
<th>Precipitation (mm)</th>
<th>Infiltration (mm)</th>
<th>Interception (mm)</th>
<th>Transpiration (mm)</th>
<th>Soil Evapo (mm)</th>
<th>Total ET (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>239</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>240</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>241</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>242</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>243</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>244</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
</tbody>
</table>

#### Weekly Summary for Week 3

<table>
<thead>
<tr>
<th>Day</th>
<th>Precipitation (mm)</th>
<th>Infiltration (mm)</th>
<th>Interception (mm)</th>
<th>Transpiration (mm)</th>
<th>Soil Evapo (mm)</th>
<th>Total ET (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>239</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>240</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>241</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>242</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>243</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>244</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
</tbody>
</table>

#### Weekly Summary for Week 4

<table>
<thead>
<tr>
<th>Day</th>
<th>Precipitation (mm)</th>
<th>Infiltration (mm)</th>
<th>Interception (mm)</th>
<th>Transpiration (mm)</th>
<th>Soil Evapo (mm)</th>
<th>Total ET (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>244</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>245</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>246</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>247</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>248</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>249</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>250</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>251</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>252</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
</tbody>
</table>

---

PROSPECT: A MODEL OF ATMOSPHERIC-SOIL-PANT WATER FLOW.
### PROSPECT: A MODEL OF ATOSPHERE-SOIL-PLANT WATER FLOW

#### 1969 Transket Meteorological Data, WAKERS BRANCH PRECIPITATION DATA

<table>
<thead>
<tr>
<th>MONTH</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>DRAINS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OUTFLOW</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SOIL STORAGE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DRAINAGE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### WEEKLY SUMMARY FOR WEEK 1

<table>
<thead>
<tr>
<th>FICIPITATION</th>
<th>INFLUENCE</th>
<th>INTERCEPT</th>
<th>TRANSPIRATION</th>
<th>SOIL EVAP</th>
<th>TOTAL ET</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
</tr>
</tbody>
</table>

#### WEEKLY SUMMARY FOR WEEK 2

<table>
<thead>
<tr>
<th>FICIPITATION</th>
<th>INFLUENCE</th>
<th>INTERCEPT</th>
<th>TRANSPIRATION</th>
<th>SOIL EVAP</th>
<th>TOTAL ET</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
</tr>
</tbody>
</table>

#### WEEKLY SUMMARY FOR WEEK 3

<table>
<thead>
<tr>
<th>FICIPITATION</th>
<th>INFLUENCE</th>
<th>INTERCEPT</th>
<th>TRANSPIRATION</th>
<th>SOIL EVAP</th>
<th>TOTAL ET</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
</tr>
</tbody>
</table>

#### WEEKLY SUMMARY FOR WEEK 4

<table>
<thead>
<tr>
<th>FICIPITATION</th>
<th>INFLUENCE</th>
<th>INTERCEPT</th>
<th>TRANSPIRATION</th>
<th>SOIL EVAP</th>
<th>TOTAL ET</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
</tr>
</tbody>
</table>

---

**Note:** The table above represents a portion of the weekly summaries for different weeks, showing the impact of precipitation, influence, intercept, transpiration, soil evaporation, and total ET (Evapotranspiration).
### Monthly Water Budget (cm) per Month

<table>
<thead>
<tr>
<th>MONTHLY PRECIPITATION (cm)</th>
<th>INFILTRATION (cm)</th>
<th>INTERCEPT-ET (cm)</th>
<th>TRANSPARATION (cm)</th>
<th>SOIL EVAP (cm)</th>
<th>TOTAL ET (cm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
</tbody>
</table>

### Daily Summary for Week 1

<table>
<thead>
<tr>
<th>DAY</th>
<th>INFILTRATION</th>
<th>INTERCEPT-ET</th>
<th>TRANSPARATION</th>
<th>SOIL EVAP</th>
<th>DRAINAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>248</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>249</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>250</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
</tbody>
</table>

### Weekly Summary for Week 2

<table>
<thead>
<tr>
<th>WEEKLY PRECIPITATION (cm)</th>
<th>INFILTRATION (cm)</th>
<th>INTERCEPT-ET (cm)</th>
<th>TRANSPARATION (cm)</th>
<th>SOIL EVAP (cm)</th>
<th>TOTAL ET (cm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
</tbody>
</table>

### Monthly Summary

<table>
<thead>
<tr>
<th>MONTHLY SUMMARY</th>
<th>INFILTRATION (cm)</th>
<th>INTERCEPT-ET (cm)</th>
<th>TRANSPARATION (cm)</th>
<th>SOIL EVAP (cm)</th>
<th>TOTAL ET (cm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
</tbody>
</table>

### Yearly Totals

<table>
<thead>
<tr>
<th>YEARLY TOTALS</th>
<th>INFILTRATION (cm)</th>
<th>INTERCEPT-ET (cm)</th>
<th>TRANSPARATION (cm)</th>
<th>SOIL EVAP (cm)</th>
<th>TOTAL ET (cm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
</tbody>
</table>
### Monthly Water Budget for Month 11

<table>
<thead>
<tr>
<th>DRAINAGE</th>
<th>OUTFLOW</th>
<th>SCIL STORAGE</th>
<th>BALANCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.648000</td>
<td>0.648000</td>
<td>0.648000</td>
<td>0.648000</td>
</tr>
</tbody>
</table>

#### Monthly Budget Breakdown

<table>
<thead>
<tr>
<th>PRECIPITATION</th>
<th>INfiltration</th>
<th>INTERCEPT-ET</th>
<th>TRANSPON</th>
<th>SCIL EVAP</th>
<th>TOTAL ET</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.9440</td>
<td>5.9440</td>
<td>0.0000</td>
<td>0.0000</td>
<td>0.0000</td>
<td>5.9440</td>
</tr>
</tbody>
</table>

#### Weekly Summary for Week 1

<table>
<thead>
<tr>
<th>WEEKLY SUMMARY</th>
<th>PRECIPITATION</th>
<th>INFILTRATION</th>
<th>INTERCEPT-ET</th>
<th>TRANSPON</th>
<th>SCIL EVAP</th>
<th>TOTAL ET</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.496000</td>
<td>0.496000</td>
<td>0.0000</td>
<td>0.0000</td>
<td>0.0000</td>
<td>0.496000</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>WEEKLY SUMMARY</th>
<th>DRAINAGE</th>
<th>SOIL STORAGE</th>
<th>BALANCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.250000</td>
<td>0.250000</td>
<td>0.250000</td>
<td>0.250000</td>
</tr>
</tbody>
</table>

#### Weekly Summary for Week 2

<table>
<thead>
<tr>
<th>WEEKLY SUMMARY</th>
<th>PRECIPITATION</th>
<th>INFILTRATION</th>
<th>INTERCEPT-ET</th>
<th>TRANSPON</th>
<th>SCIL EVAP</th>
<th>TOTAL ET</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.3586</td>
<td>1.3586</td>
<td>0.0000</td>
<td>0.0000</td>
<td>0.0000</td>
<td>1.3586</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>WEEKLY SUMMARY</th>
<th>DRAINAGE</th>
<th>SOIL STORAGE</th>
<th>BALANCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.250000</td>
<td>0.250000</td>
<td>0.250000</td>
<td>0.250000</td>
</tr>
</tbody>
</table>

#### Weekly Summary for Week 3

<table>
<thead>
<tr>
<th>WEEKLY SUMMARY</th>
<th>PRECIPITATION</th>
<th>INFILTRATION</th>
<th>INTERCEPT-ET</th>
<th>TRANSPON</th>
<th>SCIL EVAP</th>
<th>TOTAL ET</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.5940</td>
<td>2.5940</td>
<td>0.0000</td>
<td>0.0000</td>
<td>0.0000</td>
<td>2.5940</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>WEEKLY SUMMARY</th>
<th>DRAINAGE</th>
<th>SOIL STORAGE</th>
<th>BALANCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.250000</td>
<td>0.250000</td>
<td>0.250000</td>
<td>0.250000</td>
</tr>
</tbody>
</table>

#### Weekly Summary for Week 4

<table>
<thead>
<tr>
<th>WEEKLY SUMMARY</th>
<th>PRECIPITATION</th>
<th>INFILTRATION</th>
<th>INTERCEPT-ET</th>
<th>TRANSPON</th>
<th>SCIL EVAP</th>
<th>TOTAL ET</th>
</tr>
</thead>
<tbody>
<tr>
<td>7.112000</td>
<td>7.112000</td>
<td>0.0000</td>
<td>0.0000</td>
<td>0.0000</td>
<td>7.112000</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>WEEKLY SUMMARY</th>
<th>DRAINAGE</th>
<th>SOIL STORAGE</th>
<th>BALANCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.250000</td>
<td>0.250000</td>
<td>0.250000</td>
<td>0.250000</td>
</tr>
</tbody>
</table>
### Monthly Water Budget (ECI) for Month 12

<table>
<thead>
<tr>
<th>Month</th>
<th>Total ET</th>
<th>Drainage</th>
<th>Outflow</th>
<th>Soil Storage</th>
<th>Balance</th>
<th>Monthly Precipitation</th>
<th>Interception</th>
<th>Transpiration</th>
<th>Soil Evap</th>
<th>Balance</th>
<th>Total ET</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>3.19E+03</td>
<td>2.84E+03</td>
<td>1.04E+03</td>
<td>1.45E+00</td>
<td>1.45E+00</td>
<td>4.41E+04</td>
<td>4.41E+04</td>
<td>4.22E+04</td>
<td>3.87E+04</td>
<td>1.71E+04</td>
<td>1.71E+04</td>
</tr>
</tbody>
</table>

### Weekly Summary for Week 1

<table>
<thead>
<tr>
<th>Day</th>
<th>Precipitation</th>
<th>Irrigation</th>
<th>ET</th>
<th>Transpiration</th>
<th>Soil Evap</th>
<th>Total ET</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Day</th>
<th>Precipitation</th>
<th>Irrigation</th>
<th>ET</th>
<th>Transpiration</th>
<th>Soil Evap</th>
<th>Total ET</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Weekly Summary for Week 2

<table>
<thead>
<tr>
<th>Day</th>
<th>Precipitation</th>
<th>Irrigation</th>
<th>ET</th>
<th>Transpiration</th>
<th>Soil Evap</th>
<th>Total ET</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Weekly Summary for Week 3

<table>
<thead>
<tr>
<th>Day</th>
<th>Precipitation</th>
<th>Irrigation</th>
<th>ET</th>
<th>Transpiration</th>
<th>Soil Evap</th>
<th>Total ET</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Weekly Summary for Week 4

<table>
<thead>
<tr>
<th>Day</th>
<th>Precipitation</th>
<th>Irrigation</th>
<th>ET</th>
<th>Transpiration</th>
<th>Soil Evap</th>
<th>Total ET</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Meteorological Data

- **Wetbulk Precipitation**: 4.41E+04 mm
- **Evaporation**: 3.87E+04 mm
- **Irrigation**: 1.71E+04 mm
- **Transpiration**: 1.71E+04 mm
- **Soil Evaporation**: 1.71E+04 mm

### Other Data

- **Drainage**: 1.45E+00 mm
- **Outflow**: 1.04E+03 mm
- **Soil Storage**: 1.45E+00 mm
- **Balance**: 1.45E+00 mm

### Additional Notes

- The data is presented in a tabular format for easier readability.
- The calculations are based on the principle of mass balance, where the total water input equals the sum of the output.
<table>
<thead>
<tr>
<th></th>
<th>Drainage (m^3)</th>
<th>Outflow (m^3)</th>
<th>Soil Storage (m^3)</th>
<th>Balance (m^3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monthly Water Budget (643.3 ft³)</td>
<td>17,585</td>
<td>27,903</td>
<td>120,660</td>
<td>119,700</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Precipitation</th>
<th>Infiltration</th>
<th>Interception</th>
<th>Transpiration</th>
<th>Soil Evap</th>
<th>Total ET</th>
</tr>
</thead>
<tbody>
<tr>
<td>21,450</td>
<td>31,450</td>
<td></td>
<td>1,450</td>
<td>20,200</td>
<td>17,000</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Annual Water Budget (CM)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Precipitation</td>
</tr>
<tr>
<td>98,250</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Drainage</th>
<th>Outflow</th>
<th>Soil Storage</th>
<th>Balance</th>
<th>Soil Evap</th>
</tr>
</thead>
<tbody>
<tr>
<td>98,250</td>
<td>99,147</td>
<td>1,450</td>
<td>-9,10834</td>
<td>17,000</td>
</tr>
</tbody>
</table>