CALIFORNIA CROP AND SOIL EVAPOTRANSPIRATION

ITRC

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CALIFORNIA
CROP AND SOIL EVAPOTRANSPIRATION
For
Water Balances and Irrigation Scheduling/Design

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FOREWORD

Crop and soil (field) evapotranspiration values presented in this publication (ITRC Report 03-001) were developed in 2002 by the Cal Poly Irrigation Training and Research Center (ITRC) for the report "Evaporation from Irrigated Agricultural Land in California" (ITRC Report 02-001), funded by CALFED and CSU/ARI.

ITRC Report 03-001 is targeted for people who need estimates of crop and soil evapotranspiration and crop/soil coefficients for specific irrigation types and precipitation amounts.

What you will find in this publication

This publication presents evapotranspiration for crops and soils in 13 California Dept. of Water Resources (DWR) Reference Evapotranspiration Zones (ETo Zones) for three types of precipitation years (typical, wet, and dry) on a 12 month basis. For persons interested in *irrigation scheduling and system design*, the publication includes instructions on how to adjust ET values for (i) different irrigation systems, and (ii) different growing seasons. It also includes instructions, for persons doing regional or irrigation district *water balances*, on how to adjust values for (i) bare spots and decreased plant vigor, and (ii) multiple crops on the same field.

One of the main purposes of this publication is to provide California water users with crop/soil ET values that take into account regional environmental and management differences. Furthermore, with the ETo and crop/soil ET information presented in each table, crop coefficients can be calculated with relative ease for regions throughout California.

This publication provides the most comprehensive crop/soil ET values available to date for California.

What you will not find in this publication

This publication is not a guide to irrigation scheduling, which requires an understanding of labor constraints, irrigation system distribution uniformity, and other factors.

ACKNOWLEDGEMENTS

The Cal Poly Irrigation Training and Research Center gratefully acknowledges Dr. Richard Allen of Univ. of Idaho for developing the initial crop and soil evapotranspiration model, described in FAO Irrigation and Drainage Paper No. 56, which was used to develop the values in this report.

Initial research and development of the evapotranspiration values was funded through two different contracts:

1. CALFED
2. The Agricultural Research Initiative of the California State University (CSU/ARI).

Funding for the preparation of this summary publication was provided through a California Department of Water Resources (DWR) contract.

DISCLAIMER

The ET values provided in this publication are best estimates based on specific information such as published ETo values, planting and harvest dates. However, these ET values are not exact. Actual crop and soil evapotranspiration will depend on plant vigor, frequency of irrigation and rainfall, growing season, and irrigation method. Canopy cover and cover crop health are also important ET factors for trees and vines.

Persons involved in irrigation scheduling should use a variety of reality checks. In particular, weather-based ET estimates should always be accompanied by in-field soil moisture verifications.

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INTRODUCTION

How to use this publication

The goal of this publication is to provide water users, consultants, water agency personnel, and others throughout California with information that will: (a) help individual water users with irrigation scheduling and system design and (b) help agricultural water agency personnel with water balances and future planning.

The tables in this publication represent the consolidation of results from thousands of annual ET simulations that accounted for crop, rainfall (wet, dry, or "typical"), soil, and irrigation method in each of 13 major ETo zones in California. The annual simulations used daily water balances at the soil surface, crop canopy, and soil root zone.

When using these tables, one must keep the following in mind:

1. The tables account for soil evaporation 365 days out of the year. Many other published ET tables ignore ET that occurs when a crop is not present.
2. The crop/soil ET values assume typical surface (furrow, border strip, and basin) irrigation management (except for grapes in Zones 3, 6, and 8, where drip irrigation is assumed). Procedures for adjusting the ET values for special conditions, various irrigation methods, etc. are explained in this publication and in the original ITRC Report 02-001 (found at www.itrc.org).
3. The ET values are given for irrigation scheduling and system design purposes. For persons interested in computing water balances, the ET values must be de-rated because in most fields there are some bare spots and areas with decreased vigor – meaning that the field *average* ET is less than the crop/soil ET in areas of the field with healthy crops.

The tables in this publication provide year-round daily estimates of the evapotranspiration (ET) for the ***soil/crop system***. The text explains how to adjust those ET values for special circumstances.

Origin of Crop Coefficients

Many publications address the topic of crop evapotranspiration estimates. Recent publications meant for the water user community generally use the following equation to estimate Crop Evapotranspiration (ETc):

$$Crop\ \ Evapotranspiration = Kc \times ETo$$

Where

Kc = Crop Coefficient

ETo = Grass reference evapotranspiration

The general idea is that if daily ETo information is available, and if one knows the appropriate "Kc" value, one can estimate daily ETc on a real-time basis.

ETo values

The California Irrigation Management Information System (CIMIS) collects weather data from calibrated weather stations at more than 100 sites throughout California. That hourly weather data is used to compute daily ETo values for each station, using a standardized formula (a modified Penman equation). Grass reference evapotranspiration (ETo) can be downloaded for CIMIS stations throughout California at www.cimis.water.ca.gov/. The ETo value depends upon the daily weather, which varies by location and date, and upon the specific formula used for calculation. For example, there have historically been differences in the ETo equations used in Arizona and California.

Kc values

Crop coefficients (Kc) have been developed for many crops. Tables of growing season Kc values generally include 3 key components, such as:

$Kc_{initial}$ – this Kc begins at the planting date and ends generally when the crop canopy is about 10% full.

Kc_{mid} – this Kc begins when the crop has approximately 60% canopy (depending on the crop) and ends in the later part of the season when the crop begins to enter the end of the season.

Kc_{end} – the Kc on the last day the crop is in the field or as the crop goes dormant.

In practice, appropriate crop coefficients for a specific crop vary by region, soil type, irrigation frequency and type, reference crop type, and a host of other factors that are specific to management practices and the environment. Maximum values are about 1.2, and minimum values are about 0.10

In short, in order to calculate crop evapotranspiration using the equation above, one must have the reference crop evapotranspiration (ETo) for one's region and a specific crop coefficient depending on one's crop, region, soil type, irrigation type, etc. However, in most cases, only one set of crop coefficients per region is provided, which may not match the particulars of your situation, and if you have an unusual crop for the region, there may not be any coefficients available at all.

This dilemma was addressed in FAO Irrigation and Drainage Publication No. 56. Dr. Richard Allen and the other authors laid out a procedure called the "dual crop coefficient" method of calculating ETc. This method uses a basal crop coefficient (Kcb – a crop coefficient calculated from a crop that is not stressed and has no surface wetting). Therefore, in theory, the Kcb is transferable anywhere in the world and from field-to-field, regardless of irrigation practices.

The challenge is in taking published Kcb values and converting them to Kc values, so that actual crop ET values can be computed using ETo data. This is done by adjusting the Kcb values using two other coefficients, one for evaporation (Ke) and another for crop stress (Ks).

The drawback of this method, from a user's standpoint, is that the calculations for Ks and Ke require examining daily water balances of the soil profile. Even with a computer program to do this, it can be a significant task.

This publication allows the user to bypass computations using ETo and crop coefficients. Using a program written by Dr. Allen and modified by the Cal Poly Irrigation Training and Research Center (ITRC), ETc values were modeled for "average" cropping situations throughout California. The resulting ETc estimates have been compiled in this publication for the convenience of the user.

The tables in this report present crop and soil evapotranspiration values for healthy crops throughout the state – which may include stress at certain stages of growth (e.g., processing tomatoes and cotton are generally stressed prior to harvest). The information is for *irrigation scheduling* and *irrigation system design* purposes. If, however, a water agency wants to analyze the *actual average field* evapotranspiration of a crop for water balance purposes, the values in the tables should be adjusted to account for bare spots and decreased vigor. This will be explained in more detail in a later section. The remainder of this report will explain how to use the ET values presented in the final tables.

IRRIGATION SCHEDULING AND SYSTEM DESIGN

The tables in this publication assume typical well-managed crops. Design and scheduling should be based on well-managed crops and include factors for irrigation system non-uniformity, plus time margins for off-peak pumping, spraying, and other procedures.

For an irrigation system design, two values from these tables are necessary: the peak monthly ET, and the annual ET of irrigation water. The peak monthly ET rate will typically determine the pumping capacity needed (after adjustment for non-uniformity, etc.). The annual ET of irrigation water is used in computations of annual pumping bills, which impacts the economic choice of pipe and valve sizes.

The off-season ET values can assist irrigation schedulers in estimating the soil water content at the beginning of the season. Off-season ET (evaporation from bare soil, evaporation and transpiration if a cover crop is present) is primarily from the top 5-7 inches of the soil profile when cover crops are not present. If a precipitation event is not significant enough to refill this layer, the majority of precipitation from that event will likely evaporate.

For these tables, annual crops throughout California were modeled with pre-irrigations 20-45 days before the planting date. For this reason, the evapotranspiration value one month before planting is relatively significant since it indicates evaporation from the bare soil evaporation layer.

For the most part, the values in the tables do not account for double or triple cropping. An exception is the crop category "Small Vegetables", which does account for double cropping. For most ETo Zones, this category was based on lettuce. Other small vegetables with similar basal crop coefficients, such as cabbage, broccoli, cauliflower, carrots, and celery, have also been grouped in this category and do not have separate listings.

The following instructions will show how to obtain appropriate values from the tables presented in this publication for irrigation scheduling and system design.

Cotton irrigated in California's San Joaquin Valley with gated pipe.

Step 1. Choosing a table

The first step in determining crop evapotranspiration is to choose the table or tables that represent your climate region and general precipitation year. Right before the ETc tables is the California Department of Water Resources (DWR) ETo Zone Map. There are three ETc tables for 13 of the 18 zones on the map (the remaining 5 zones did not have significant enough agricultural acreage to be included). The three tables for each zone differ by the amount of precipitation. For certain zones this will vary, but generally 1997 was a typical year, 1998 was a wet year, and 1999 was a dry year.

a. First, select the zone number for your region of interest.

b. For each year that you are interested in, determine the annual amount and timing of precipitation in the area for that year.

c. Select the table that is representative of the amount and timing of precipitation in your region.

Some of the zones represent large areas that can have a wide variability in precipitation. For example, Zone 12 has a northern boundary in the Sacramento Valley and a southern boundary in Tulare and North Kern Counties. A typical year in the northern section may be a wet year in the southern region. Therefore, the terms Typical, Wet, and Dry are relative; it is up to the user to choose the appropriate table according to the amount of precipitation that actually occurred.

The monthly values of ETc that fall within the crop growing season are shown in **bold** for each crop in the table.

Onions grown with drip in the San Joaquin Valley.

Step 2. Adjusting for special conditions

Values may need to be adjusted to account for several special conditions:

a. The use of sprinkler or drip/micro irrigation (except for grapes in Zones 3, 6, and 8, where drip irrigation is already assumed).

b. Double or triple cropping of any crops that do not fall into the "Small Vegetables" category.

c. Growing season dates that vary from the dates used in the tables.

These procedures are described in a later section of this report.

Step 3. Using the tabular values

The information in this publication can be a useful tool for irrigation scheduling purposes. However, the values in any ETc tables always have a confidence interval. With the use of any ETc values for irrigation scheduling, the scheduler must always conduct field checks to verify how well the scheduling is working.

WATER BALANCES AND PLANNING

As mentioned earlier, the values in this publication assume a typical well-managed crop that has uniform cover and vigor across the field. For irrigation scheduling and design purposes, those depth values should be used. However, when accounting for water destinations in water balances, one is interested in the volume of water actually consumed as crop and soil evapotranspiration due to actual crop growth, not ideally uniform growth. Since there are almost always some bare spots in a field, or areas with poor vigor, the ideal values presented in these tables must be adjusted downward when computing a water balance. On the average, the ***actual*** ET depth is less over the whole field than the ideal crop ET for which one schedules.

Research by the ITRC has concluded that for the average cropping situation in California, irrigation scheduling crop/soil evapotranspiration (ETc) should be reduced 7-8% when calculating water balances. Some of the reasons for decreased vigor and bare spots include, but are not limited to, salinity, irrigation and fertilizer distribution non-uniformity, crop damage caused by machinery (including the building of ditches for surface irrigation), pest and disease damage, soil variability, high water table, poor initial crop stand, etc.

For water balance purposes, it is also important to account for evaporation (and transpiration if there are cover crops) during the non-growing season. This off-season information is already included in the tables in this publication. The tables have evapotranspiration values for each crop on a 12-month basis. Of course, many crops do not have a 12-month growing period. The values in the table that are outside of the crop's growing season signify evaporation (and transpiration if there are cover crops) during the off-season. ETc values that fall within the crop growing season are shown in **bold**.

For the most part, the values in the tables do not account for double or triple cropping. An exception is the crop category "Small Vegetables", which does account for double cropping (two crops grown back-to-back). For most ETo Zones, this category was based on lettuce. Other small vegetables with similar basal crop coefficients, such as cabbage, broccoli, cauliflower, carrots, and celery, have also been grouped in this category and do not have separate listings in the tables. Further instructions in the following section will show how double and triple cropping can be taken into account in other cropping situations.

Step 1. Choosing a table

The first step in determining the evapotranspiration component of a water balance is to choose the table or tables that represent your climate region and general precipitation year. Right before the ETc tables is the California Department of Water Resources (DWR) ETo Zone Map. There are three ETc tables for 13 of the 18 zones on the map (the remaining 5 zones did not have significant enough agricultural acreage to be included). The three tables for each zone differ by the amount of precipitation. For certain zones this will vary, but generally 1997 was a typical year, 1998 was a wet year, and 1999 was a dry year.

a. First, find the zone(s) that represent your water agency.

b. For each year that you are interested in, determine the annual amount of precipitation in your region.

c. Select the tables that are representative of the amount and timing of precipitation in your region.

Some of the zones represent large areas that can have a wide variability in precipitation. For example, Zone 12 has a northern boundary in the Sacramento Valley and a southern boundary in Tulare and North Kern Counties. A typical year in the northern section may be a wet year in the southern region. Therefore, the terms Typical, Wet, and Dry are relative; it is up to the user to choose the appropriate table based on the amount of precipitation that actually occurred in the year being modeled.

Step 2. Adjusting for bare spots and decreased vigor

There are two ways to "adjust" the field ET values for bare spots and decreased vigor:

1. As mentioned above, ITRC has found that a good approximation is that the table values should be decreased by 7-8%. If you want to have a better estimate of the appropriate adjustments factors, it is necessary to obtain aerial photos of the fields in question. The aerial photos can be used to estimate the percentages of fields that are bare or with reduced vigor. The aerial photos should be combined with field visits for verification.
2. Download "approximate" values in spreadsheet format from the ITRC website: www.itrc.org/ETWeb/WBandISHomePage.htm. If the tables are downloaded from the ***Water Balance*** section of the web page, adjustments for bare spots and decreased vigor have already been taken into account.

Step 3. Adjusting for special conditions

See the following section for details on how to make adjustments to account for:

a. The use of sprinkler or drip/micro irrigation (except for grapes in Zones 3, 6, and 8, where drip irrigation is already assumed).

b. Double or triple cropping of any crops that do not fall into the "Small Vegetables" category.

c. Growing season dates that vary from the dates used in the tables.

Grapevines growing on the east side of the Central Valley.

USING THE TABLES IN MORE DETAIL

Adjusting for Special Conditions

Sprinkler and drip/microspray irrigation

To limit the number of tables in this publication, only evapotranspiration values with surface (flood, furrow, basin, border strip) irrigation are presented (except for grapes in Zones 3, 6, and 8, where drip irrigation is assumed). Evapotranspiration from sprinkler and drip/micro irrigated crops can be directly downloaded from the ITRC website (www.itrc.org/ETWeb/WBandISHomePage.htm). The table below shows a range of multipliers that can be used to roughly adjust the values in this report to account for sprinkler and drip/micro irrigation. The actual ET will vary depending on the frequency of sprinkler and drip/micro irrigations. A crop with a higher irrigation frequency should use a higher multiplier. ETc will also vary depending on the surface wetting percentage. For example, microspray on trees often has a larger soil surface wetted area than drip irrigation, and therefore has a higher multiplier.

Table 1. Multipliers to adjust ETc based on irrigation method

Crop Type	Sprinkler	Drip/Micro	Subsurface Drip (SDI)
Orchards	1.01-1.03	1.03-1.06	0.95-0.98
Field crops	1.02-1.04	1.00-1.05	0.95-0.98

Accounting for double and triple cropping

Modifications to the tables are necessary when double and triple cropping is considered (unless the crop falls into the Small Vegetables category). When multiple crops are grown on a single field during a one-year period, the field is fallow or idle less time during the year than the table indicates. Therefore, there may be less evaporation during the off-season but more transpiration.

Double and triple cropping can be accounted for in a number of different ways. The way a water agency may approach this will depend on how crop acreage is accounted. Possibly the easiest way to account for double and triple cropping is to create multiple evapotranspiration tables, one for single crops and one for double and triple crops. The difference between the tables is that the single crop table will include off-season ET for all of the months that are not during the growing season. The double and triple crop table will only include growing season ET plus one month prior to planting to account for evaporation from pre-irrigation.

Small vegetables growing in Salinas Valley.

Example 1. Double Cropping in the Central San Joaquin Valley

Let's assume a field northwest of Bakersfield (ETo Zone 15) has a field that is double cropped with grain hay followed by silage corn.

The tables below illustrate how to estimate the crop and soil ET for each of these cropping situations. The top table represents the single cropping situation. The values highlighted in gray represent the ET one month prior to planting. This accounts for evaporation from the pre-irrigation.

In the middle table, many of the off-season ET values have been removed from the table to avoid duplication of values. However, May, September, and October all have 2 sets of ETc values.

Table 2. Single cropping table for Example 1

Notes:
1. The **bold** values indicate ET during the crop growing season.
2. The values highlighted in gray indicate the ET one month prior to planting, which accounts for evaporation from pre-irrigation.

Single Cropping Table

	1997 (Typical Year)												
	January	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**	**October**	**November**	**December**	**Annual**
	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches	**inches**
Precipitation	3.46	0.39	0.07	0.59	0.01	0.33	0.01	0.00	0.02	0.33	1.91	1.28	**8.40**
Grass Reference ETo	0.95	2.30	4.38	6.30	8.18	8.18	8.35	7.33	5.72	4.04	1.58	1.09	**58.41**
Grain and Grain Hay	**1.12**	**2.42**	**4.81**	**7.00**	**4.01**	0.40	0.01	0.00	0.02	0.33	0.89	**1.20**	**22.21**
Corn and Grain Sorghum	1.11	0.92	1.20	1.83	**2.84**	**7.68**	**8.83**	**5.96**	0.46	0.33	0.86	1.14	**33.17**

Table 3. Double cropping intermediate table for Example 1

Double Cropping Table

	1997 (Typical Year)												
	January	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**	**October**	**November**	**December**	**Annual**
	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches	**inches**
Precipitation	3.46	0.39	0.07	0.59	0.01	0.33	0.01	0.00	0.02	0.33	1.91	1.28	**8.40**
Grass Reference ETo	0.95	2.30	4.38	6.30	8.18	8.18	8.35	7.33	5.72	4.04	1.58	1.09	**58.41**
Grain and Grain Hay	**1.12**	**2.42**	**4.81**	**7.00**	**4.01**				0.02	0.33	0.89	**1.20**	**21.79**
Corn and Grain Sorghum					**2.84**	**7.68**	**8.83**	**5.96**	0.46	0.33			**26.10**

Table 4. Final double cropping table for Example 1

Final Cropping Table

	1997 (Typical Year)												
	January	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**	**October**	**November**	**December**	**Annual**
	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches	**inches**
Precipitation	3.46	0.39	0.07	0.59	0.01	0.33	0.01	0.00	0.02	0.33	1.91	1.28	**8.40**
Grass Reference ETo	0.95	2.30	4.38	6.30	8.18	8.18	8.35	7.33	5.72	4.04	1.58	1.09	**58.41**
Grain Hay and Corn	**1.12**	**2.42**	**4.81**	**7.00**	**2.84**	**7.68**	**8.83**	**5.96**	0.46	0.33	0.89	**1.20**	**43.53**

One of the major discrepancies in the double cropping table above is that the growing seasons overlap. This is because the tables were generated using average planting and harvest dates for each region. There are a number of logical methods to adjust these values to reflect reality in your situation. One way is to adjust the planting and harvest dates, which will be explained in the next section. Another way is to assume that if corn is following grain hay, the grain hay will be removed earlier, say in late April. Therefore, one can remove the ET value for grain hay in May. However, in most cases, the error will not have a significant impact on the overall evapotranspiration value and the values can be left as they are.

Alfalfa growing in Imperial Valley near El Centro, California.

Adjusting growing season dates

The tables in this report were generated using information from University of California Cooperative Extension Crop Calendars, water agency crop calendars, farmer interviews, and ITRC experience. Each source had one thing in common: they all presented a range of beginning and end of growing season dates. ITRC used an average of these dates for the tables presented in this report. It is understood that actual dates will vary; this means the evapotranspiration from the crop will also vary. With some work, the values in these tables can be adjusted to be more representative of specific regions.

The basic steps to adjust the ETc values are these:

1. Compute the monthly Kc values for the crop in your ETo zone (and year of interest).

   $$Kc = ETc / ETo$$

   In each of the tables, a row near the top represents the monthly ETo that was used to calculate the ETc values in that table. Dividing the monthly ETc by the monthly ETo for the same month gives the monthly crop coefficient (Kc). This should be done for each of the months during the growing season.

2. Recognize that the Kc values are primarily impacted by (a) the crop stage of growth, and (b) the availability of rainfall that would wet the soil surface, if a crop is not growing then.

3. Use the appropriate Kc values that reflect the actual crop planting and harvest dates, together with the ETo for those months, to compute the adjusted monthly ETc values during the growing season and the month prior to planting.

   $$Crop\ \ Evapotranspiration(ETc) = Kc \times ETo$$

4. The off-season months for the crop with new growing season should be replaced with the "Idle" evaporation values for the appropriate months.

Example 2. Adjusting the beginning and end of the growing season

Let's take for example lettuce in the Salinas Valley (Zone 6) for a wet year. All tables in this publication assume double cropping of small vegetables back to back, so there are actually 2 crops in a row for small vegetables. The planting date for Zone 6 is in mid-January with pre-irrigations starting in December. The harvest of the second crop is in early-mid July.

In this example, a local water agency wishes to estimate the evapotranspiration of 2 lettuce crops with the first crop planted in March instead of January. For simplicity of illustration, the second crop growing season length is assumed to remain the same in this example, although in reality crop growing season lengths change depending upon planting dates.

The 2 lettuce crops are planted back-to-back in both cases. The table below shows how to adjust the planting dates by using the ETc values during the growing season to determine crop coefficients (Kc), and multiplying the Kc values by their respective monthly ETo values in the new growing season.

Table 5. Example adjustment of beginning and end of growing season dates

Notes:

1. Small vegetables are presented in the tables with a planting date in January but the user want to change the planting date to March.
2. Small vegetables are presented as back-to-back double crops (2 crops). The December value (gray) in the original row and the February value (gray) in the **New Season row represent pre-irrigation evaporation.**

	1998 (Wet Year)												
	January	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**	**October**	**November**	**December**	**Annual**
	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches	**inches**
Precipitation	5.02	10.54	3.20	1.57	1.92	0.21	0.00	0.05	0.17	0.39	1.94	0.65	**25.66**
Grass Reference (ETo)	1.56	1.53	3.17	4.33	4.98	5.28	6.51	6.29	4.32	3.74	2.00	1.91	**45.65**
Small Vegetables (ETc)	**1.77**	**1.80**	**3.40**	**3.58**	**4.26**	**5.46**	**2.10**	0.05	0.17	0.36	0.91	1.17	**25.04**
Kc = ETc/ETo	**1.14**	**1.18**	**1.07**	**0.83**	**0.86**	**1.03**	**0.32**					0.61	
New Season Small Vegetable ETc	1.67	0.94	**3.60**	**5.11**	**5.34**	**4.36**	**5.57**	**6.50**	**1.40**	0.36	0.91	1.18	**35.27**
Idle	1.67	1.81	2.01	1.94	1.82	0.25	0.00	0.05	0.17	0.36	0.91	1.18	**12.16**

Example Calculation – New Season Small Vegetable ETc for April

Where

Kc computed for the second month of the growing season in the table (Feb) = 1.18

ETo for April = 4.33 inches

ETc = Kc x ETo

= 1.18 x 4.33 inches = **5.1 inches**

Calculating Crop Coefficients from the Tables

Typical crop coefficients can be calculated from the tables in this publication. Those Kc values can then be used to calculate crop and soil evapotranspiration for any other year by using current grass reference evapotranspiration (ETo) data from a local weather station. This can be beneficial for both water balances and irrigation scheduling purposes.

Monthly crop coefficients (Kc) can be calculated from the tables by using the following equation:

$$Kc = ETc / ETo$$

In the tables in this report, ETc (field evapotranspiration) values are presented by month in the columns to the right of the crop category (in inches). ETo values are presented at the top of each table for that ETo zone and year (in inches).

For example, using cotton in Zone 15 for a "typical" year in July (ETc Table 11),

ETo = 8.35 inches
ETc = 7.32

$$Kc = \frac{ETc}{ETo} = \frac{7.32"}{8.35"} = .88$$

It is important to understand the conditions under which the crop coefficients were derived. This is for surface irrigation, which because of its periodic frequency, will stress the crop somewhat. Furthermore, the soil surface will only be wet for a few days once every 2 weeks or so, so the evaporation is not high. Finally, these values assume no cover crop. More frequent irrigation and a cover crop would both increase the ETc and, therefore, the Kc would be higher.

This Kc value could be used to estimate the ETc for the same conditions in another year as:

$$\text{Monthly } ETc_{(\text{predicted})} = Kc_{(\text{computed from the tables})} \times ETo_{(\text{CIMIS})}$$

Grass reference evapotranspiration (ETo) can be downloaded for CIMIS (California Irrigation Management Information Systems) stations throughout California at www.cimis.water.ca.gov/. By using monthly ETo values from CIMIS and the crop coefficients calculated from the tables in this publication, the user can determine the monthly ETc for a crop, for a different year, but with the same month and location. For example, assume that in another year the ETo was 8.7" during July, and all other conditions remained the same.

Then, ETc = Kc x ETo
ETc = .88 x 8.7" = 7.7"

Effective Precipitation

ETc includes both crop and soil ET. Soil evaporation occurs even when a field is bare. The water for evaporation may originate from rain or from irrigation. In practice, it is difficult to partition the rain and irrigation components of ET. Typically, a value of "effective precipitation" is assigned to the depth of rainfall that contributes to "crop ET", where "crop ET" is usually a value that occurs between crop planting and harvesting dates. However, these values are usually very loosely assigned, and things become confusing when pre-irrigations occur along with rainfall.

This report does not provide "effective precipitation" values. Instead, it provides the total E and T estimates of precipitation water for each zone, for each of 3 rainfall years. Those values can be found in **Tables 40-43**. As with all other values in this report, the E and T contributions of precipitation are based upon a complete calendar year, rather than just the crop growing season. The "crop ET" values and "crop coefficient" values in this report may be correctly considered to be "field ET" and "field coefficient" values.

CROP AND SOIL EVAPOTRANSPIRATION TABLES

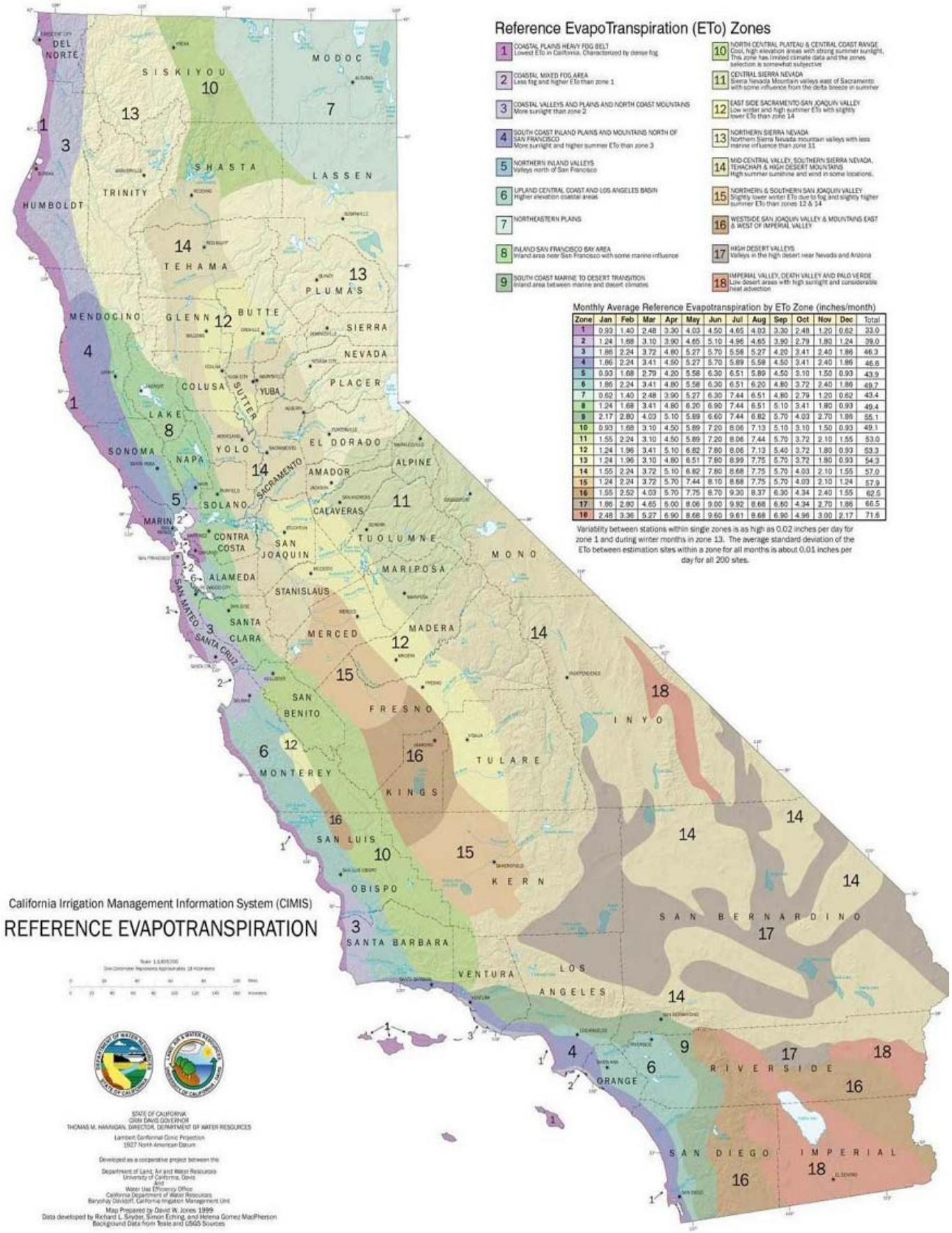
The following evapotranspiration tables are in sequential order by ETo Zone. There are 3 tables per Zone representing typical, wet, and dry precipitation calendar years. All values presented in the following tables are shown to the 100th of an inch. This does not suggest that the values are accurate to this level. They are only presented to this level to minimize rounding errors when crop coefficients are calculated.

The tables presented assume surface irrigation for all crops except grapevines grown in ETo Zones 3, 6, and 8, where drip irrigation is assumed.

List of ETc Tables

ETc Tables 1-13 – Typical Precipitation Year
ETc Tables 14-26 – Wet Year
ETc Tables 27-39 – Dry Year
ETc Tables 40-43 – E and T from Precipitation

Citrus grows on the south and central coast, the San Joaquin Valley, and in the deserts of southern California.



Zone	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1	0.93	1.40	2.48	3.30	4.03	4.50	4.65	4.03	3.30	2.48	1.20	0.62	33.0
2	1.24	1.68	3.10	3.90	4.65	5.10	4.96	4.65	3.90	2.79	1.80	1.24	39.0
3	1.86	2.24	3.72	4.80	5.27	5.70	5.58	5.27	4.20	3.41	2.40	1.86	46.3
4	1.86	2.24	3.41	4.50	5.27	5.70	5.89	5.58	4.50	3.41	2.40	1.86	46.6
5	0.93	1.68	2.79	4.20	5.58	6.30	6.51	5.89	4.50	3.10	1.50	0.93	43.9
6	1.86	2.24	3.41	4.80	5.58	6.30	6.51	6.20	4.80	3.72	2.40	1.86	49.7
7	0.62	1.40	2.48	3.90	5.27	6.30	7.44	6.51	4.80	2.79	1.20	0.62	43.4
8	1.24	1.68	3.41	4.80	6.20	6.90	7.44	6.51	5.10	3.41	1.80	0.93	49.4
9	2.17	2.80	4.03	5.10	5.89	6.60	7.44	6.82	5.70	4.03	2.70	1.86	55.1
10	0.93	1.68	3.10	4.50	5.89	7.20	8.06	7.13	5.10	3.10	1.50	0.93	49.1
11	1.55	2.24	3.10	4.50	5.89	7.20	8.06	7.44	5.70	3.72	2.10	1.55	53.0
12	1.24	1.96	3.41	5.10	6.82	7.80	8.06	7.13	5.40	3.72	1.80	0.93	53.3
13	1.24	1.96	3.10	4.80	6.51	7.80	8.99	7.75	5.70	3.72	1.80	0.93	54.3
14	1.55	2.24	3.72	5.10	6.82	7.80	8.68	7.75	5.70	4.03	2.10	1.55	57.0
15	1.24	2.24	3.72	5.70	7.44	8.10	8.68	7.75	5.70	4.03	2.10	1.24	57.9
16	1.55	2.52	4.03	5.70	7.75	8.70	9.30	8.37	6.30	4.34	2.40	1.55	62.5
17	1.86	2.80	4.65	6.00	8.06	9.00	9.92	8.68	6.60	4.34	2.70	1.86	66.5
18	2.48	3.36	5.27	6.90	8.68	9.60	9.61	8.68	6.90	4.96	3.00	2.17	71.6

ETc Table 1. Zone 1 Typical Year

ETc Table for Irrigation Scheduling and Design

Zone 1 Monthly Evapotranspiration

Surface Irrigation Typical Year

IRRIGATION TRAINING AND RESEARCH CENTER, California Polytechnic State University, San Luis Obispo

Table does not include adjustments for bare spots and reduced vigor

	1997 (Typical Year)												
	January	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**	**October**	**November**	**December**	**Annual**
	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches	**inches**
Precipitation	6.85	0.12	0.28	0.43	0.04	0.08	0.00	0.08	0.00	0.75	6.22	3.62	**18.46**
Grass Reference ETo	1.09	2.15	3.32	4.68	5.50	5.58	3.67	3.79	3.84	2.86	1.37	1.32	**39.18**
Apple, Pear, Cherry, Plum and Prune	1.20	0.68	**0.65**	**1.45**	**2.61**	**4.06**	**3.24**	**3.10**	**3.33**	**2.55**	0.80	1.14	**24.79**
Apples, Plums, Cherries etc w/covercrop	1.20	2.27	**2.90**	**3.65**	**5.19**	**5.63**	**3.83**	**3.97**	**4.08**	**2.86**	1.30	1.52	**38.40**
Peach, Nectarine and Apricots	1.20	0.68	**0.65**	**1.49**	**3.15**	**4.72**	**3.08**	**3.17**	**3.24**	**2.61**	0.85	1.14	**25.97**
Immature Peaches, Nectarines, etc	1.22	0.67	**0.47**	**0.95**	**1.57**	**2.31**	**1.65**	**1.57**	**1.57**	**1.87**	0.81	1.14	**15.79**
Misc. Deciduous	1.20	0.68	**0.94**	**1.74**	**3.49**	**4.49**	**3.05**	**2.87**	**3.35**	**2.57**	**1.25**	1.14	**26.77**
Grain and Grain Hay	**1.28**	**2.39**	**3.70**	**5.14**	**2.88**	0.10	0.00	0.08	0.00	1.33	**0.87**	**1.38**	**19.16**
Corn and Grain Sorghum	1.28	0.64	**1.24**	**1.52**	**1.27**	**4.75**	**4.01**	**3.47**	0.66	0.69	0.82	1.17	**21.53**
Misc. field crops	1.28	1.28	**0.57**	**1.46**	**4.18**	**5.28**	**3.41**	**1.25**	0.00	0.68	0.82	1.17	**21.38**
Alfalfa Hay and Clover	**1.28**	**2.22**	**3.28**	**4.18**	**5.10**	**5.16**	**3.22**	**3.74**	**3.57**	**2.13**	**1.23**	**1.52**	**36.62**
Pasture and Misc. Grasses	1.28	**1.48**	**2.03**	**4.03**	**5.25**	**5.24**	**3.45**	**3.64**	**3.60**	**2.87**	**1.46**	1.17	**35.50**
Small Vegetables	**1.28**	**1.66**	**3.34**	**3.67**	**3.09**	**5.74**	1.97	0.08	0.00	0.68	0.82	1.17	**23.50**
Tomatoes and Peppers	1.28	0.83	**0.77**	**2.19**	**5.47**	**5.89**	**3.74**	**1.38**	0.00	0.68	0.82	1.17	**24.22**
Potatoes, Sugar beets, Turnip etc..	1.28	0.64	0.97	**1.17**	**1.01**	**3.07**	**3.39**	**4.26**	**4.28**	**3.28**	**1.57**	1.41	**26.33**
Melons, Squash, and Cucumbers	1.28	1.29	**0.88**	**2.09**	**5.47**	**5.54**	**2.04**	0.08	0.00	0.68	0.82	1.17	**21.34**
Citrus (no ground cover)	**1.20**	**2.12**	**2.46**	**3.44**	**3.37**	**3.55**	**2.05**	**2.33**	**2.39**	**2.23**	**1.19**	**1.48**	**27.79**
Immature Citrus	**1.22**	**1.37**	**1.25**	**1.75**	**1.71**	**1.75**	**1.03**	**1.07**	**1.12**	**1.53**	**1.03**	**1.34**	**16.18**
Avocado	**1.20**	**0.68**	**0.94**	**1.74**	**3.49**	**4.49**	**3.05**	**2.87**	**3.35**	**2.57**	**1.25**	**1.14**	**26.77**
Idle	1.31	0.63	0.28	0.42	0.06	0.08	0.00	0.08	0.00	0.68	0.85	1.18	**5.56**

ETc Table 2. Zone 3 Typical Year

ETc Table for Irrigation Scheduling and Design

Zone 3 Monthly Evapotranspiration

Surface Irrigation Typical Year

IRRIGATION TRAINING AND RESEARCH CENTER, California Polytechnic State University, San Luis Obispo

Table does not include adjustments for bare spots and reduced vigor

	1997 (Typical Year)												
	January	February	March	April	May	June	July	August	September	October	November	December	Annual
	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches
Precipitation	3.46	0.39	0.07	0.59	0.01	0.33	0.01	0.00	0.02	0.33	1.91	1.28	**8.40**
Grass Reference ETo	0.95	2.30	4.38	6.30	8.18	8.18	8.35	7.33	5.72	4.04	1.58	1.09	**58.41**
Apple, Pear, Cherry, Plum and Prune	1.21	0.74	**0.99**	**1.65**	**3.11**	**4.43**	**4.68**	**4.76**	**4.32**	**2.82**	0.83	1.29	**30.84**
Apples, Plums, Cherries etc w/covercrop	1.22	2.60	**3.40**	**4.16**	**6.01**	**6.16**	**5.64**	**5.81**	**5.42**	**3.52**	1.42	1.84	**47.19**
Peach, Nectarine and Apricots	1.21	0.74	**0.99**	**1.70**	**3.72**	**5.15**	**4.36**	**4.91**	**4.42**	**2.93**	0.91	1.29	**32.32**
Immature Peaches, Nectarines, etc	1.22	0.74	**0.78**	**1.10**	**1.95**	**2.43**	**2.46**	**2.38**	**2.86**	**1.68**	0.80	1.29	**19.69**
Almonds	1.21	0.74	**0.99**	**2.04**	**4.26**	**4.91**	**4.27**	**4.85**	**4.19**	**2.90**	**1.32**	1.29	**32.98**
Almonds w/covercrop	1.22	2.27	**2.78**	**3.72**	**5.94**	**5.77**	**5.05**	**5.48**	**4.80**	**3.38**	**1.29**	1.77	**43.45**
Immature Almonds	1.22	0.74	**0.78**	**1.26**	**2.23**	**2.32**	**2.54**	**2.37**	**2.72**	**1.69**	**1.04**	1.29	**20.20**
Walnuts	1.21	0.74	**0.57**	**1.38**	**2.78**	**4.69**	**5.02**	**5.37**	**4.95**	**3.10**	1.30	1.29	**32.39**
Misc. Deciduous	1.21	0.74	**1.31**	**1.99**	**4.14**	**4.93**	**4.22**	**4.83**	**4.21**	**3.09**	1.36	1.29	**33.32**
Grain and Grain Hay	**1.26**	**2.68**	**4.19**	**5.65**	**3.50**	0.14	0.03	0.38	0.74	1.20	**0.86**	**1.59**	**22.22**
Safflower and Sunflower	1.25	**1.00**	**1.80**	**4.74**	**7.00**	**5.96**	**1.71**	0.38	0.74	0.49	0.83	1.31	**27.20**
Corn and Grain Sorghum	1.25	0.72	1.48	**1.57**	**1.65**	**5.10**	**5.85**	**5.25**	**1.58**	0.49	0.83	1.31	**27.07**
Misc. field crops	1.25	1.37	**0.90**	**1.67**	**4.89**	**5.77**	**4.86**	**2.60**	0.74	0.49	0.83	1.31	**26.66**
Alfalfa Hay and Clover	**1.26**	**2.50**	**3.71**	**4.57**	**5.77**	**5.54**	**4.74**	**4.92**	**4.44**	**1.90**	**1.31**	**1.80**	**42.45**
Pasture and Misc. Grasses	1.25	**1.66**	**2.47**	**4.44**	**6.04**	**5.66**	**5.04**	**5.26**	**4.73**	**3.26**	**1.53**	1.31	**42.64**
Small Vegetables	**1.25**	**1.82**	**3.72**	**3.77**	**3.73**	**6.11**	**2.31**	0.38	0.74	0.49	0.83	1.31	**26.45**
Tomatoes and Peppers	1.25	0.97	**1.13**	**2.54**	**6.34**	**6.32**	**5.48**	**2.61**	0.74	0.49	0.83	1.31	**30.00**
Potatoes, Sugar beets, Turnip etc..	1.25	0.72	1.00	**0.92**	**1.34**	**3.34**	**5.09**	**6.03**	**5.44**	**3.73**	**1.70**	1.64	**32.18**
Melons, Squash, and Cucumbers	1.25	1.37	**0.89**	**2.46**	**6.33**	**5.94**	**2.52**	0.38	0.74	0.49	0.83	1.31	**24.49**
Onions and Garlic	**1.26**	**2.34**	**3.54**	**4.92**	**5.45**	**1.36**	0.03	0.38	0.74	0.49	1.46	**1.49**	**23.44**
Flowers, Nursery and Christmas Tree	1.21	0.74	**1.31**	**1.99**	**4.14**	**4.93**	**4.22**	**4.83**	**4.21**	**3.09**	**1.36**	1.29	**33.32**
Citrus (no ground cover)	**1.22**	**2.38**	**2.94**	**3.81**	**3.94**	**3.79**	**3.12**	**3.62**	**3.37**	**2.60**	**1.24**	**1.76**	**33.80**
Immature Citrus	**1.23**	**1.52**	**1.66**	**1.96**	**2.11**	**1.90**	**1.46**	**1.84**	**2.26**	**1.41**	**1.01**	**1.55**	**19.91**
Avocado	**1.21**	**0.74**	**1.31**	**1.99**	**4.14**	**4.93**	**4.22**	**4.83**	**4.21**	**3.09**	**1.36**	**1.29**	**33.32**
Grape with 40% cover	1.21	0.74	**0.99**	**1.88**	**2.66**	**2.40**	**1.99**	**1.89**	**1.66**	0.53	0.79	1.29	**18.02**
Grape with cover crop	1.23	1.64	**1.91**	**2.70**	**3.24**	**2.88**	**2.52**	**2.69**	**2.59**	1.73	1.06	1.59	**25.77**
Grape with 60% cover	1.21	0.74	**0.99**	**2.38**	**3.92**	**3.60**	**3.02**	**2.62**	**1.95**	0.53	0.79	1.29	**23.03**
Idle	1.26	0.71	0.57	0.50	0.25	0.12	0.03	0.38	0.73	0.49	0.85	1.31	**7.21**

ETc Table 3. Zone 4 Typical Year

ETc Table for Irrigation Scheduling and Design

Zone 4 Monthly Evapotranspiration

Surface Irrigation Typical Year

IRRIGATION TRAINING AND RESEARCH CENTER, California Polytechnic State University, San Luis Obispo

Table does not include adjustments for bare spots and reduced vigor

	1997 (Typical Year)												
	January	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**	**October**	**November**	**December**	**Annual**
	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches	**inches**
Precipitation	6.21	0.29	0.34	0.30	0.49	0.22	0.07	0.31	0.43	0.65	4.92	4.29	**18.52**
Grass Reference ETo	1.53	2.43	3.44	4.82	5.74	5.79	5.92	5.70	4.78	3.58	1.56	1.74	**47.04**
Apple, Pear, Cherry, Plum and Prune	1.74	0.65	**0.73**	**1.38**	**3.11**	**4.34**	**5.21**	**5.12**	**4.07**	**3.13**	1.09	1.62	**32.19**
Apples, Plums, Cherries etc w/covercrop	1.79	2.61	**3.01**	**3.77**	**5.64**	**5.97**	**6.21**	**6.11**	**5.34**	**3.60**	1.51	2.09	**47.64**
Peach, Nectarine and Apricots	1.74	0.65	**0.73**	**1.42**	**3.65**	**4.95**	**4.93**	**5.08**	**4.26**	**3.33**	1.04	1.62	**33.41**
Immature Peaches, Nectarines, etc	1.75	0.65	**0.54**	**0.85**	**2.08**	**2.46**	**2.71**	**2.46**	**2.56**	**1.88**	1.02	1.62	**20.57**
Walnuts	1.74	0.65	0.35	**1.14**	**2.77**	**4.61**	**5.62**	**5.59**	**4.82**	**3.42**	**1.49**	1.62	**33.81**
Misc. Deciduous	1.74	0.65	**1.03**	**1.70**	**3.94**	**4.81**	**4.78**	**5.02**	**4.03**	**3.33**	**1.45**	1.62	**34.10**
Grain and Grain Hay	**1.81**	**2.71**	**3.86**	**5.31**	**3.30**	0.24	0.06	0.31	0.40	1.35	**1.07**	**1.91**	**22.33**
Corn and Grain Sorghum	1.77	0.64	1.33	**1.21**	**1.76**	**4.96**	**6.48**	**5.50**	**1.20**	0.63	1.05	1.63	**28.17**
Misc. field crops	1.77	1.28	**0.65**	**1.42**	**4.47**	**5.51**	**5.51**	**2.68**	0.40	0.64	1.05	1.63	**27.02**
Alfalfa Hay and Clover	**1.82**	**2.52**	**3.44**	**4.29**	**5.39**	**5.44**	**5.18**	**5.22**	**4.29**	**2.23**	**1.47**	**2.05**	**43.33**
Pasture and Misc. Grasses	1.77	**1.60**	**2.12**	**4.07**	**5.62**	**5.50**	**5.60**	**5.49**	**4.65**	**3.58**	**1.63**	1.63	**43.26**
Small Vegetables	**1.78**	**1.77**	**3.44**	**3.58**	**3.49**	**5.97**	**2.44**	0.31	0.40	0.63	1.05	1.63	**26.50**
Tomatoes and Peppers	1.78	0.94	**0.86**	**2.30**	**5.75**	**6.14**	**6.06**	**2.73**	0.40	0.64	1.05	1.63	**30.29**
Melons, Squash, and Cucumbers	1.77	1.28	**0.64**	**2.17**	**5.78**	**5.84**	**2.67**	0.31	0.40	0.64	1.05	1.63	**24.20**
Onions and Garlic	**1.81**	**2.35**	**3.23**	**4.59**	**5.03**	**1.45**	0.06	0.31	0.40	0.64	1.62	**1.84**	**23.32**
Citrus (no ground cover)	**1.79**	**2.38**	**2.57**	**3.44**	**3.82**	**3.82**	**3.47**	**3.73**	**3.11**	**2.84**	**1.42**	**2.05**	**34.44**
Immature Citrus	**1.79**	**1.47**	**1.35**	**1.67**	**2.10**	**1.96**	**1.76**	**1.89**	**1.94**	**1.57**	**1.20**	**1.90**	**20.61**
Avocado	**1.74**	**0.65**	**1.03**	**1.70**	**3.94**	**4.81**	**4.78**	**5.02**	**4.03**	**3.33**	**1.45**	**1.62**	**34.10**
Idle	1.79	0.64	0.35	0.30	0.51	0.22	0.06	0.31	0.40	0.63	1.07	1.64	**7.91**

ETc Table 4. Zone 6 Typical Year

ETc Table for Irrigation Scheduling and Design

Zone 6 Monthly Evapotranspiration

Surface Irrigation Typical Year

IRRIGATION TRAINING AND RESEARCH CENTER, California Polytechnic State University, San Luis Obispo

Table does not include adjustments for bare spots and reduced vigor

	1997 (Typical Year)												
	January	February	March	April	May	June	July	August	September	October	November	December	Annual
	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches
Precipitation	7.00	0.41	0.07	0.15	0.09	0.02	0.01	0.21	0.61	0.11	3.57	3.39	**15.65**
Grass Reference ETo	1.45	2.60	3.98	5.54	6.89	6.49	6.11	6.01	5.13	3.75	1.79	1.73	**51.46**
Apple, Pear, Cherry, Plum and Prune	1.61	0.74	**0.56**	**1.41**	**3.23**	**4.84**	**5.17**	**5.36**	**4.57**	**2.75**	1.16	1.34	**32.72**
Apples, Plums, Cherries etc w/covercrop	1.65	2.79	**3.22**	**4.43**	**6.22**	**6.74**	**6.49**	**6.50**	**5.71**	**3.51**	1.72	2.01	**50.98**
Peach, Nectarine and Apricots	1.61	0.74	**0.56**	**1.47**	**4.01**	**5.53**	**5.11**	**5.17**	**4.75**	**2.93**	1.17	1.34	**34.37**
Immature Peaches, Nectarines, etc	1.62	0.73	**0.34**	**0.81**	**1.97**	**2.66**	**2.68**	**2.69**	**2.67**	**1.67**	1.13	1.34	**20.32**
Almonds	1.61	0.74	**0.56**	**1.85**	**4.51**	**5.47**	**4.72**	**5.13**	**4.58**	**2.91**	**1.55**	1.34	**34.95**
Almonds w/covercrop	1.65	2.42	**2.67**	**3.72**	**6.15**	**6.40**	**5.87**	**5.82**	**5.37**	**3.40**	**1.77**	1.93	**47.16**
Immature Almonds	1.62	0.73	**0.34**	**1.00**	**2.25**	**2.53**	**2.79**	**2.63**	**2.74**	**1.45**	**1.38**	1.34	**20.82**
Walnuts	1.61	0.74	0.12	**1.14**	**2.87**	**5.00**	**5.85**	**5.97**	**5.17**	**3.21**	**1.64**	1.34	**34.66**
Misc. Deciduous	1.61	0.74	**0.92**	**1.80**	**4.33**	**5.48**	**4.74**	**5.10**	**4.59**	**3.17**	**1.59**	1.34	**35.40**
Grain and Grain Hay	**1.71**	**2.90**	**4.45**	**6.09**	**3.81**	**0.04**	0.01	0.23	0.61	0.86	**1.16**	**1.72**	**23.59**
Safflower and Sunflower	1.67	**1.00**	**1.48**	**5.11**	**7.63**	**6.60**	**1.35**	0.23	0.61	0.12	1.14	1.35	**28.29**
Corn and Grain Sorghum	1.67	0.71	1.19	**1.16**	**1.70**	**5.43**	**6.71**	**5.63**	**1.36**	0.12	1.14	1.35	**28.17**
Misc. field crops	1.67	1.36	**0.47**	**1.53**	**5.40**	**6.13**	**5.65**	**2.39**	0.61	0.12	1.14	1.35	**27.81**
Alfalfa Hay and Clover	**1.71**	**2.69**	**3.73**	**4.86**	**6.30**	**5.91**	**5.34**	**5.50**	**4.65**	**1.80**	**1.64**	**1.98**	**46.13**
Pasture and Misc. Grasses	1.67	**1.71**	**2.24**	**4.75**	**6.52**	**6.15**	**5.78**	**5.77**	**5.00**	**3.60**	**1.89**	1.35	**46.42**
Small Vegetables	**1.69**	**1.88**	**4.01**	**3.81**	**4.31**	**6.66**	**2.45**	0.23	0.61	0.12	1.14	1.35	**28.27**
Tomatoes and Peppers	1.68	1.05	**0.72**	**2.51**	**6.88**	**6.96**	**6.25**	**2.61**	0.61	0.12	1.14	1.35	**31.88**
Potatoes, Sugar beets, Turnip etc..	1.67	0.71	0.72	**0.63**	**1.27**	**3.67**	**5.82**	**6.68**	**5.75**	**4.22**	**2.04**	**1.79**	**34.99**
Melons, Squash, and Cucumbers	1.67	1.36	**0.45**	**2.52**	**6.90**	**6.45**	**2.88**	0.23	0.61	0.12	1.14	1.35	**25.68**
Onions and Garlic	**1.70**	**2.52**	**3.72**	**5.21**	**5.76**	**1.29**	0.01	0.23	0.61	0.12	1.76	**1.60**	**24.54**
Citrus (no ground cover)	**1.65**	**2.55**	**2.79**	**3.74**	**4.27**	**3.88**	**3.66**	**3.78**	**3.65**	**2.45**	**1.57**	**1.93**	**35.91**
Immature Citrus	**1.66**	**1.58**	**1.31**	**1.75**	**2.28**	**1.84**	**1.58**	**2.19**	**1.92**	**1.24**	**1.37**	**1.71**	**20.42**
Avocado	**1.61**	**0.74**	**0.92**	**1.80**	**4.33**	**5.48**	**4.74**	**5.10**	**4.59**	**3.17**	**1.59**	**1.34**	**35.40**
Grape with 40% cover	1.61	0.73	**0.56**	**1.73**	**2.90**	**2.65**	**2.36**	**1.99**	**1.64**	0.15	1.09	1.34	**18.75**
Grape with cover crop	1.65	1.72	**1.60**	**2.63**	**3.34**	**3.08**	**2.86**	**2.85**	**2.61**	1.39	1.35	1.75	**26.83**
Grape with 60% cover	1.61	0.73	**0.56**	**2.30**	**4.20**	**3.90**	**3.49**	**2.77**	**2.03**	0.16	1.09	1.34	**24.19**
Idle	1.69	0.71	0.13	0.17	0.10	0.02	0.01	0.23	0.61	0.12	1.15	1.36	**6.29**

ETc Table 5. Zone 8 Typical Year

ETc Table for Irrigation Scheduling and Design

Zone 8 Monthly Evapotranspiration

Surface Irrigation Typical Year

IRRIGATION TRAINING AND RESEARCH CENTER, California Polytechnic State University, San Luis Obispo

Table does not include adjustments for bare spots and reduced vigor

	1997 (Typical Year)												
	January	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**	**October**	**November**	**December**	**Annual**
	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches	**inches**
Precipitation	6.76	0.36	1.27	1.37	1.15	0.41	0.22	0.72	0.02	1.11	8.44	3.29	**25.11**
Grass Reference ETo	0.75	2.30	3.64	5.19	6.72	7.03	6.92	5.88	5.17	3.33	1.06	1.22	**49.20**
Apple, Pear, Cherry, Plum and Prune	0.85	0.99	**1.50**	**2.49**	**4.36**	**6.15**	**6.52**	**5.95**	**4.87**	**3.19**	0.68	1.13	**38.68**
Apples, Plums, Cherries etc w/covercrop	0.86	2.55	**3.73**	**4.91**	**7.22**	**7.99**	**7.97**	**6.83**	**5.80**	**3.66**	1.01	1.46	**53.99**
Peach, Nectarine and Apricots	0.85	0.99	**1.50**	**2.54**	**5.11**	**6.91**	**6.53**	**5.89**	**4.87**	**3.36**	0.66	1.13	**40.34**
Immature Peaches, Nectarines, etc	0.85	0.99	**1.30**	**1.95**	**3.25**	**3.98**	**3.59**	**3.51**	**2.72**	**2.31**	0.57	1.13	**26.15**
Almonds	0.85	0.99	**1.50**	**2.89**	**5.64**	**6.87**	**6.39**	**5.53**	**4.94**	**3.17**	**0.92**	1.13	**40.82**
Almonds w/covercrop	0.86	2.28	**3.23**	**4.51**	**7.29**	**7.79**	**7.20**	**6.39**	**5.61**	**3.57**	**1.05**	1.42	**51.20**
Immature Almonds	0.85	0.99	**1.30**	**2.14**	**3.65**	**4.07**	**3.43**	**3.76**	**2.67**	**2.25**	**0.83**	1.13	**27.08**
Walnuts	0.85	0.99	1.10	**2.19**	**3.93**	**6.22**	**7.16**	**6.36**	**5.49**	**3.38**	**0.97**	1.13	**39.76**
Misc. Deciduous	0.85	0.99	**1.81**	**2.83**	**5.38**	**6.72**	**6.29**	**5.47**	**4.84**	**3.24**	**1.01**	1.13	**40.57**
Grain and Grain Hay	**0.89**	**2.66**	**4.21**	**5.93**	**4.37**	0.47	0.18	0.77	0.02	1.58	**0.61**	**1.31**	**22.99**
Safflower and Sunflower	0.88	**1.26**	**2.21**	**5.11**	**7.79**	**7.44**	**2.13**	0.77	0.02	0.91	0.59	1.14	**30.25**
Corn and Grain Sorghum	0.88	0.97	1.98	**2.40**	**2.61**	**6.56**	**8.06**	**6.13**	**0.85**	0.91	0.59	1.14	**33.08**
Misc. field crops	0.88	1.55	**1.41**	**2.44**	**5.74**	**7.14**	**6.75**	**2.93**	0.02	0.91	0.59	1.14	**31.49**
Alfalfa Hay and Clover	**0.89**	**2.46**	**3.84**	**4.95**	**6.56**	**6.72**	**6.21**	**5.41**	**4.76**	**2.38**	**0.93**	**1.43**	**46.54**
Pasture and Misc. Grasses	0.88	**1.86**	**2.86**	**5.01**	**7.04**	**7.13**	**6.90**	**6.07**	**5.14**	**3.51**	**1.11**	1.14	**48.64**
Small Vegetables	**0.88**	**1.96**	**3.77**	**4.35**	**4.48**	**7.54**	**2.90**	0.77	0.02	0.91	0.59	1.14	**29.31**
Tomatoes and Peppers	0.88	1.05	**1.63**	**3.13**	**7.12**	**7.79**	**7.44**	**3.36**	0.02	0.91	0.59	1.14	**35.04**
Potatoes, Sugar beets, Turnip etc..	0.88	0.97	1.14	**1.71**	**2.39**	**4.43**	**6.78**	**6.81**	**5.98**	**3.87**	**1.27**	**1.35**	**37.59**
Melons, Squash, and Cucumbers	0.88	1.58	**1.40**	**3.10**	**7.06**	**7.39**	**3.52**	0.76	0.02	0.91	0.59	1.14	**28.34**
Onions and Garlic	**0.89**	**2.38**	**3.70**	**5.32**	**6.40**	**1.88**	0.18	0.77	0.02	0.91	1.09	**1.25**	**24.79**
Citrus (no ground cover)	**0.86**	**2.38**	**3.43**	**4.87**	**5.74**	**5.56**	**5.01**	**4.90**	**3.70**	**3.07**	**0.98**	**1.45**	**41.94**
Immature Citrus	**0.87**	**1.68**	**2.22**	**3.11**	**3.81**	**3.12**	**2.94**	**3.03**	**2.01**	**2.08**	**0.73**	**1.30**	**26.90**
Avocado	**0.85**	**0.99**	**1.81**	**2.83**	**5.38**	**6.72**	**6.29**	**5.47**	**4.84**	**3.24**	**1.01**	**1.13**	**40.57**
Grape with 40% cover	0.84	0.99	**1.49**	**2.66**	**3.75**	**3.23**	**2.74**	**2.48**	**1.03**	0.92	0.55	1.13	**21.82**
Grape with cover crop	0.86	1.79	**2.36**	**3.51**	**4.66**	**4.13**	**3.70**	**3.39**	**2.11**	2.00	0.73	1.32	**30.56**
Grape with 60% cover	0.84	0.99	**1.49**	**3.09**	**4.95**	**4.56**	**4.02**	**3.25**	**1.43**	0.93	0.55	1.13	**27.23**
Idle	0.89	0.96	1.10	1.35	1.22	0.44	0.18	0.77	0.02	0.91	0.61	1.15	**9.59**

ETc Table 6. Zone 9 Typical Year

ETc Table for Irrigation Scheduling and Design

Zone 9 Monthly Evapotranspiration

Surface Irrigation Typical Year

IRRIGATION TRAINING AND RESEARCH CENTER, California Polytechnic State University, San Luis Obispo

Table does not include adjustments for bare spots and reduced vigor

	1997 (Typical Year)												
	January	February	March	April	May	June	July	August	September	October	November	December	Annual
	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches
Precipitation	5.64	0.49	0.25	1.00	0.02	0.03	0.02	0.00	0.21	0.52	3.31	4.11	**15.60**
Grass Reference ETo	1.53	2.86	4.54	5.51	6.58	5.58	6.56	6.66	5.28	4.16	2.17	2.35	**53.77**
Apple, Pear, Cherry, Plum and Prune	1.73	0.65	**0.75**	**2.25**	**3.03**	**4.10**	**5.67**	**5.73**	**4.50**	**3.44**	1.31	1.75	**34.93**
Apples, Plums, Cherries etc w/covercrop	1.92	3.02	**3.89**	**5.12**	**5.91**	**5.68**	**7.16**	**7.26**	**5.88**	**3.94**	2.29	2.94	**55.03**
Peach, Nectarine and Apricots	1.73	0.65	**0.75**	**2.30**	**3.72**	**4.77**	**5.53**	**5.56**	**4.65**	**3.45**	1.31	1.75	**36.19**
Immature Peaches, Nectarines, etc	1.72	0.65	**0.52**	**1.72**	**1.83**	**2.31**	**2.89**	**2.78**	**2.27**	**2.22**	1.29	1.75	**21.97**
Walnuts	1.73	0.65	0.29	**2.00**	**2.67**	**4.37**	**6.28**	**6.54**	**5.37**	**3.74**	**2.04**	1.75	**37.44**
Misc. Deciduous	1.73	0.65	**1.18**	**2.64**	**4.05**	**4.76**	**5.20**	**5.46**	**4.48**	**3.66**	**2.06**	1.75	**37.63**
Grain and Grain Hay	**1.83**	**3.20**	**5.13**	**6.14**	**3.55**	0.05	0.02	0.00	0.19	1.26	**1.36**	**2.26**	**24.99**
Safflower and Sunflower	1.69	**0.97**	**1.74**	**5.42**	**7.28**	**5.92**	**2.02**	0.00	0.19	0.52	1.28	1.75	**28.77**
Corn and Grain Sorghum	1.69	0.66	1.41	**1.95**	**1.61**	**4.69**	**7.23**	**6.16**	**0.90**	0.52	1.28	1.74	**29.84**
Misc. field crops	1.69	1.32	**0.77**	**2.36**	**5.05**	**5.29**	**6.15**	**2.63**	0.19	0.52	1.28	1.74	**29.00**
Alfalfa Hay and Clover	**1.86**	**2.95**	**4.15**	**5.39**	**5.98**	**5.29**	**5.83**	**5.97**	**4.62**	**2.31**	**2.05**	**2.74**	**49.13**
Pasture and Misc. Grasses	1.69	**1.77**	**2.64**	**5.17**	**6.20**	**5.28**	**6.21**	**6.34**	**5.02**	**4.06**	**2.38**	1.75	**48.51**
Small Vegetables	**1.78**	**2.02**	**4.61**	**4.17**	**4.07**	**5.70**	**2.77**	0.00	0.19	0.52	1.28	1.75	**28.87**
Tomatoes and Peppers	1.75	1.07	**1.08**	**3.30**	**6.50**	**5.99**	**6.71**	**2.82**	0.19	0.52	1.28	1.74	**32.95**
Potatoes, Sugar beets, Turnip etc..	1.70	0.66	0.88	**1.50**	**1.20**	**3.12**	**6.33**	**7.44**	**5.91**	**4.64**	**2.55**	**2.47**	**38.40**
Melons, Squash, and Cucumbers	1.69	1.31	**0.63**	**3.36**	**6.55**	**5.53**	**2.97**	0.00	0.19	0.52	1.28	1.74	**25.77**
Onions and Garlic	**1.82**	**2.74**	**4.32**	**5.43**	**5.41**	**1.17**	0.02	0.00	0.19	0.52	1.92	**2.09**	**25.64**
Citrus (no ground cover)	**1.92**	**2.71**	**3.34**	**4.55**	**4.10**	**3.09**	**4.05**	**4.10**	**3.10**	**3.16**	**2.06**	**2.78**	**38.95**
Immature Citrus	**1.86**	**1.60**	**1.61**	**2.80**	**2.02**	**1.62**	**1.84**	**2.03**	**1.56**	**1.85**	**1.74**	**2.31**	**22.83**
Avocado	**1.73**	**0.65**	**1.18**	**2.64**	**4.05**	**4.76**	**5.20**	**5.46**	**4.48**	**3.66**	**2.06**	**1.75**	**37.63**
Idle	1.68	0.66	0.29	1.03	0.04	0.03	0.02	0.00	0.19	0.52	1.29	1.74	**7.48**

ETc Table 7. Zone 10 Typical Year

ETc Table for Irrigation Scheduling and Design

Zone 10 Monthly Evapotranspiration

Surface Irrigation Typical Year

IRRIGATION TRAINING AND RESEARCH CENTER, California Polytechnic State University, San Luis Obispo

Table does not include adjustments for bare spots and reduced vigor

	1997 (Typical Year)												
	January	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**	**October**	**November**	**December**	**Annual**
	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches	**inches**
Precipitation	5.68	0.12	0.54	0.14	0.17	0.06	0.84	0.56	0.06	0.81	3.14	4.51	**16.63**
Grass Reference ETo	1.45	2.70	4.08	5.49	6.68	6.29	6.50	6.23	5.27	4.09	2.00	1.69	**52.47**
Apple, Pear, Cherry, Plum and Prune	1.65	0.47	**0.91**	**2.43**	**5.71**	**5.76**	**6.60**	**6.07**	**4.62**	**2.90**	1.17	1.66	**39.96**
Apples, Plums, Cherries etc w/covercrop	1.67	2.70	**3.57**	**4.75**	**6.99**	**7.15**	**7.36**	**6.92**	**5.91**	**4.04**	1.94	1.99	**54.99**
Peach, Nectarine and Apricots	1.65	0.47	**0.91**	**2.21**	**5.46**	**5.89**	**6.42**	**6.15**	**4.67**	**2.79**	1.17	1.66	**39.45**
Immature Peaches, Nectarines, etc	1.66	0.47	**0.70**	**1.20**	**3.34**	**3.67**	**4.03**	**3.90**	**2.77**	**2.16**	1.18	1.67	**26.75**
Almonds	1.65	0.47	**1.13**	**2.93**	**5.87**	**5.41**	**6.38**	**5.90**	**4.42**	**2.80**	1.17	1.66	**39.81**
Almonds w/covercrop	1.67	2.28	**2.85**	**4.71**	**6.84**	**6.62**	**6.71**	**6.59**	**5.39**	**3.40**	1.59	1.95	**50.59**
Immature Almonds	1.66	0.47	**0.91**	**1.87**	**4.38**	**3.98**	**4.60**	**4.44**	**3.24**	**1.83**	1.17	1.67	**30.22**
Walnuts	1.65	0.47	**1.06**	**1.79**	**5.27**	**6.85**	**6.93**	**6.89**	**5.28**	**3.26**	**1.22**	1.66	**42.33**
Pistachio	1.65	0.47	0.49	**1.15**	**2.37**	**4.72**	**6.90**	**6.63**	**5.22**	**3.30**	**1.22**	1.66	**35.77**
Pistachio w/ covercrop	1.67	2.28	2.72	**3.67**	**4.97**	**6.23**	**7.19**	**7.11**	**5.91**	**4.33**	**1.90**	1.96	**49.94**
Immature Pistachio	1.66	0.47	0.49	**0.67**	**1.38**	**3.27**	**4.85**	**4.82**	**3.66**	**2.31**	**1.28**	1.67	**26.52**
Misc. Deciduous	1.65	0.47	**0.91**	**2.34**	**5.39**	**5.70**	**6.26**	**5.71**	**4.60**	**2.62**	1.17	1.66	**38.48**
Grain and Grain Hay	**1.72**	**2.58**	**4.48**	**5.99**	**3.59**	0.11	0.75	0.53	0.11	0.78	1.22	**1.78**	**23.63**
Rice	1.70	0.46	0.49	0.58	**6.45**	**7.54**	**7.94**	**7.56**	**2.98**	0.79	1.21	1.69	**39.37**
Cotton	1.70	0.46	0.49	0.87	**1.33**	**3.71**	**6.84**	**6.78**	**5.24**	**2.07**	1.20	1.69	**32.38**
Safflower and Sunflower	1.70	**0.76**	**1.73**	**5.29**	**7.65**	**6.57**	**2.07**	0.54	0.11	0.78	1.21	1.69	**30.09**
Corn and Grain Sorghum	1.70	0.46	1.64	**1.39**	**2.31**	**5.64**	**6.73**	**5.03**	**0.59**	0.78	1.21	1.69	**29.16**
Misc. field crops	1.70	0.46	1.64	**1.40**	**2.37**	**5.88**	**6.31**	**2.80**	0.11	0.78	1.21	1.69	**26.32**
Alfalfa Hay and Clover	**1.72**	**2.69**	**3.90**	**5.15**	**6.18**	**5.87**	**5.89**	**5.68**	**4.75**	**2.57**	**1.82**	**1.98**	**48.20**
Pasture and Misc. Grasses	1.70	**1.09**	**2.24**	**4.57**	**6.47**	**6.23**	**6.60**	**6.31**	**5.11**	**3.56**	**1.65**	1.69	**47.21**
Small Vegetables	**1.71**	**1.26**	**3.89**	**5.75**	**1.75**	0.09	0.75	1.57	1.46	**1.94**	**1.77**	**1.96**	**23.90**
Tomatoes and Peppers	1.70	0.46	1.25	**0.89**	**3.48**	**6.66**	**6.38**	**1.63**	0.11	0.78	1.21	1.69	**26.22**
Potatoes, Sugar beets, Turnips etc.	1.70	**0.86**	**2.28**	**5.79**	**7.47**	**6.93**	**6.61**	0.66	0.11	0.78	1.21	1.69	**36.08**
Melons, Squash, and Cucumbers	1.70	0.46	0.49	0.19	0.92	**1.04**	**4.06**	**5.14**	1.76	0.78	1.21	1.69	**19.42**
Onions and Garlic	**1.72**	**2.27**	**3.57**	**4.93**	**4.73**	**0.85**	0.75	0.53	0.11	0.78	1.87	**1.78**	**23.90**
Citrus (no ground cover)	**1.67**	**2.42**	**3.11**	**4.23**	**4.71**	**4.31**	**5.05**	**4.77**	**3.74**	**3.49**	**1.92**	**1.98**	**41.40**
Immature Citrus	**1.68**	**1.37**	**1.78**	**2.55**	**2.92**	**2.60**	**3.29**	**3.06**	**2.21**	**2.50**	**1.62**	**1.85**	**27.44**
Avocado	**1.65**	**0.47**	**0.91**	**2.34**	**5.39**	**5.70**	**6.26**	**5.71**	**4.60**	**2.62**	**1.17**	**1.66**	**38.48**
Idle	1.72	0.45	0.49	0.19	0.16	0.09	0.75	0.53	0.11	0.78	1.22	1.69	**8.18**

ETc Table 8. Zone 12 Typical Year

ETc Table for Irrigation Scheduling and Design

Zone 12 Monthly Evapotranspiration

Surface Irrigation Typical Year

IRRIGATION TRAINING AND RESEARCH CENTER, California Polytechnic State University, San Luis Obispo

Table does not include adjustments for bare spots and reduced vigor

	1997 (Typical Year)												
	January	February	March	April	May	June	July	August	September	October	November	December	Annual
	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches
Precipitation	6.81	0.27	1.34	0.22	0.21	0.20	0.13	0.34	0.07	0.64	4.15	2.12	**16.50**
Grass Reference ETo	0.73	2.12	4.01	5.56	7.32	7.58	7.98	6.76	5.39	3.47	1.05	0.99	**52.96**
Apple, Pear, Cherry, Plum and Prune	0.84	0.92	**1.56**	**2.37**	**6.29**	**7.08**	**7.65**	**6.47**	**4.85**	**2.25**	0.45	0.95	**41.68**
Apples, Plums, Cherries etc w/covercrop	0.84	2.37	**4.09**	**4.72**	**7.60**	**8.94**	**9.22**	**7.64**	**5.97**	**3.44**	0.85	1.19	**56.88**
Peach, Nectarine and Apricots	0.84	0.92	**1.58**	**2.17**	**6.11**	**7.08**	**7.54**	**6.45**	**4.76**	**2.37**	0.46	0.95	**41.21**
Immature Peaches, Nectarines, etc	0.84	0.92	**1.34**	**1.19**	**3.84**	**4.28**	**4.65**	**4.10**	**2.86**	**1.67**	0.46	0.95	**27.11**
Almonds	0.84	**0.98**	**1.82**	**2.97**	**6.51**	**6.81**	**7.21**	**6.29**	**4.71**	**2.95**	0.54	0.95	**42.59**
Almonds w/covercrop	0.84	**2.13**	**3.51**	**4.68**	**7.52**	**8.16**	**8.33**	**7.24**	**5.37**	**3.42**	0.79	1.17	**53.17**
Immature Almonds	0.84	**0.96**	**1.56**	**2.02**	**4.68**	**5.11**	**5.10**	**4.69**	**3.33**	**2.41**	0.49	0.95	**32.14**
Walnuts	0.83	0.92	**1.71**	**1.78**	**5.76**	**8.48**	**8.72**	**7.36**	**5.24**	**2.87**	0.57	0.95	**45.18**
Pistachio	0.84	0.92	1.11	**1.14**	**2.62**	**6.00**	**8.27**	**7.09**	**5.34**	**2.73**	0.53	0.95	**37.53**
Pistachio w/ covercrop	0.84	2.14	3.46	**3.70**	**5.53**	**7.50**	**9.11**	**7.79**	**6.05**	**3.51**	0.99	1.17	**51.79**
Immature Pistachio	0.84	0.92	1.11	**0.69**	**1.54**	**3.95**	**5.75**	**4.95**	**3.71**	**2.02**	0.52	0.95	**26.94**
Misc. Deciduous	0.84	0.92	**1.56**	**2.28**	**5.94**	**6.84**	**7.27**	**6.28**	**4.56**	**2.39**	0.45	0.95	**40.29**
Grain and Grain Hay	**0.87**	**2.25**	**4.42**	**6.13**	**3.86**	0.22	0.15	0.34	0.07	0.63	0.49	**1.03**	**20.46**
Rice	0.86	0.91	1.11	0.75	**7.13**	**9.19**	**9.74**	**8.22**	**2.53**	0.63	0.49	0.95	**42.49**
Cotton	0.86	0.91	1.10	1.00	**1.71**	**4.68**	**8.44**	**7.40**	**5.19**	**1.63**	0.49	0.95	**34.37**
Safflower and Sunflower	0.86	**1.17**	**2.34**	**5.21**	**8.41**	**7.19**	**0.94**	0.34	0.07	0.63	0.49	0.95	**28.61**
Corn and Grain Sorghum	0.86	0.91	2.15	**1.39**	**2.57**	**6.97**	**8.13**	**5.51**	0.49	0.63	0.49	0.95	**31.04**
Misc. field crops	0.86	0.91	2.15	**1.39**	**2.55**	**7.12**	**7.74**	**2.92**	0.07	0.63	0.49	0.95	**27.77**
Alfalfa Hay and Clover	**0.86**	**2.25**	**4.23**	**5.16**	**6.68**	**7.02**	**7.19**	**5.97**	**4.91**	**2.15**	**0.87**	**1.17**	**48.46**
Pasture and Misc. Grasses	0.86	**1.43**	**2.84**	**4.61**	**7.25**	**7.53**	**7.87**	**6.67**	**5.33**	**3.07**	**0.80**	0.95	**49.20**
Small Vegetables	**0.87**	**1.55**	**3.92**	**5.95**	**1.91**	0.21	0.15	1.44	**1.54**	**1.59**	**0.76**	**1.15**	**21.04**
Tomatoes and Peppers	0.86	0.91	1.66	**0.78**	**3.77**	**8.10**	**7.01**	**0.91**	0.07	0.63	0.49	0.95	**26.14**
Potatoes, Sugar beets, Turnips etc.	0.86	**1.21**	**2.74**	**5.88**	**8.15**	**8.45**	**7.70**	**0.44**	0.07	0.63	0.49	0.95	**37.57**
Melons, Squash, and Cucumbers	0.86	0.91	1.10	0.22	1.00	**1.48**	**5.06**	**5.61**	**1.58**	0.63	0.49	0.95	**19.89**
Onions and Garlic	**0.87**	**2.08**	**3.83**	**5.00**	**5.46**	**1.15**	0.18	0.34	0.07	0.63	1.03	**1.03**	**21.67**
Citrus (no ground cover)	**0.84**	**2.22**	**3.73**	**4.24**	**5.23**	**5.36**	**5.62**	**4.98**	**3.69**	**2.87**	**0.85**	**1.18**	**40.80**
Immature Citrus	**0.85**	**1.56**	**2.38**	**2.52**	**3.39**	**3.24**	**3.36**	**3.28**	**2.40**	**1.82**	**0.67**	**1.09**	**26.55**
Avocado	**0.84**	**0.92**	**1.56**	**2.28**	**5.94**	**6.84**	**7.27**	**6.28**	**4.56**	**2.39**	**0.45**	**0.95**	**40.29**
Grape Vines with 80% canopy	0.84	0.92	**1.27**	**1.14**	**3.52**	**5.90**	**6.38**	**4.91**	**3.12**	0.63	0.46	0.95	**30.05**
Grape Vines with cover crop (80% canopy)	0.85	1.96	**3.10**	**3.08**	**5.38**	**6.88**	**7.15**	**5.80**	**3.60**	2.35	0.74	1.15	**42.04**
Immature Grapes Vines with 50% canopy	0.85	0.91	**1.21**	**0.82**	**2.42**	**4.30**	**4.46**	**3.73**	**1.87**	0.63	0.47	0.95	**22.63**
Idle	0.87	0.90	1.11	0.22	0.22	0.21	0.15	0.34	0.07	0.63	0.50	0.96	**6.18**

ETc Table 9. Zone 13 Typical Year

ETc Table for Irrigation Scheduling and Design

Zone 13 Monthly Evapotranspiration

Surface Irrigation Typical Year

IRRIGATION TRAINING AND RESEARCH CENTER, California Polytechnic State University, San Luis Obispo

Table does not include adjustments for bare spots and reduced vigor

	1997 (Typical Year)												
	January	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**	**October**	**November**	**December**	**Annual**
	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches	**inches**
Precipitation	11.46	0.79	0.37	1.10	0.33	0.43	0.12	0.28	0.08	1.56	2.22	2.46	**21.20**
Grass Reference ETo	0.89	1.95	4.01	4.80	6.98	6.74	8.27	7.59	5.79	3.59	1.38	1.05	**53.03**
Apple, Pear, Cherry, Plum and Prune	1.02	1.33	**0.76**	**1.90**	**3.51**	**5.91**	**7.90**	**7.31**	**5.39**	**3.41**	0.86	1.07	**40.37**
Apples, Plums, Cherries etc w/covercrop	1.05	2.36	**3.65**	**4.24**	**6.93**	**7.66**	**9.64**	**8.96**	**6.71**	**3.88**	1.38	1.27	**57.73**
Almonds	1.02	1.33	**0.76**	**1.85**	**3.16**	**5.32**	**7.33**	**7.09**	**5.31**	**3.48**	1.24	1.07	**38.96**
Almonds w/covercrop	1.05	2.24	**2.88**	**3.73**	**5.78**	**6.87**	**8.67**	**8.17**	**6.07**	**3.87**	1.39	1.26	**51.96**
Immature Almonds	1.02	1.33	**0.64**	**1.58**	**2.49**	**3.89**	**5.35**	**4.99**	**3.80**	**2.60**	1.04	1.07	**29.79**
Walnuts	1.01	1.33	**0.62**	**2.01**	**3.08**	**5.49**	**8.84**	**8.26**	**5.93**	**3.60**	1.17	1.07	**42.42**
Pistachio	1.02	1.33	0.40	**1.86**	**2.43**	**4.93**	**8.46**	**8.26**	**6.27**	**3.53**	1.29	1.07	**40.86**
Pistachio w/ covercrop	1.05	2.24	2.86	**3.86**	**5.40**	**6.76**	**9.35**	**8.99**	**6.77**	**4.16**	1.42	1.26	**54.11**
Immature Pistachio	1.02	1.33	0.40	**1.47**	**1.44**	**3.60**	**5.60**	**5.71**	**4.31**	**2.70**	1.03	1.07	**29.67**
Misc. Deciduous	1.02	1.33	**0.40**	**1.66**	**2.20**	**4.74**	**7.64**	**7.34**	**5.40**	**3.55**	0.82	1.07	**37.17**
Grain and Grain Hay	**1.05**	**2.22**	**4.43**	**5.33**	**3.98**	0.45	0.11	0.28	0.08	1.08	0.73	**1.12**	**20.86**
Rice	1.03	1.32	0.40	1.48	**6.84**	**8.21**	**10.25**	**9.35**	**2.66**	1.08	0.73	1.07	**44.42**
Cotton	1.03	1.31	1.05	1.37	**1.76**	**5.73**	**8.87**	**7.70**	**1.37**	**1.10**	0.73	1.07	**33.06**
Corn and Grain Sorghum	1.03	1.31	1.22	**2.21**	**2.72**	**6.85**	**8.94**	**7.37**	**0.93**	1.08	0.73	1.07	**35.45**
Misc. field crops	1.03	1.31	1.22	**2.21**	**2.62**	**6.49**	**8.10**	**3.17**	0.08	1.08	0.73	1.07	**29.11**
Alfalfa Hay and Clover	**1.06**	**2.22**	**4.00**	**4.38**	**6.38**	**6.79**	**7.49**	**6.70**	**5.22**	**2.58**	**1.20**	**1.25**	**49.27**
Pasture and Misc. Grasses	1.03	**1.75**	**2.33**	**4.25**	**7.01**	**6.80**	**8.31**	**7.63**	**5.73**	**3.29**	**1.15**	1.07	**50.35**
Small Vegetables	**1.05**	**1.80**	**3.74**	**2.27**	**0.35**	0.44	0.11	1.43	**1.59**	**2.06**	**1.24**	**1.21**	**17.28**
Tomatoes and Peppers	1.03	1.31	1.15	**1.61**	**3.67**	**7.24**	**7.69**	**1.12**	0.08	1.08	0.73	1.07	**27.77**
Misc Subtropical	1.02	1.33	**0.40**	**1.66**	**2.20**	**4.74**	**7.64**	**7.34**	**5.40**	**3.55**	0.82	1.07	**37.17**
Grape Vines with 80% canopy	1.02	1.33	**0.76**	**2.03**	**4.02**	**5.38**	**6.06**	**5.67**	**2.79**	1.09	0.71	1.07	**31.93**
Grape Vines with cover crop (80% canopy)	1.05	2.12	**2.46**	**3.20**	**5.64**	**5.93**	**7.00**	**6.60**	**3.58**	2.71	1.04	1.25	**42.58**
Immature Grapes Vines with 50% canopy	1.02	1.32	**0.64**	**1.67**	**3.06**	**4.17**	**4.74**	**3.93**	**2.18**	1.09	0.72	1.07	**25.62**
Idle	1.03	1.31	0.40	1.06	0.35	0.44	0.11	0.28	0.08	1.08	0.74	1.06	**7.95**

ETc Table 10. Zone 14 Typical Year

ETc Table for Irrigation Scheduling and Design

Zone 14 Monthly Evapotranspiration

Surface Irrigation Typical Year

IRRIGATION TRAINING AND RESEARCH CENTER, California Polytechnic State University, San Luis Obispo

Table does not include adjustments for bare spots and reduced vigor

	1997 (Typical Year)												
	January	February	March	April	May	June	July	August	September	October	November	December	Annual
	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches
Precipitation	8.22	0.28	0.81	0.30	0.44	0.35	0.09	0.31	0.31	0.82	4.92	2.74	**19.59**
Grass Reference ETo	0.73	2.36	4.13	5.82	7.62	8.00	8.36	7.11	5.82	3.86	1.25	1.14	**56.22**
Apple, Pear, Cherry, Plum and Prune	0.86	0.92	**1.22**	**2.58**	**6.85**	**7.83**	**8.18**	**6.94**	**5.45**	**2.96**	0.60	1.06	**45.45**
Apples, Plums, Cherries etc w/covercrop	0.88	2.56	**3.87**	**4.91**	**8.21**	**9.50**	**9.78**	**8.29**	**6.66**	**4.10**	1.09	1.42	**61.27**
Peach, Nectarine and Apricots	0.86	0.92	**1.24**	**2.37**	**6.68**	**7.93**	**7.99**	**7.00**	**5.47**	**2.74**	0.61	1.06	**44.86**
Immature Peaches, Nectarines, etc	0.86	0.93	**1.00**	**1.34**	**4.24**	**5.04**	**5.11**	**4.55**	**3.41**	**1.88**	0.61	1.06	**30.03**
Almonds	0.86	0.92	**1.45**	**3.16**	**7.03**	**7.72**	**7.72**	**6.63**	**5.21**	**2.85**	0.60	1.06	**45.19**
Almonds w/covercrop	0.88	2.26	**3.31**	**4.84**	**8.06**	**8.90**	**9.03**	**7.75**	**5.96**	**3.53**	1.01	1.37	**56.91**
Immature Almonds	0.86	0.93	**1.20**	**2.29**	**5.23**	**5.70**	**5.82**	**5.09**	**3.79**	**2.06**	0.61	1.06	**34.62**
Walnuts	0.86	0.92	**1.38**	**1.94**	**6.30**	**9.13**	**9.35**	**8.05**	**5.98**	**3.22**	0.71	1.06	**48.91**
Pistachio	0.86	0.92	0.76	**1.27**	**2.97**	**6.53**	**8.93**	**7.49**	**5.89**	**3.20**	0.66	1.06	**40.52**
Pistachio w/ covercrop	0.88	2.26	3.13	**3.99**	**5.90**	**8.22**	**9.65**	**8.28**	**6.76**	**4.14**	1.15	1.37	**55.75**
Immature Pistachio	0.86	0.93	0.76	**0.79**	**1.87**	**4.43**	**6.19**	**5.31**	**4.22**	**2.43**	0.66	1.06	**29.49**
Misc. Deciduous	0.86	0.92	**1.22**	**2.49**	**6.54**	**7.49**	**7.77**	**6.76**	**5.34**	**2.66**	0.60	1.06	**43.71**
Grain and Grain Hay	**0.88**	**2.52**	**4.55**	**6.43**	**4.14**	0.38	0.10	0.33	0.31	0.81	0.64	**1.15**	**22.24**
Rice	0.86	0.92	0.76	0.89	**7.49**	**9.76**	**10.35**	**8.76**	**3.23**	0.81	0.64	1.06	**45.52**
Cotton	0.86	0.92	0.76	1.09	**1.98**	**5.19**	**8.91**	**7.77**	**5.95**	**2.26**	0.64	1.05	**37.38**
Safflower and Sunflower	0.88	**1.22**	**2.17**	**5.52**	**8.80**	**8.21**	**1.28**	0.33	0.31	0.81	0.64	1.06	**31.21**
Corn and Grain Sorghum	0.86	0.92	1.75	**1.60**	**2.84**	**7.55**	**8.66**	**6.18**	**0.83**	0.81	0.64	1.05	**33.70**
Misc. field crops	0.86	0.92	**1.75**	**1.60**	**2.87**	**7.63**	**8.26**	**3.00**	0.31	0.81	0.64	1.05	**29.71**
Alfalfa Hay and Clover	**0.88**	**2.50**	**4.29**	**5.23**	**6.99**	**7.52**	**7.51**	**6.29**	**5.37**	**2.44**	**1.07**	**1.35**	**51.44**
Pasture and Misc. Grasses	0.86	**1.54**	**2.69**	**4.89**	**7.59**	**8.09**	**8.36**	**7.25**	**5.75**	**3.28**	**0.92**	1.06	**52.27**
Small Vegetables	**0.88**	**1.65**	**4.09**	**6.28**	**2.29**	0.36	0.10	1.45	**1.91**	**1.75**	**1.00**	**1.33**	**23.07**
Tomatoes and Peppers	0.86	0.92	1.50	**1.11**	**4.05**	**8.73**	**7.24**	**0.80**	0.31	0.81	0.64	1.05	**28.03**
Potatoes, Sugar beets, Turnips etc.	0.86	**1.27**	**2.69**	**6.19**	**8.55**	**8.89**	**7.75**	**0.40**	0.31	0.81	0.64	1.05	**39.41**
Melons, Squash, and Cucumbers	0.86	0.92	0.76	0.31	1.23	**1.66**	**5.33**	**5.98**	**1.92**	0.81	0.64	1.05	**21.47**
Onions and Garlic	**0.88**	**2.30**	**3.78**	**5.33**	**5.29**	**1.00**	0.11	0.33	0.31	0.81	1.25	**1.15**	**22.52**
Citrus (no ground cover)	**0.88**	**2.36**	**3.56**	**4.55**	**5.81**	**6.09**	**6.08**	**5.33**	**4.33**	**3.46**	**1.12**	**1.40**	**44.98**
Immature Citrus	**0.88**	**1.60**	**2.23**	**2.83**	**3.61**	**3.90**	**3.73**	**3.51**	**2.78**	**2.54**	**0.88**	**1.24**	**29.73**
Avocado	**0.86**	**0.92**	**1.22**	**2.49**	**6.54**	**7.49**	**7.77**	**6.76**	**5.34**	**2.66**	**0.60**	**1.06**	**43.71**
Grape Vines with 80% canopy	0.86	0.93	**0.94**	**1.28**	**3.83**	**6.58**	**6.78**	**5.38**	**3.27**	0.83	0.61	1.06	**32.34**
Grape Vines with cover crop (80% canopy)	0.88	2.04	**2.92**	**3.20**	**5.89**	**7.49**	**7.53**	**6.28**	**4.06**	2.41	0.80	1.33	**44.82**
Immature Grapes Vines with 50% canopy	0.86	0.93	**0.88**	**0.94**	**2.89**	**4.90**	**4.74**	**4.13**	**2.25**	0.83	0.61	1.05	**25.01**
Idle	0.86	0.92	0.76	0.31	0.44	0.36	0.10	0.33	0.31	0.81	0.65	1.05	**6.90**

ETc Table 11. Zone 15 Typical Year

ETc Table for Irrigation Scheduling and Design

Zone 15 Monthly Evapotranspiration

Surface Irrigation Typical Year

IRRIGATION TRAINING AND RESEARCH CENTER, California Polytechnic State University, San Luis Obispo

Table does not include adjustments for bare spots and reduced vigor

	1997 (Typical Year)												
	January	February	March	April	May	June	July	August	September	October	November	December	Annual
	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches
Precipitation	3.46	0.39	0.07	0.59	0.01	0.33	0.01	0.00	0.02	0.33	1.91	1.28	**8.40**
Grass Reference ETo	0.95	2.30	4.38	6.30	8.18	8.18	8.35	7.33	5.72	4.04	1.58	1.09	**58.41**
Apple, Pear, Cherry, Plum and Prune	1.05	0.95	**0.86**	**3.84**	**7.26**	**7.90**	**7.70**	**6.50**	**5.19**	**2.29**	0.82	1.10	**45.45**
Apples, Plums, Cherries etc w/covercrop	1.05	2.58	**3.79**	**5.38**	**8.77**	**9.40**	**9.38**	**8.20**	**6.08**	**3.83**	1.36	1.21	**61.02**
Peach, Nectarine and Apricots	1.05	0.95	**0.65**	**2.89**	**6.82**	**7.84**	**7.83**	**6.67**	**4.80**	**2.77**	0.82	1.10	**44.19**
Immature Peaches, Nectarines, etc	1.06	0.94	**0.38**	**1.77**	**4.25**	**5.29**	**5.10**	**4.47**	**3.21**	**1.41**	0.83	1.11	**29.83**
Almonds	1.05	**1.15**	**1.30**	**4.41**	**6.78**	**7.00**	**7.32**	**6.00**	**4.45**	**2.03**	0.82	1.10	**43.42**
Almonds w/covercrop	1.02	**2.34**	**2.57**	**5.85**	**8.24**	**8.17**	**7.91**	**6.96**	**5.06**	**2.84**	1.20	1.16	**53.33**
Immature Almonds	1.06	**1.08**	**0.82**	**3.68**	**5.81**	**6.04**	**5.96**	**5.05**	**3.60**	**1.68**	0.83	1.11	**36.70**
Walnuts	1.04	0.95	**0.99**	**2.98**	**7.74**	**9.29**	**9.41**	**8.11**	**5.79**	**2.77**	1.03	1.10	**51.20**
Pistachio	1.05	0.95	0.12	**1.69**	**2.75**	**6.59**	**8.95**	**7.75**	**5.73**	**3.10**	0.87	1.10	**40.65**
Pistachio w/ covercrop	1.05	2.33	2.67	**4.75**	**5.93**	**8.55**	**9.64**	**8.50**	**6.53**	**3.98**	1.44	1.22	**56.57**
Immature Pistachio	1.06	0.94	0.12	**1.15**	**1.53**	**4.54**	**6.24**	**5.42**	**3.95**	**2.02**	0.93	1.11	**29.01**
Misc. Deciduous	1.05	0.95	**0.85**	**3.38**	**7.22**	**7.51**	**7.27**	**6.56**	**4.84**	**2.50**	0.82	1.10	**44.05**
Grain and Grain Hay	**1.12**	**2.42**	**4.81**	**7.00**	**4.01**	0.40	0.01	0.00	0.02	0.33	0.89	**1.20**	**22.21**
Rice	1.11	0.93	0.12	1.31	**7.97**	**9.98**	**10.40**	**9.06**	**2.78**	0.33	0.86	1.15	**45.98**
Cotton	1.11	0.92	0.12	1.39	**1.68**	**5.26**	**8.92**	**8.10**	**5.74**	**1.57**	0.86	1.14	**36.81**
Safflower and Sunflower	1.11	**1.19**	**1.78**	**6.22**	**9.58**	**8.20**	**1.22**	0.00	0.02	0.33	0.86	1.15	**31.66**
Corn and Grain Sorghum	1.11	0.92	1.20	**1.83**	**2.84**	**7.68**	**8.83**	**5.96**	**0.46**	0.33	0.86	1.14	**33.17**
Misc. field crops	1.11	0.92	1.20	**1.84**	**2.82**	**7.94**	**8.15**	**2.76**	0.02	0.33	0.86	1.14	**29.10**
Alfalfa Hay and Clover	**1.11**	**2.45**	**4.32**	**6.19**	**7.55**	**7.86**	**7.53**	**6.57**	**5.13**	**2.10**	**1.40**	**1.27**	**53.48**
Pasture and Misc. Grasses	1.11	**1.47**	**2.23**	**5.43**	**8.14**	**8.32**	**8.34**	**7.34**	**5.65**	**3.53**	**1.30**	1.15	**54.01**
Small Vegetables	**1.12**	**1.57**	**4.19**	**6.83**	**1.88**	0.39	0.01	1.11	**1.52**	**1.34**	**1.39**	**1.26**	**22.61**
Tomatoes and Peppers	1.11	0.92	0.88	**1.45**	**4.53**	**8.80**	**7.36**	**0.59**	0.02	0.33	0.86	1.14	**27.99**
Potatoes, Sugar beets, Turnips etc.	1.11	**1.26**	**2.50**	**6.82**	**9.22**	**9.29**	**7.84**	0.09	0.02	0.33	0.86	1.14	**40.49**
Melons, Squash, and Cucumbers	1.11	0.92	0.12	0.61	0.74	**1.57**	**5.36**	**6.08**	**1.79**	0.33	0.86	1.14	**20.64**
Onions and Garlic	**1.12**	**2.22**	**3.88**	**5.83**	**5.35**	**0.83**	0.01	0.00	0.02	0.33	1.55	**1.20**	**22.33**
Citrus (no ground cover)	**1.05**	**2.42**	**3.14**	**5.20**	**5.89**	**6.28**	**5.98**	**5.40**	**4.27**	**3.13**	**1.46**	**1.22**	**45.44**
Immature Citrus	**1.07**	**1.66**	**1.59**	**3.39**	**3.57**	**4.11**	**3.76**	**3.46**	**2.57**	**2.05**	**1.20**	**1.20**	**29.63**
Misc Subtropical	**1.05**	**0.95**	**0.85**	**3.38**	**7.22**	**7.51**	**7.27**	**6.56**	**4.84**	**2.50**	**0.82**	**1.10**	**44.05**
Grape Vines with 80% canopy	1.06	0.94	**0.52**	**1.94**	**4.52**	**6.46**	**6.35**	**5.06**	**2.58**	0.51	0.83	1.11	**31.89**
Grape Vines with cover crop (80% canopy)	1.07	2.09	**2.59**	**3.71**	**6.23**	**7.31**	**7.25**	**5.57**	**3.92**	2.40	1.23	1.23	**44.59**
Immature Grapes Vines with 50% canopy	1.08	0.94	**0.39**	**1.44**	**3.43**	**4.90**	**4.89**	**3.76**	**2.14**	0.42	0.84	1.12	**25.33**
Idle	1.13	0.92	0.12	0.61	0.01	0.39	0.01	0.00	0.02	0.33	0.87	1.16	**5.57**

ETc Table 12. Zone 16 Typical Year

ETc Table for Irrigation Scheduling and Design

Zone 16 Monthly Evapotranspiration

Surface Irrigation Typical Year

IRRIGATION TRAINING AND RESEARCH CENTER, California Polytechnic State University, San Luis Obispo

Table does not include adjustments for bare spots and reduced vigor

	1997 (Typical Year)												
	January	February	March	April	May	June	July	August	September	October	November	December	Annual
	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches
Precipitation	2.85	0.15	2.22	0.00	0.02	0.13	0.20	0.08	0.09	0.52	1.36	1.56	**9.19**
Grass Reference ETo	0.82	2.22	4.50	6.73	8.52	8.23	8.34	7.62	5.80	4.20	1.58	0.84	**59.41**
Apple, Pear, Cherry, Plum and Prune	0.90	0.72	**2.69**	**3.49**	**7.76**	**7.85**	**7.72**	**6.93**	**4.79**	**2.98**	0.81	0.90	**47.55**
Apples, Plums, Cherries etc w/covercrop	0.90	2.31	**4.67**	**5.99**	**9.04**	**9.43**	**9.28**	**8.47**	**6.18**	**3.99**	1.49	0.93	**62.68**
Peach, Nectarine and Apricots	0.90	0.72	**2.46**	**2.50**	**7.12**	**7.86**	**7.82**	**7.13**	**5.10**	**2.66**	0.81	0.90	**45.97**
Immature Peaches, Nectarines, etc	0.92	0.72	**2.27**	**1.35**	**4.47**	**5.21**	**5.32**	**4.56**	**3.25**	**1.92**	0.82	0.91	**31.71**
Almonds	0.90	**0.92**	**2.94**	**4.25**	**7.33**	**6.95**	**7.15**	**6.61**	**4.26**	**2.44**	0.81	0.90	**45.47**
Almonds w/covercrop	0.89	**2.12**	**4.18**	**5.80**	**8.08**	**8.22**	**8.34**	**7.49**	**5.11**	**3.21**	1.25	0.90	**55.60**
Immature Almonds	0.92	**0.85**	**2.61**	**3.60**	**6.05**	**5.89**	**6.01**	**5.43**	**3.69**	**1.85**	0.82	0.91	**38.64**
Walnuts	0.89	0.72	**2.82**	**2.69**	**8.17**	**9.24**	**9.43**	**8.53**	**5.70**	**3.17**	0.91	0.90	**53.17**
Pistachio	0.90	0.72	2.09	**1.23**	**3.01**	**6.42**	**8.88**	**8.31**	**5.72**	**3.25**	0.88	0.90	**42.31**
Pistachio w/ covercrop	0.90	2.04	3.76	**4.60**	**6.17**	**8.33**	**9.62**	**8.94**	**6.65**	**4.19**	1.37	0.93	**57.51**
Immature Pistachio	0.92	0.72	2.08	**0.65**	**1.68**	**4.44**	**6.21**	**5.73**	**4.12**	**2.09**	0.92	0.91	**30.47**
Misc. Deciduous	0.90	0.72	**2.69**	**3.47**	**7.23**	**7.35**	**7.42**	**6.55**	**5.19**	**2.40**	0.81	0.90	**45.63**
Grain and Grain Hay	**0.97**	**2.27**	**5.07**	**7.46**	**4.17**	0.15	0.22	0.09	0.09	0.42	0.91	**0.97**	**22.80**
Cotton	0.96	0.70	2.04	0.82	**1.76**	**5.09**	**8.89**	**8.37**	**5.81**	**1.65**	0.84	0.95	**37.88**
Safflower and Sunflower	0.96	**0.95**	**3.02**	**6.61**	**9.97**	**8.88**	**1.79**	0.09	0.09	0.42	0.85	0.95	**34.59**
Corn and Grain Sorghum	0.96	0.70	3.15	**1.26**	**3.07**	**7.61**	**8.76**	**5.56**	**0.41**	0.42	0.84	0.95	**33.69**
Misc. field crops	0.96	0.70	3.15	**1.26**	**3.01**	**7.96**	**8.22**	**3.30**	0.09	0.42	0.84	0.95	**30.85**
Alfalfa Hay and Clover	**0.96**	**2.31**	**4.69**	**6.28**	**7.88**	**7.63**	**7.62**	**6.89**	**5.22**	**2.18**	**1.44**	**0.99**	**54.08**
Pasture and Misc. Grasses	0.96	**1.78**	**3.66**	**5.62**	**8.51**	**8.31**	**8.41**	**7.61**	**5.78**	**3.53**	**1.28**	0.95	**56.41**
Small Vegetables	**0.97**	**1.37**	**4.53**	**7.28**	**1.95**	0.14	0.22	1.20	**1.67**	**1.39**	**1.41**	**0.99**	**23.10**
Tomatoes and Peppers	0.96	0.70	2.81	**0.75**	**4.78**	**8.83**	**8.07**	**0.85**	0.09	0.42	0.84	0.95	**30.05**
Potatoes, Sugar beets, Turnips etc.	0.96	**1.02**	**3.40**	**7.30**	**9.63**	**9.35**	**8.13**	0.21	0.09	0.42	0.84	0.95	**42.32**
Melons, Squash, and Cucumbers	0.96	0.70	2.07	0.08	0.80	**1.48**	**5.41**	**6.32**	**1.72**	0.42	0.84	0.95	**21.77**
Onions and Garlic	**0.97**	**2.05**	**4.47**	**5.97**	**5.60**	**0.69**	0.22	0.09	0.09	0.42	1.49	**0.97**	**23.03**
Citrus (no ground cover)	**0.90**	**2.15**	**4.30**	**5.10**	**6.02**	**6.26**	**6.22**	**5.69**	**4.25**	**3.42**	**1.60**	**0.93**	**46.84**
Immature Citrus	**0.92**	**1.40**	**3.32**	**3.12**	**3.77**	**4.00**	**4.05**	**3.52**	**2.69**	**2.13**	**1.28**	**0.94**	**31.14**
Misc Subtropical	**0.90**	**0.72**	**2.69**	**3.47**	**7.23**	**7.35**	**7.42**	**6.55**	**5.19**	**2.40**	**0.81**	**0.90**	**45.63**
Grape Vines with 80% canopy	0.92	0.72	**2.36**	**1.55**	**4.54**	**6.59**	**6.53**	**5.24**	**2.97**	0.43	0.82	0.91	**33.58**
Grape Vines with cover crop (80% canopy)	0.91	1.78	**4.01**	**3.80**	**6.16**	**7.13**	**7.48**	**6.19**	**3.66**	1.93	1.04	0.88	**44.97**
Immature Grapes Vines with 50% canopy	0.93	0.71	**2.27**	**1.00**	**3.66**	**4.85**	**5.11**	**3.82**	**2.11**	0.42	0.83	0.92	**26.62**
Idle	0.99	0.69	2.06	0.09	0.02	0.14	0.22	0.09	0.09	0.42	0.85	0.97	**6.63**

ETc Table 13. Zone 18 Typical Year

ETc Table for Irrigation Scheduling and Design

Zone 18 Monthly Evapotranspiration

Surface Irrigation Typical Year

IRRIGATION TRAINING AND RESEARCH CENTER, California Polytechnic State University, San Luis Obispo

Table does not include adjustments for bare spots and reduced vigor

	1998 (Typical Year)												
	January	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**	**October**	**November**	**December**	**Annual**
	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches	**inches**
Precipitation	0.18	1.31	0.37	0.05	0.08	0.06	0.04	0.07	0.12	0.04	0.05	0.28	**2.64**
Grass Reference ETo	2.27	2.63	5.02	7.20	8.36	9.40	9.12	8.35	6.93	5.39	2.90	2.63	**70.20**
Peach, Nectarine and Apricots	0.22	1.21	**2.83**	**3.72**	**7.66**	**10.14**	**9.63**	**8.74**	**7.32**	**5.34**	0.28	0.28	**57.38**
Grain and Grain Hay	**1.26**	**2.85**	**5.78**	**6.70**	**0.69**	0.06	0.04	0.07	0.12	0.04	**0.99**	**1.46**	**20.06**
Cotton	0.21	1.21	1.25	**1.41**	**2.36**	**8.23**	**10.54**	**9.73**	**7.23**	**1.49**	0.05	0.26	**43.98**
Safflower and Sunflower	0.96	**1.61**	**2.18**	**7.29**	**9.91**	**9.58**	**1.14**	0.07	0.12	0.04	0.04	0.26	**33.19**
Corn and Grain Sorghum	**1.11**	**1.92**	**4.61**	**8.71**	**9.47**	**2.57**	0.05	0.07	0.12	0.04	0.04	1.30	**30.01**
Misc. field crops	**1.08**	**1.99**	**4.57**	**7.70**	**4.98**	0.08	0.04	0.07	0.12	0.04	0.04	1.49	**22.21**
Alfalfa Hay and Clover	**2.36**	**2.78**	**5.06**	**7.39**	**7.38**	**8.78**	**8.28**	**7.60**	**6.68**	**5.30**	**2.32**	**2.92**	**66.85**
Pasture and Misc. Grasses	**0.22**	**2.43**	**2.21**	**4.82**	**7.54**	**9.02**	**8.62**	**8.00**	**6.00**	**2.55**	**0.06**	**0.26**	**51.74**
Small Vegetables	**1.95**	**2.35**	**5.10**	**2.52**	0.10	0.06	0.04	0.07	1.88	**1.81**	**1.35**	**2.75**	**19.99**
Tomatoes and Peppers	1.07	**1.66**	**3.42**	**8.56**	**9.78**	**4.09**	0.04	0.07	0.12	0.04	0.04	0.26	**29.16**
Potatoes, Sugar beets, Turnips etc.	**2.74**	**3.28**	**6.20**	**8.89**	**8.45**	**0.22**	0.04	0.07	1.08	**0.34**	**0.53**	**2.08**	**33.92**
Melons, Squash, and Cucumbers	1.07	**1.66**	**3.24**	**7.85**	**9.07**	**4.24**	0.05	0.07	0.12	0.04	0.04	0.26	**27.71**
Onions and Garlic	**2.42**	**2.88**	**5.32**	**6.69**	**1.85**	0.07	0.04	0.07	1.08	**0.36**	**0.93**	**2.47**	**24.18**
Citrus (no ground cover)	**2.03**	**2.80**	**4.05**	**5.29**	**6.60**	**7.42**	**7.10**	**6.50**	**5.50**	**4.20**	**2.28**	**2.53**	**56.29**
Grape Vines with 80% canopy	0.22	1.21	**2.83**	**3.72**	**7.66**	**10.14**	**9.63**	**8.74**	**7.32**	**5.34**	0.28	0.28	**57.38**
Idle	0.21	1.21	0.44	0.10	0.08	0.06	0.04	0.07	0.12	0.04	0.04	0.26	**2.68**

ETc Table 14. Zone 1 Wet Year

ETc Table for Irrigation Scheduling and Design

Zone 1 Monthly Evapotranspiration

Surface Irrigation Wet Year

IRRIGATION TRAINING AND RESEARCH CENTER, California Polytechnic State University, San Luis Obispo

Table does not include adjustments for bare spots and reduced vigor

	1998 (Wet Year)												
	January	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**	**October**	**November**	**December**	**Annual**
	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches	**inches**
Precipitation	8.11	13.07	3.50	2.32	1.54	0.16	0.00	0.00	1.26	0.71	1.50	0.67	**32.83**
Grass Reference ETo	0.87	1.06	2.61	4.07	4.70	4.23	3.58	3.68	2.65	2.62	1.34	1.42	**32.82**
Apple, Pear, Cherry, Plum and Prune	0.90	1.10	**2.32**	**2.98**	**3.62**	**3.28**	**2.94**	**3.17**	**2.32**	**2.37**	1.35	1.04	**27.38**
Apples, Plums, Cherries etc w/covercrop	0.91	1.13	**2.84**	**4.28**	**5.07**	**4.30**	**3.85**	**3.74**	**2.96**	**2.65**	1.37	1.57	**34.67**
Peach, Nectarine and Apricots	0.90	1.10	**2.32**	**3.01**	**4.01**	**3.58**	**3.04**	**3.08**	**2.29**	**2.52**	1.36	1.04	**28.24**
Immature Peaches, Nectarines, etc	0.92	1.13	**2.29**	**2.64**	**2.75**	**1.84**	**1.51**	**1.62**	**1.79**	**1.59**	1.17	1.04	**20.29**
Misc. Deciduous	0.90	1.10	**2.51**	**3.24**	**4.24**	**3.44**	**2.97**	**3.03**	**2.14**	**2.39**	**1.40**	1.04	**28.40**
Grain and Grain Hay	**1.00**	**1.23**	**3.01**	**4.52**	**3.16**	0.23	0.00	0.00	0.94	1.26	**1.24**	**1.36**	**17.94**
Corn and Grain Sorghum	0.98	1.19	**2.66**	**2.63**	**2.57**	**3.59**	**3.90**	**3.57**	1.55	0.61	1.09	1.05	**25.39**
Misc. field crops	0.98	1.20	**2.36**	**3.13**	**4.45**	**4.01**	**3.21**	**1.73**	0.92	0.61	1.09	1.05	**24.73**
Alfalfa Hay and Clover	**1.00**	**1.22**	**3.00**	**4.59**	**5.20**	**4.13**	**3.47**	**3.38**	**2.48**	**1.78**	**1.47**	**1.62**	**33.33**
Pasture and Misc. Grasses	0.98	**1.23**	**2.93**	**4.20**	**4.86**	**3.98**	**3.43**	**3.48**	**2.67**	**2.61**	**1.52**	1.05	**32.94**
Small Vegetables	**0.99**	**1.22**	**2.90**	**3.67**	**3.79**	**4.29**	1.29	0.00	0.94	0.60	1.09	1.05	**21.84**
Tomatoes and Peppers	0.98	1.20	**2.52**	**3.60**	**5.00**	**4.50**	**3.63**	**1.57**	0.92	0.61	1.09	1.05	**26.66**
Potatoes, Sugar beets, Turnips etc.	0.99	1.19	2.52	**2.62**	**2.29**	**2.36**	**3.54**	**4.07**	**3.02**	**2.96**	**1.55**	1.43	**28.54**
Melons, Squash, and Cucumbers	0.98	1.20	**2.35**	**3.44**	**4.94**	**4.18**	**1.44**	0.00	0.93	0.60	1.09	1.05	**22.20**
Citrus (no ground cover)	**0.91**	**1.13**	**2.84**	**3.95**	**4.20**	**2.88**	**2.11**	**2.03**	**2.14**	**2.31**	**1.44**	**1.59**	**27.53**
Immature Citrus	**0.93**	**1.15**	**2.72**	**3.14**	**2.75**	**1.37**	**0.98**	**1.20**	**1.52**	**1.34**	**1.32**	**1.36**	**19.77**
Avocado	**0.90**	**1.10**	**2.51**	**3.24**	**4.24**	**3.44**	**2.97**	**3.03**	**2.14**	**2.39**	**1.40**	**1.04**	**28.40**
Idle	1.02	1.23	2.30	2.31	1.54	0.21	0.00	0.00	0.95	0.60	1.09	1.06	**12.29**

ETc Table 15. Zone 3 Wet Year

ETc Table for Irrigation Scheduling and Design

Zone 3 Monthly Evapotranspiration

Surface Irrigation Wet Year

IRRIGATION TRAINING AND RESEARCH CENTER, California Polytechnic State University, San Luis Obispo

Table does not include adjustments for bare spots and reduced vigor

	1998 (Wet Year)												
	January	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**	**October**	**November**	**December**	**Annual**
	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches	**inches**
Precipitation	1.65	7.30	2.74	1.11	1.59	0.35	0.02	0.00	0.15	0.76	0.88	0.70	**17.25**
Grass Reference ETo	0.93	1.37	3.13	4.73	5.39	7.11	8.52	7.69	5.30	3.61	1.60	1.20	**50.58**
Apple, Pear, Cherry, Plum and Prune	1.04	1.25	**2.49**	**3.05**	**3.46**	**3.83**	**4.69**	**4.47**	**3.19**	**2.42**	1.22	0.94	**32.07**
Apples, Plums, Cherries etc w/covercrop	1.07	1.27	**3.31**	**4.49**	**4.58**	**4.74**	**5.77**	**5.67**	**3.77**	**3.11**	1.37	1.54	**40.69**
Peach, Nectarine and Apricots	1.04	1.25	**2.49**	**3.09**	**3.79**	**4.10**	**4.82**	**4.43**	**3.04**	**2.68**	1.24	0.94	**32.91**
Immature Peaches, Nectarines, etc	1.06	1.27	**2.39**	**2.68**	**2.76**	**2.19**	**2.49**	**2.16**	**1.55**	**1.72**	1.17	0.94	**22.39**
Almonds	1.04	1.25	**2.49**	**3.39**	**4.07**	**3.93**	**4.70**	**4.06**	**3.22**	**2.29**	**1.29**	0.94	**32.67**
Almonds w/covercrop	1.07	1.27	**3.29**	**4.34**	**4.55**	**4.62**	**5.16**	**5.25**	**3.37**	**2.90**	**1.37**	1.48	**38.65**
Immature Almonds	1.06	1.27	**2.39**	**2.83**	**2.94**	**2.17**	**2.48**	**2.18**	**1.31**	**1.56**	**1.23**	0.94	**22.35**
Walnuts	1.04	1.25	**2.27**	**2.91**	**3.26**	**3.97**	**5.19**	**5.02**	**3.58**	**2.76**	1.34	0.94	**33.54**
Misc. Deciduous	1.05	1.25	**2.73**	**3.35**	**3.98**	**3.93**	**4.70**	**4.03**	**3.24**	**2.40**	1.32	0.94	**32.93**
Grain and Grain Hay	**1.13**	**1.34**	**3.36**	**4.72**	**3.27**	0.40	0.03	0.05	0.09	1.16	**1.20**	**1.25**	**18.01**
Safflower and Sunflower	1.12	**1.33**	**2.82**	**4.63**	**4.80**	**4.87**	**1.58**	0.05	0.09	0.46	1.16	0.95	**23.87**
Corn and Grain Sorghum	1.11	1.32	2.69	**2.68**	**2.60**	**4.07**	**5.98**	**5.22**	**0.88**	0.46	1.16	0.95	**29.12**
Misc. field crops	1.11	1.32	**2.45**	**3.21**	**4.15**	**4.36**	**5.15**	**1.95**	0.09	0.46	1.16	0.95	**26.37**
Alfalfa Hay and Clover	**1.14**	**1.34**	**3.35**	**4.81**	**4.87**	**4.55**	**4.98**	**4.72**	**3.12**	**1.92**	**1.36**	**1.51**	**37.67**
Pasture and Misc. Grasses	1.12	**1.34**	**3.25**	**4.36**	**4.55**	**4.44**	**5.20**	**4.99**	**3.42**	**3.00**	**1.45**	0.95	**38.07**
Small Vegetables	**1.12**	**1.34**	**3.22**	**3.72**	**3.74**	**4.69**	**1.77**	0.05	0.09	0.46	1.16	0.95	**22.30**
Tomatoes and Peppers	1.11	1.32	**2.64**	**3.72**	**4.52**	**4.90**	**5.60**	**2.37**	0.09	0.46	1.16	0.95	**28.86**
Potatoes, Sugar beets, Turnips etc.	1.12	1.32	2.68	**2.64**	**2.38**	**2.70**	**5.40**	**5.87**	**3.98**	**3.45**	**1.51**	1.36	**34.41**
Melons, Squash, and Cucumbers	1.11	1.32	**2.44**	**3.56**	**4.51**	**4.60**	**2.30**	0.05	0.09	0.46	1.16	0.95	**22.55**
Onions and Garlic	**1.13**	**1.34**	**3.22**	**4.37**	**4.19**	**1.81**	0.03	0.05	0.09	0.46	1.43	**1.14**	**19.26**
Flowers, Nursery and Christmas Tree	1.05	1.25	**2.73**	**3.35**	**3.98**	**3.93**	**4.70**	**4.03**	**3.24**	**2.40**	**1.32**	0.94	**32.93**
Citrus (no ground cover)	**1.07**	**1.27**	**3.30**	**4.09**	**3.88**	**3.29**	**3.21**	**3.32**	**2.07**	**2.12**	**1.36**	**1.47**	**30.44**
Immature Citrus	**1.08**	**1.28**	**3.01**	**3.19**	**2.77**	**1.72**	**1.79**	**1.48**	**1.05**	**1.28**	**1.26**	**1.24**	**21.14**
Avocado	**1.05**	**1.25**	**2.73**	**3.35**	**3.98**	**3.93**	**4.70**	**4.03**	**3.24**	**2.40**	**1.32**	**0.94**	**32.93**
Grape with 40% cover	1.06	1.26	**2.51**	**3.25**	**3.15**	**2.23**	**2.04**	**1.55**	**0.80**	0.47	1.11	0.94	**20.37**
Grape with cover crop	1.08	1.28	**3.09**	**3.59**	**3.53**	**2.64**	**2.55**	**2.36**	**1.53**	1.44	1.27	1.29	**25.65**
Grape with 60% cover	1.06	1.26	**2.51**	**3.63**	**3.75**	**3.14**	**3.08**	**2.28**	**1.10**	0.47	1.11	0.94	**24.32**
Idle	1.14	1.34	2.27	2.23	1.79	0.34	0.03	0.05	0.09	0.47	1.18	0.96	**11.88**

ETc Table 16. Zone 4 Wet Year

ETc Table for Irrigation Scheduling and Design

Zone 4 Monthly Evapotranspiration

Surface Irrigation Wet Year

IRRIGATION TRAINING AND RESEARCH CENTER, California Polytechnic State University, San Luis Obispo

Table does not include adjustments for bare spots and reduced vigor

	1998 (Wet Year)												
	January	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**	**October**	**November**	**December**	**Annual**
	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches	**inches**
Precipitation	5.87	15.74	3.31	1.44	2.46	0.06	0.04	0.07	0.22	0.46	2.28	1.31	**33.26**
Grass Reference ETo	1.12	1.51	3.23	4.41	4.82	5.20	6.16	6.09	4.00	3.22	1.61	1.54	**42.90**
Apple, Pear, Cherry, Plum and Prune	1.19	1.70	**2.85**	**2.75**	**3.98**	**4.18**	**5.34**	**5.13**	**3.56**	**2.47**	1.30	1.14	**35.58**
Apples, Plums, Cherries etc w/covercrop	1.22	1.70	**3.72**	**4.73**	**5.10**	**5.44**	**6.50**	**6.48**	**4.32**	**3.11**	1.61	1.79	**45.71**
Peach, Nectarine and Apricots	1.19	1.70	**2.85**	**2.79**	**4.30**	**4.55**	**5.34**	**5.24**	**3.36**	**2.81**	1.30	1.14	**36.56**
Immature Peaches, Nectarines, etc	1.21	1.72	**2.78**	**2.29**	**3.24**	**2.27**	**2.75**	**2.47**	**1.79**	**1.78**	1.19	1.14	**24.64**
Walnuts	1.19	1.70	2.70	**2.61**	**3.74**	**4.28**	**5.87**	**5.93**	**3.94**	**2.93**	**1.67**	1.14	**37.70**
Misc. Deciduous	1.19	1.70	**3.12**	**3.07**	**4.51**	**4.33**	**5.31**	**4.87**	**3.31**	**2.88**	**1.64**	1.14	**37.06**
Grain and Grain Hay	**1.30**	**1.78**	**3.77**	**4.91**	**3.97**	0.26	0.03	0.07	0.18	1.12	**1.26**	**1.47**	**20.12**
Corn and Grain Sorghum	1.28	1.78	3.22	**2.58**	**3.05**	**4.42**	**6.74**	**5.77**	**0.90**	0.40	1.18	1.15	**32.46**
Misc. field crops	1.28	1.78	**2.84**	**2.86**	**4.67**	**4.94**	**5.72**	**2.51**	0.18	0.40	1.18	1.15	**29.50**
Alfalfa Hay and Clover	**1.30**	**1.77**	**3.79**	**4.88**	**5.47**	**4.97**	**5.46**	**5.47**	**3.67**	**1.93**	**1.67**	**1.76**	**42.14**
Pasture and Misc. Grasses	1.28	**1.78**	**3.65**	**4.40**	**5.17**	**5.02**	**5.81**	**5.76**	**3.82**	**3.18**	**1.80**	1.15	**42.81**
Small Vegetables	**1.28**	**1.78**	**3.65**	**3.66**	**4.07**	**5.28**	**2.18**	0.07	0.18	0.40	1.18	1.15	**24.87**
Tomatoes and Peppers	1.28	1.78	**3.04**	**3.53**	**5.07**	**5.52**	**6.35**	**2.43**	0.18	0.40	1.18	1.15	**31.90**
Melons, Squash, and Cucumbers	1.28	1.78	**2.82**	**3.29**	**5.11**	**5.14**	**2.57**	0.07	0.18	0.40	1.18	1.15	**24.98**
Onions and Garlic	**1.29**	**1.78**	**3.63**	**4.45**	**4.79**	**1.91**	0.03	0.07	0.18	0.40	1.64	**1.36**	**21.53**
Citrus (no ground cover)	**1.21**	**1.70**	**3.72**	**4.20**	**4.43**	**3.57**	**3.61**	**3.65**	**2.55**	**2.28**	**1.69**	**1.75**	**34.37**
Immature Citrus	**1.23**	**1.72**	**3.38**	**2.95**	**3.28**	**1.64**	**2.03**	**1.70**	**1.27**	**1.27**	**1.53**	**1.48**	**23.48**
Avocado	**1.19**	**1.70**	**3.12**	**3.07**	**4.51**	**4.33**	**5.31**	**4.87**	**3.31**	**2.88**	**1.64**	**1.14**	**37.06**
Idle	1.31	1.81	2.72	1.82	2.19	0.18	0.03	0.07	0.18	0.40	1.19	1.15	**13.05**

ETc Table 17. Zone 6 Wet Year

ETc Table for Irrigation Scheduling and Design

Zone 6 Monthly Evapotranspiration

Surface Irrigation Wet Year

IRRIGATION TRAINING AND RESEARCH CENTER, California Polytechnic State University, San Luis Obispo

Table does not include adjustments for bare spots and reduced vigor

	1998 (Wet Year)												
	January	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**	**October**	**November**	**December**	**Annual**
	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches	**inches**
Precipitation	5.02	10.54	3.20	1.57	1.92	0.21	0.00	0.05	0.17	0.39	1.94	0.65	**25.66**
Grass Reference ETo	1.56	1.53	3.17	4.33	4.98	5.28	6.51	6.29	4.32	3.74	2.00	1.91	**45.65**
Apple, Pear, Cherry, Plum and Prune	1.62	1.70	**2.17**	**2.88**	**4.01**	**4.06**	**5.77**	**5.35**	**3.63**	**2.84**	0.99	1.16	**36.19**
Apples, Plums, Cherries etc w/covercrop	1.80	1.73	**3.66**	**4.63**	**5.29**	**5.80**	**6.99**	**6.65**	**4.67**	**3.66**	2.05	2.06	**48.99**
Peach, Nectarine and Apricots	1.62	1.70	**2.17**	**2.92**	**4.42**	**4.56**	**5.48**	**5.42**	**3.64**	**3.18**	1.02	1.16	**37.31**
Immature Peaches, Nectarines, etc	1.63	1.72	**2.09**	**2.43**	**3.09**	**2.35**	**2.81**	**2.55**	**2.18**	**1.63**	0.93	1.16	**24.57**
Almonds	1.62	1.70	**2.17**	**3.25**	**4.74**	**4.37**	**5.43**	**5.25**	**3.46**	**3.02**	**1.64**	1.16	**37.83**
Almonds w/covercrop	1.79	1.73	**3.50**	**4.46**	**5.34**	**5.45**	**6.27**	**6.02**	**4.32**	**3.31**	**1.96**	1.97	**46.12**
Immature Almonds	1.63	1.72	**2.09**	**2.58**	**3.29**	**2.32**	**2.72**	**2.62**	**1.89**	**1.89**	**1.25**	1.16	**25.17**
Walnuts	1.62	1.70	1.99	**2.73**	**3.78**	**4.25**	**6.30**	**6.15**	**4.21**	**3.33**	**1.78**	1.16	**39.01**
Misc. Deciduous	1.63	1.70	**2.46**	**3.21**	**4.63**	**4.37**	**5.46**	**5.24**	**3.44**	**3.28**	**1.73**	1.16	**38.31**
Grain and Grain Hay	**1.81**	**1.81**	**3.64**	**4.83**	**3.59**	**0.29**	0.00	0.05	0.17	1.11	**1.04**	**1.65**	**19.97**
Safflower and Sunflower	1.66	**1.80**	**2.60**	**4.73**	**5.63**	**5.21**	**1.51**	0.05	0.17	0.36	0.91	1.17	**25.81**
Corn and Grain Sorghum	1.66	1.78	2.62	**2.58**	**2.91**	**4.54**	**7.12**	**5.81**	**0.82**	0.36	0.91	1.17	**32.28**
Misc. field crops	1.66	1.78	**2.14**	**3.02**	**4.78**	**5.10**	**5.95**	**2.28**	0.17	0.36	0.91	1.17	**29.32**
Alfalfa Hay and Clover	**1.83**	**1.80**	**3.54**	**4.94**	**5.67**	**5.13**	**5.79**	**5.60**	**3.84**	**2.05**	**1.96**	**2.14**	**44.27**
Pasture and Misc. Grasses	1.66	**1.81**	**3.15**	**4.42**	**5.32**	**5.10**	**6.13**	**5.93**	**4.18**	**3.55**	**2.18**	1.17	**44.60**
Small Vegetables	**1.77**	**1.80**	**3.40**	**3.58**	**4.26**	**5.46**	**2.10**	0.05	0.17	0.36	0.91	1.17	**25.04**
Tomatoes and Peppers	1.66	1.78	**2.35**	**3.64**	**5.29**	**5.66**	**6.73**	**2.59**	0.17	0.36	0.91	1.17	**32.32**
Potatoes, Sugar beets, Turnips etc.	1.67	1.78	2.47	**2.35**	**2.59**	**2.98**	**6.39**	**7.03**	**4.79**	**4.17**	**2.33**	**1.89**	**40.44**
Melons, Squash, and Cucumbers	1.66	1.78	**2.12**	**3.49**	**5.27**	**5.29**	**2.60**	0.05	0.17	0.36	0.91	1.17	**24.88**
Onions and Garlic	**1.78**	**1.81**	**3.37**	**4.42**	**4.74**	**1.74**	0.00	0.05	0.17	0.36	1.62	**1.47**	**21.52**
Citrus (no ground cover)	**1.79**	**1.73**	**3.57**	**4.16**	**4.43**	**3.52**	**3.96**	**3.60**	**2.82**	**2.43**	**1.93**	**2.03**	**35.96**
Immature Citrus	**1.74**	**1.75**	**2.78**	**3.06**	**3.05**	**1.75**	**2.00**	**1.81**	**1.23**	**1.47**	**1.56**	**1.63**	**23.82**
Avocado	**1.63**	**1.70**	**2.46**	**3.21**	**4.63**	**4.37**	**5.46**	**5.24**	**3.44**	**3.28**	**1.73**	**1.16**	**38.31**
Grape with 40% cover	1.62	1.71	**2.21**	**3.14**	**3.62**	**2.41**	**2.51**	**1.91**	**1.05**	0.38	0.91	1.16	**22.63**
Grape with cover crop	1.75	1.74	**2.92**	**3.55**	**3.99**	**2.75**	**3.00**	**2.78**	**1.93**	1.64	1.48	1.67	**29.20**
Grape with 60% cover	1.62	1.71	**2.21**	**3.57**	**4.34**	**3.40**	**3.68**	**2.73**	**1.40**	0.38	0.91	1.16	**27.11**
Idle	1.67	1.81	2.01	1.94	1.82	0.25	0.00	0.05	0.17	0.36	0.91	1.18	**12.16**

ETc Table 18. Zone 8 Wet Year

ETc Table for Irrigation Scheduling and Design

Zone 8 Monthly Evapotranspiration

Surface Irrigation Wet Year

IRRIGATION TRAINING AND RESEARCH CENTER, California Polytechnic State University, San Luis Obispo

Table does not include adjustments for bare spots and reduced vigor

	1998 (Wet Year)												
	January	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**	**October**	**November**	**December**	**Annual**
	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches	**inches**
Precipitation	10.96	19.59	2.98	2.51	4.00	0.01	0.00	0.00	0.11	0.96	6.29	1.22	**48.64**
Grass Reference ETo	0.44	0.91	2.66	4.12	4.03	5.14	6.49	6.19	4.15	3.36	0.96	1.09	**39.52**
Apple, Pear, Cherry, Plum and Prune	0.46	0.98	**2.33**	**3.38**	**3.64**	**4.60**	**6.08**	**5.77**	**3.80**	**3.05**	1.01	1.05	**36.14**
Apples, Plums, Cherries etc w/covercrop	0.46	1.00	**3.07**	**4.66**	**4.52**	**5.68**	**7.33**	**7.08**	**4.69**	**3.44**	1.02	1.26	**44.21**
Peach, Nectarine and Apricots	0.46	0.98	**2.33**	**3.43**	**3.95**	**4.93**	**6.10**	**5.79**	**3.81**	**3.23**	1.01	1.05	**37.08**
Immature Peaches, Nectarines, etc	0.47	1.00	**2.23**	**3.04**	**3.07**	**2.69**	**3.34**	**2.96**	**2.32**	**1.87**	0.93	1.06	**24.97**
Almonds	0.46	0.98	**2.33**	**3.78**	**4.23**	**4.88**	**6.03**	**5.63**	**3.68**	**3.03**	**1.04**	1.05	**37.13**
Almonds w/covercrop	0.46	1.00	**3.05**	**4.57**	**4.52**	**5.43**	**6.65**	**6.58**	**4.43**	**3.46**	**1.07**	1.25	**42.47**
Immature Almonds	0.47	1.00	**2.23**	**3.23**	**3.28**	**2.76**	**3.45**	**2.95**	**2.37**	**1.96**	**0.99**	1.06	**25.76**
Walnuts	0.46	0.98	2.13	**3.25**	**3.43**	**4.71**	**6.59**	**6.45**	**4.30**	**3.32**	**1.06**	1.05	**37.72**
Misc. Deciduous	0.46	0.98	**2.52**	**3.73**	**4.13**	**4.81**	**5.90**	**5.45**	**3.58**	**3.26**	**1.04**	1.05	**36.91**
Grain and Grain Hay	**0.51**	**1.07**	**3.12**	**4.68**	**3.27**	0.36	0.00	0.00	0.07	1.21	**0.94**	**1.21**	**16.43**
Safflower and Sunflower	0.51	**1.06**	**2.62**	**4.72**	**4.70**	**5.23**	**1.25**	0.00	0.07	0.60	0.92	1.07	**22.75**
Corn and Grain Sorghum	0.51	1.04	2.53	**3.11**	**2.82**	**4.67**	**7.54**	**6.30**	**0.89**	0.60	0.91	1.07	**31.99**
Misc. field crops	0.51	1.04	**2.29**	**3.51**	**4.23**	**5.15**	**6.34**	**2.28**	0.07	0.60	0.91	1.07	**28.01**
Alfalfa Hay and Clover	**0.50**	**1.06**	**3.11**	**4.91**	**4.72**	**5.02**	**5.95**	**5.57**	**3.60**	**2.13**	**1.06**	**1.28**	**38.90**
Pasture and Misc. Grasses	0.51	**1.07**	**3.00**	**4.48**	**4.38**	**5.12**	**6.46**	**6.18**	**4.10**	**3.53**	**1.11**	1.07	**41.00**
Small Vegetables	**0.51**	**1.06**	**2.99**	**3.90**	**3.56**	**5.35**	**2.34**	0.00	0.07	0.60	0.91	1.07	**22.37**
Tomatoes and Peppers	0.51	1.04	**2.44**	**3.97**	**4.58**	**5.73**	**6.86**	**2.96**	0.07	0.60	0.91	1.07	**30.74**
Potatoes, Sugar beets, Turnips etc.	0.51	1.04	2.47	**2.98**	**2.61**	**3.00**	**6.49**	**7.12**	**4.79**	**3.90**	**1.18**	**1.23**	**37.33**
Melons, Squash, and Cucumbers	0.51	1.04	**2.27**	**3.84**	**4.40**	**5.25**	**2.77**	0.00	0.07	0.60	0.91	1.07	**22.74**
Onions and Garlic	**0.51**	**1.06**	**3.00**	**4.45**	**4.05**	**2.17**	0.00	0.00	0.07	0.60	1.10	**1.17**	**18.18**
Citrus (no ground cover)	**0.46**	**1.00**	**3.06**	**4.44**	**4.12**	**4.18**	**4.57**	**4.33**	**3.13**	**2.67**	**1.06**	**1.26**	**34.28**
Immature Citrus	**0.47**	**1.01**	**2.80**	**3.63**	**3.20**	**2.20**	**2.61**	**2.38**	**1.53**	**1.99**	**1.00**	**1.20**	**24.03**
Avocado	**0.46**	**0.98**	**2.52**	**3.73**	**4.13**	**4.81**	**5.90**	**5.45**	**3.58**	**3.26**	**1.04**	**1.05**	**36.91**
Grape with 40% cover	0.47	0.99	**2.33**	**3.59**	**3.30**	**2.43**	**2.44**	**1.79**	**0.89**	0.61	0.88	1.05	**20.77**
Grape with cover crop	0.47	1.01	**2.85**	**3.96**	**3.62**	**3.19**	**3.24**	**2.87**	**1.74**	1.62	0.99	1.20	**26.76**
Grape with 60% cover	0.47	0.99	**2.33**	**3.92**	**3.76**	**3.44**	**3.64**	**2.64**	**1.23**	0.61	0.88	1.05	**24.97**
Idle	0.52	1.06	2.13	2.59	2.10	0.27	0.00	0.00	0.07	0.60	0.93	1.08	**11.36**

ETc Table 19. Zone 9 Wet Year

ETc Table for Irrigation Scheduling and Design

Zone 9 Monthly Evapotranspiration

Surface Irrigation Wet Year

IRRIGATION TRAINING AND RESEARCH CENTER, California Polytechnic State University, San Luis Obispo

Table does not include adjustments for bare spots and reduced vigor

	1998 (Wet Year)												
	January	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**	**October**	**November**	**December**	**Annual**
	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches	**inches**
Precipitation	4.10	16.38	4.59	1.37	3.94	0.23	0.04	0.02	0.56	0.02	0.57	0.29	**32.11**
Grass Reference ETo	1.64	1.68	3.03	4.31	4.14	4.94	6.91	6.97	3.80	3.74	2.40	2.42	**45.97**
Apple, Pear, Cherry, Plum and Prune	1.51	1.87	**2.12**	**2.72**	**3.34**	**3.86**	**5.96**	**5.88**	**3.59**	**2.68**	0.41	0.48	**34.43**
Apples, Plums, Cherries etc w/covercrop	1.93	1.98	**3.60**	**4.58**	**4.54**	**5.12**	**7.47**	**7.72**	**4.22**	**3.33**	1.49	1.40	**47.39**
Peach, Nectarine and Apricots	1.51	1.87	**2.12**	**2.77**	**3.69**	**4.16**	**5.90**	**5.91**	**3.44**	**2.98**	0.42	0.49	**35.26**
Immature Peaches, Nectarines, etc	1.51	1.87	**2.02**	**2.29**	**2.63**	**2.11**	**3.03**	**2.84**	**2.12**	**1.54**	0.37	0.48	**22.82**
Walnuts	1.51	1.87	1.91	**2.60**	**3.21**	**4.05**	**6.62**	**6.93**	**3.82**	**3.12**	**1.47**	0.50	**37.61**
Misc. Deciduous	1.51	1.87	**2.40**	**3.08**	**3.87**	**4.07**	**5.77**	**5.59**	**3.46**	**3.09**	**1.26**	0.49	**36.47**
Grain and Grain Hay	**1.86**	**2.00**	**3.50**	**4.77**	**2.85**	0.27	0.04	0.02	0.53	0.80	**0.53**	**1.29**	**18.44**
Safflower and Sunflower	1.52	**1.94**	**2.56**	**4.72**	**4.67**	**4.74**	**1.22**	0.02	0.53	0.04	0.38	0.48	**22.82**
Corn and Grain Sorghum	1.52	1.89	2.22	**2.37**	**2.58**	**4.23**	**7.59**	**6.40**	**0.98**	0.04	0.37	0.48	**30.68**
Misc. field crops	1.52	1.89	**2.08**	**2.90**	**4.13**	**4.69**	**6.51**	**2.49**	0.53	0.04	0.37	0.48	**27.64**
Alfalfa Hay and Clover	**1.91**	**2.00**	**3.32**	**4.98**	**4.82**	**5.10**	**6.12**	**6.24**	**3.75**	**1.79**	**2.13**	**2.67**	**44.84**
Pasture and Misc. Grasses	1.52	**1.99**	**3.08**	**4.30**	**4.22**	**4.79**	**6.54**	**6.66**	**3.76**	**3.54**	**2.12**	0.52	**43.04**
Small Vegetables	**1.78**	**1.98**	**3.28**	**3.47**	**3.43**	**5.13**	**2.29**	0.02	0.53	0.04	0.37	0.98	**23.31**
Tomatoes and Peppers	1.52	1.89	**2.29**	**3.58**	**4.54**	**5.25**	**7.02**	**2.72**	0.53	0.04	0.37	0.48	**30.24**
Potatoes, Sugar beets, Turnips etc.	1.53	1.89	2.37	**2.25**	**2.25**	**2.80**	**6.81**	**7.80**	**4.26**	**4.19**	**2.74**	**2.29**	**41.19**
Melons, Squash, and Cucumbers	1.52	1.89	**2.06**	**3.39**	**4.26**	**4.98**	**2.79**	0.02	0.53	0.04	0.37	0.48	**22.34**
Onions and Garlic	**1.80**	**1.99**	**3.25**	**4.35**	**3.90**	**1.60**	0.04	0.02	0.53	0.04	1.14	**0.93**	**19.58**
Citrus (no ground cover)	**1.90**	**1.98**	**3.45**	**4.01**	**3.54**	**2.97**	**4.32**	**4.19**	**2.56**	**2.50**	**1.80**	**2.04**	**35.27**
Immature Citrus	**1.74**	**1.96**	**2.71**	**2.89**	**2.54**	**1.49**	**1.93**	**2.14**	**1.66**	**1.01**	**1.05**	**1.28**	**22.42**
Avocado	**1.51**	**1.87**	**2.40**	**3.08**	**3.87**	**4.07**	**5.77**	**5.59**	**3.46**	**3.09**	**1.26**	**0.49**	**36.47**
Idle	1.52	1.90	1.92	1.81	1.64	0.23	0.04	0.02	0.53	0.04	0.38	0.48	**10.52**

ETc Table 20. Zone 10 Wet Year

ETc Table for Irrigation Scheduling and Design

Zone 10 Monthly Evapotranspiration

Surface Irrigation Wet Year

IRRIGATION TRAINING AND RESEARCH CENTER, California Polytechnic State University, San Luis Obispo

Table does not include adjustments for bare spots and reduced vigor

	1998 (Wet Year)												
	January	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**	**October**	**November**	**December**	**Annual**
	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches	**inches**
Precipitation	5.42	15.81	2.36	1.22	3.33	0.17	0.05	0.09	0.32	3.35	3.23	0.64	**36.00**
Grass Reference ETo	1.42	1.64	3.28	4.63	4.73	5.41	6.73	6.63	4.04	3.68	2.00	1.76	**45.94**
Apple, Pear, Cherry, Plum and Prune	1.48	1.87	**2.02**	**3.74**	**5.19**	**5.17**	**6.19**	**6.18**	**3.81**	**3.19**	1.50	1.04	**41.36**
Apples, Plums, Cherries etc w/covercrop	1.58	1.90	**3.74**	**5.03**	**5.14**	**6.33**	**7.60**	**7.45**	**4.31**	**3.97**	2.40	2.02	**51.46**
Peach, Nectarine and Apricots	1.48	1.87	**1.99**	**3.53**	**5.13**	**5.28**	**6.16**	**6.32**	**3.71**	**3.11**	1.50	1.04	**41.09**
Immature Peaches, Nectarines, etc	1.50	1.88	**1.88**	**2.69**	**3.98**	**3.24**	**3.89**	**3.75**	**2.50**	**2.22**	1.50	1.04	**30.04**
Almonds	1.48	1.87	**2.15**	**4.10**	**5.08**	**5.04**	**5.93**	**5.93**	**3.46**	**3.19**	1.50	1.04	**40.75**
Almonds w/covercrop	1.58	1.90	**3.42**	**5.07**	**5.22**	**5.88**	**7.04**	**6.82**	**4.05**	**3.27**	2.33	1.83	**48.39**
Immature Almonds	1.50	1.88	**2.02**	**3.06**	**4.06**	**3.75**	**4.37**	**4.24**	**2.54**	**2.65**	1.50	1.04	**32.60**
Walnuts	1.47	1.86	**2.10**	**3.16**	**5.20**	**5.75**	**7.43**	**7.17**	**3.94**	**3.26**	**1.54**	1.04	**43.92**
Pistachio	1.48	1.87	1.75	**2.63**	**3.93**	**4.24**	**6.93**	**6.89**	**3.94**	**3.26**	**1.54**	1.04	**39.49**
Pistachio w/ covercrop	1.58	1.90	3.42	**4.26**	**4.86**	**5.55**	**7.59**	**7.44**	**4.39**	**4.05**	**2.36**	1.86	**49.24**
Immature Pistachio	1.50	1.88	1.75	**2.20**	**3.28**	**2.60**	**4.93**	**4.67**	**2.92**	**2.49**	**1.52**	1.04	**30.78**
Misc. Deciduous	1.48	1.87	**2.02**	**3.66**	**5.13**	**4.90**	**5.91**	**6.13**	**3.46**	**3.20**	1.50	1.04	**40.29**
Grain and Grain Hay	**1.61**	**1.95**	**3.77**	**5.21**	**3.81**	0.27	0.06	0.09	0.30	1.24	1.85	**1.18**	**21.35**
Rice	1.55	1.91	1.75	2.16	**5.54**	**6.48**	**8.21**	**8.06**	**2.64**	1.25	1.50	1.04	**42.11**
Cotton	1.55	1.91	1.75	1.83	**3.15**	**3.25**	**7.06**	**7.20**	**4.02**	**2.44**	1.50	1.04	**36.71**
Safflower and Sunflower	1.55	**1.93**	**2.46**	**5.12**	**5.51**	**5.57**	**1.69**	0.09	0.30	1.24	1.50	1.04	**28.02**
Corn and Grain Sorghum	1.55	1.91	2.38	**2.29**	**3.88**	**4.82**	**6.82**	**5.09**	**0.51**	1.24	1.50	1.04	**33.03**
Misc. field crops	1.55	1.91	2.38	**2.29**	**3.91**	**5.12**	**6.45**	**2.31**	0.30	1.24	1.50	1.04	**30.00**
Alfalfa Hay and Clover	**1.66**	**1.94**	**3.54**	**5.26**	**5.56**	**5.27**	**6.06**	**5.91**	**3.94**	**2.71**	**2.26**	**1.95**	**46.07**
Pasture and Misc. Grasses	1.55	**1.95**	**2.93**	**4.56**	**5.23**	**5.39**	**6.61**	**6.56**	**4.03**	**3.40**	**1.95**	1.04	**45.20**
Small Vegetables	**1.64**	**1.94**	**3.31**	**5.07**	**2.75**	0.23	0.06	1.12	1.29	**1.89**	**2.09**	**1.89**	**23.28**
Tomatoes and Peppers	1.55	1.91	2.36	**2.31**	**4.46**	**5.57**	**6.61**	**1.02**	0.30	1.24	1.50	1.04	**29.88**
Potatoes, Sugar beets, Turnips etc.	1.55	**1.93**	**2.71**	**5.20**	**5.48**	**5.94**	**6.48**	0.19	0.30	1.24	1.50	1.04	**33.58**
Melons, Squash, and Cucumbers	1.55	1.91	1.75	1.78	2.58	**0.82**	**4.11**	**5.40**	1.38	1.24	1.50	1.04	**25.06**
Onions and Garlic	**1.61**	**1.95**	**3.46**	**4.56**	**4.17**	**1.09**	0.06	0.09	0.30	1.24	1.50	**1.26**	**21.30**
Citrus (no ground cover)	**1.58**	**1.90**	**3.53**	**4.44**	**4.63**	**4.12**	**4.73**	**4.60**	**2.96**	**3.16**	**2.38**	**1.93**	**39.95**
Immature Citrus	**1.57**	**1.91**	**2.64**	**3.19**	**3.71**	**2.59**	**3.00**	**2.84**	**1.81**	**2.46**	**2.01**	**1.48**	**29.20**
Avocado	**1.48**	**1.87**	**2.02**	**3.66**	**5.13**	**4.90**	**5.91**	**6.13**	**3.46**	**3.20**	**1.50**	**1.04**	**40.29**
Idle	1.57	1.93	1.75	1.78	2.59	0.23	0.06	0.09	0.30	1.24	1.51	1.04	**14.10**

ETc Table 21. Zone 12 Wet Year

ETc Table for Irrigation Scheduling and Design

Zone 12 Monthly Evapotranspiration

Surface Irrigation Wet Year

IRRIGATION TRAINING AND RESEARCH CENTER, California Polytechnic State University, San Luis Obispo

Table does not include adjustments for bare spots and reduced vigor

	1998 (Wet Year)												
	January	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**	**October**	**November**	**December**	**Annual**
	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches	**inches**
Precipitation	5.91	10.81	3.00	1.83	2.93	0.39	0.00	0.02	0.16	1.09	3.38	1.07	**30.61**
Grass Reference ETo	0.39	0.81	2.76	4.12	4.08	6.31	7.49	7.00	4.78	3.48	1.05	1.02	**43.29**
Apple, Pear, Cherry, Plum and Prune	0.41	0.90	**2.40**	**3.68**	**4.51**	**6.31**	**6.84**	**6.71**	**4.30**	**2.56**	0.96	1.00	**40.58**
Apples, Plums, Cherries etc w/covercrop	0.41	0.91	**3.22**	**4.65**	**4.60**	**7.23**	**8.52**	**7.95**	**5.26**	**3.30**	1.11	1.18	**48.36**
Peach, Nectarine and Apricots	0.41	0.90	**2.38**	**3.50**	**4.47**	**6.35**	**6.90**	**6.50**	**4.38**	**2.50**	0.96	1.00	**40.24**
Immature Peaches, Nectarines, etc	0.42	0.91	**2.29**	**2.76**	**3.52**	**4.04**	**4.12**	**4.09**	**2.57**	**1.83**	0.97	1.01	**28.54**
Almonds	0.41	**0.90**	**2.55**	**4.01**	**4.51**	**6.13**	**6.49**	**6.27**	**4.35**	**2.89**	1.08	1.00	**40.60**
Almonds w/covercrop	0.41	**0.91**	**3.21**	**4.69**	**4.56**	**6.78**	**7.89**	**7.24**	**4.82**	**3.27**	1.16	1.18	**46.12**
Immature Almonds	0.42	**0.91**	**2.44**	**3.08**	**3.71**	**4.47**	**4.78**	**4.34**	**3.23**	**2.01**	1.02	1.01	**31.41**
Walnuts	0.41	0.89	**2.46**	**3.16**	**4.50**	**6.95**	**8.17**	**7.66**	**4.64**	**2.80**	1.06	1.00	**43.71**
Pistachio	0.41	0.90	2.20	**2.73**	**3.28**	**5.47**	**7.68**	**7.24**	**4.77**	**2.77**	1.06	1.00	**39.52**
Pistachio w/ covercrop	0.41	0.91	3.21	**4.05**	**4.39**	**6.81**	**8.46**	**7.94**	**5.30**	**3.42**	1.17	1.18	**47.25**
Immature Pistachio	0.42	0.91	2.20	**2.37**	**2.74**	**3.39**	**5.39**	**4.91**	**3.31**	**1.92**	1.02	1.01	**29.60**
Misc. Deciduous	0.41	0.90	**2.40**	**3.61**	**4.45**	**6.05**	**6.57**	**6.31**	**4.22**	**2.55**	0.96	1.00	**39.44**
Grain and Grain Hay	**0.45**	**0.96**	**3.24**	**4.68**	**3.26**	0.68	0.00	0.02	0.13	0.60	1.01	**1.09**	**16.10**
Rice	0.45	0.95	2.20	2.40	**4.69**	**7.59**	**9.14**	**8.48**	**2.52**	0.60	1.01	1.03	**41.06**
Cotton	0.45	0.95	2.20	2.02	**2.68**	**4.20**	**7.82**	**7.60**	**4.89**	**2.07**	1.00	1.03	**36.91**
Safflower and Sunflower	0.45	**0.95**	**2.67**	**4.66**	**4.75**	**6.47**	**1.38**	0.02	0.13	0.60	1.01	1.03	**24.12**
Corn and Grain Sorghum	0.45	0.95	2.67	**2.68**	**3.19**	**5.92**	**7.68**	**5.55**	0.49	0.60	1.00	1.03	**32.20**
Misc. field crops	0.45	0.95	2.67	**2.68**	**3.19**	**6.15**	**7.15**	**2.61**	0.13	0.60	1.00	1.03	**28.59**
Alfalfa Hay and Clover	**0.45**	**0.95**	**3.23**	**4.88**	**4.86**	**6.41**	**6.73**	**6.24**	**4.24**	**2.07**	**1.16**	**1.20**	**42.42**
Pasture and Misc. Grasses	0.45	**0.96**	**3.06**	**4.19**	**4.48**	**6.27**	**7.36**	**6.95**	**4.69**	**3.11**	**1.17**	1.03	**43.72**
Small Vegetables	**0.45**	**0.95**	**3.03**	**4.53**	**2.79**	0.60	0.00	1.10	**1.14**	**1.27**	**1.11**	**1.18**	**18.15**
Tomatoes and Peppers	0.45	0.95	2.57	**2.51**	**3.58**	**6.74**	**6.87**	**0.77**	0.13	0.60	1.00	1.03	**27.19**
Potatoes, Sugar beets, Turnips etc.	0.45	**0.95**	**2.78**	**4.73**	**4.57**	**6.99**	**7.20**	**0.13**	0.13	0.60	1.00	1.03	**30.55**
Melons, Squash, and Cucumbers	0.45	0.95	2.20	2.02	2.52	**1.32**	**4.53**	**5.76**	**1.76**	0.60	1.00	1.03	**24.13**
Onions and Garlic	**0.45**	**0.95**	**3.10**	**4.18**	**3.74**	**1.60**	0.00	0.02	0.13	0.60	1.20	**1.09**	**17.07**
Citrus (no ground cover)	**0.41**	**0.91**	**3.22**	**4.14**	**4.27**	**5.15**	**5.15**	**4.75**	**3.24**	**2.76**	**1.15**	**1.18**	**36.33**
Immature Citrus	**0.42**	**0.92**	**2.86**	**3.14**	**3.36**	**3.18**	**3.19**	**2.90**	**1.94**	**1.80**	**1.08**	**1.13**	**25.92**
Avocado	**0.41**	**0.90**	**2.40**	**3.61**	**4.45**	**6.05**	**6.57**	**6.31**	**4.22**	**2.55**	**0.96**	**1.00**	**39.44**
Grape Vines with 80% canopy	0.42	0.91	**2.24**	**2.63**	**3.62**	**5.27**	**5.96**	**4.92**	**2.68**	0.62	0.97	1.01	**31.24**
Grape Vines with cover crop (80% canopy)	0.42	0.92	**3.17**	**3.82**	**4.32**	**6.14**	**6.44**	**5.84**	**3.38**	2.14	1.13	1.18	**38.90**
Immature Grapes Vines with 50% canopy	0.43	0.92	**2.23**	**2.42**	**2.98**	**3.74**	**4.14**	**3.47**	**1.73**	0.66	0.98	1.02	**24.71**
Idle	0.46	0.96	2.20	2.03	2.15	0.59	0.00	0.02	0.13	0.60	1.02	1.04	**11.21**

ETc Table 22. Zone 13 Wet Year

ETc Table for Irrigation Scheduling and Design

Zone 13 Monthly Evapotranspiration

Surface Irrigation Wet Year

IRRIGATION TRAINING AND RESEARCH CENTER, California Polytechnic State University, San Luis Obispo

Table does not include adjustments for bare spots and reduced vigor

	1998 (Wet Year)												
	January	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**	**October**	**November**	**December**	**Annual**
	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches	**inches**
Precipitation	8.80	9.21	3.72	2.76	3.33	1.22	0.08	0.00	0.77	0.63	3.94	1.20	**35.65**
Grass Reference ETo	1.01	0.99	2.74	3.84	3.92	5.85	8.24	8.25	4.86	3.41	1.21	1.01	**45.33**
Apple, Pear, Cherry, Plum and Prune	1.07	1.14	**2.05**	**2.75**	**3.92**	**5.84**	**7.86**	**7.76**	**4.87**	**3.14**	1.36	1.00	**42.75**
Apples, Plums, Cherries etc w/covercrop	1.24	1.15	**3.23**	**4.33**	**4.53**	**6.69**	**9.67**	**9.72**	**5.61**	**3.67**	1.41	1.19	**52.44**
Almonds	1.07	1.14	**2.05**	**2.69**	**3.80**	**5.46**	**7.55**	**7.43**	**4.45**	**3.16**	1.42	1.00	**41.21**
Almonds w/covercrop	1.23	1.15	**3.07**	**3.92**	**4.41**	**6.19**	**8.84**	**8.81**	**5.28**	**3.63**	1.44	1.18	**49.15**
Immature Almonds	1.07	1.14	**2.00**	**2.49**	**3.37**	**4.16**	**5.39**	**5.25**	**3.50**	**2.26**	1.37	1.00	**33.01**
Walnuts	1.07	1.13	**1.93**	**2.74**	**3.79**	**5.82**	**8.46**	**8.80**	**5.28**	**3.33**	1.42	1.00	**44.77**
Pistachio	1.07	1.14	1.93	**2.74**	**3.59**	**5.39**	**8.46**	**8.71**	**5.36**	**3.31**	1.43	1.00	**44.11**
Pistachio w/ covercrop	1.23	1.15	3.07	**3.88**	**4.30**	**6.42**	**9.43**	**9.68**	**5.77**	**3.93**	1.43	1.18	**51.46**
Immature Pistachio	1.07	1.14	1.92	**2.45**	**3.22**	**3.71**	**5.83**	**6.06**	**3.77**	**2.44**	1.36	1.00	**33.98**
Misc. Deciduous	1.07	1.14	**1.93**	**2.60**	**3.51**	**5.09**	**7.69**	**7.57**	**4.91**	**3.15**	1.37	1.00	**41.02**
Grain and Grain Hay	**1.13**	**1.18**	**3.20**	**4.45**	**3.75**	1.45	0.08	0.00	0.61	0.55	1.27	**1.07**	**18.73**
Rice	1.07	1.16	1.91	2.53	**4.52**	**7.08**	**10.20**	**10.19**	**3.25**	0.55	1.26	1.01	**44.72**
Cotton	1.07	1.16	1.91	2.34	**3.30**	**5.64**	**8.67**	**8.53**	**2.11**	**0.59**	1.26	1.01	**37.59**
Corn and Grain Sorghum	1.07	1.16	2.15	**2.63**	**3.55**	**6.14**	**8.91**	**7.81**	**1.35**	0.55	1.26	1.01	**37.58**
Misc. field crops	1.07	1.16	2.15	**2.63**	**3.56**	**5.92**	**8.09**	**3.46**	0.62	0.55	1.26	1.01	**31.47**
Alfalfa Hay and Clover	**1.21**	**1.17**	**3.00**	**4.62**	**4.71**	**6.74**	**7.50**	**7.35**	**4.53**	**1.93**	**1.39**	**1.19**	**45.34**
Pasture and Misc. Grasses	1.07	**1.18**	**2.78**	**4.00**	**4.42**	**6.20**	**8.23**	**8.25**	**4.95**	**3.07**	**1.41**	1.01	**46.57**
Small Vegetables	**1.12**	**1.17**	**2.88**	**2.20**	**2.77**	1.37	0.08	1.13	**1.34**	**1.36**	**1.37**	**1.15**	**17.93**
Tomatoes and Peppers	1.07	1.16	2.49	**2.59**	**3.82**	**6.42**	**7.76**	**0.91**	0.62	0.55	1.26	1.01	**29.66**
Misc Subtropical	1.07	1.14	**1.93**	**2.60**	**3.51**	**5.09**	**7.69**	**7.57**	**4.91**	**3.15**	1.37	1.00	**41.02**
Grape Vines with 80% canopy	1.07	1.14	**2.04**	**2.92**	**4.03**	**5.33**	**6.24**	**5.45**	**3.20**	0.62	1.26	1.00	**34.32**
Grape Vines with cover crop (80% canopy)	1.21	1.16	**2.93**	**3.80**	**4.38**	**5.65**	**7.38**	**6.61**	**3.38**	2.10	1.34	1.16	**41.11**
Immature Grapes Vines with 50% canopy	1.07	1.15	**2.00**	**2.62**	**3.53**	**4.29**	**4.71**	**3.99**	**2.52**	0.60	1.26	1.01	**28.73**
Idle	1.07	1.17	1.90	2.16	2.78	1.37	0.08	0.00	0.62	0.54	1.26	1.01	**13.97**

ETc Table 23. Zone 14 Wet Year

ETc Table for Irrigation Scheduling and Design

Zone 14 Monthly Evapotranspiration

Surface Irrigation Wet Year

IRRIGATION TRAINING AND RESEARCH CENTER, California Polytechnic State University, San Luis Obispo

Table does not include adjustments for bare spots and reduced vigor

	1998 (Wet Year)												
	January	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**	**October**	**November**	**December**	**Annual**
	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches	**inches**
Precipitation	6.55	12.07	2.76	1.90	3.75	0.48	0.02	0.01	0.35	1.14	3.94	1.21	**34.20**
Grass Reference ETo	0.41	0.87	2.90	4.30	4.13	6.63	7.87	7.21	5.01	3.86	1.19	1.17	**45.55**
Apple, Pear, Cherry, Plum and Prune	0.43	0.96	**2.46**	**3.89**	**4.71**	**6.81**	**7.45**	**6.99**	**4.71**	**3.05**	1.10	1.10	**43.69**
Apples, Plums, Cherries etc w/covercrop	0.44	0.97	**3.45**	**4.90**	**4.75**	**7.86**	**9.08**	**8.44**	**5.65**	**3.93**	1.33	1.39	**52.19**
Peach, Nectarine and Apricots	0.43	0.96	**2.45**	**3.69**	**4.69**	**6.89**	**7.57**	**6.92**	**4.63**	**3.07**	1.10	1.10	**43.52**
Immature Peaches, Nectarines, etc	0.44	0.98	**2.34**	**2.90**	**3.91**	**4.49**	**4.58**	**4.34**	**3.14**	**1.96**	1.11	1.11	**31.30**
Almonds	0.43	0.96	**2.59**	**4.22**	**4.68**	**6.66**	**7.08**	**6.76**	**4.48**	**2.95**	1.10	1.10	**43.02**
Almonds w/covercrop	0.44	0.97	**3.41**	**4.94**	**4.71**	**7.39**	**8.41**	**7.65**	**5.03**	**3.47**	1.32	1.36	**49.11**
Immature Almonds	0.44	0.98	**2.47**	**3.24**	**4.09**	**4.73**	**5.18**	**4.95**	**3.29**	**2.26**	1.11	1.11	**33.85**
Walnuts	0.43	0.96	**2.53**	**3.32**	**4.74**	**7.53**	**8.83**	**8.01**	**5.25**	**3.09**	1.19	1.10	**46.98**
Pistachio	0.43	0.96	2.23	**2.84**	**3.70**	**5.91**	**8.23**	**7.62**	**5.17**	**3.05**	1.20	1.10	**42.46**
Pistachio w/ covercrop	0.44	0.97	3.41	**4.27**	**4.60**	**7.32**	**9.04**	**8.41**	**5.69**	**4.07**	1.35	1.36	**50.94**
Immature Pistachio	0.44	0.98	2.23	**2.46**	**3.17**	**3.69**	**5.77**	**5.25**	**3.63**	**2.31**	1.15	1.11	**32.17**
Misc. Deciduous	0.43	0.96	**2.46**	**3.82**	**4.68**	**6.53**	**7.09**	**6.77**	**4.59**	**2.88**	1.10	1.10	**42.41**
Grain and Grain Hay	**0.47**	**1.02**	**3.41**	**4.93**	**3.44**	0.79	0.02	0.01	0.29	0.68	1.15	**1.19**	**17.41**
Rice	0.47	1.01	2.22	2.46	**4.82**	**8.04**	**9.75**	**8.88**	**2.85**	0.68	1.14	1.11	**43.44**
Cotton	0.47	1.01	2.22	2.08	**3.11**	**4.52**	**8.29**	**7.96**	**5.23**	**2.57**	1.14	1.11	**39.70**
Safflower and Sunflower	0.47	**1.02**	**2.77**	**4.88**	**4.86**	**6.88**	**1.44**	0.01	0.29	0.68	1.14	1.11	**25.53**
Corn and Grain Sorghum	0.47	1.01	2.64	**2.85**	**3.55**	**6.37**	**8.25**	**5.32**	**0.58**	0.68	1.14	1.11	**33.96**
Misc. field crops	0.47	1.01	**2.64**	**2.85**	**3.55**	**6.63**	**7.60**	**2.90**	0.29	0.68	1.14	1.11	**30.85**
Alfalfa Hay and Clover	**0.47**	**1.02**	**3.37**	**5.09**	**4.97**	**6.79**	**7.15**	**6.45**	**4.44**	**2.26**	**1.31**	**1.37**	**44.69**
Pasture and Misc. Grasses	0.47	**1.02**	**3.18**	**4.42**	**4.66**	**6.73**	**7.87**	**7.19**	**5.00**	**3.55**	**1.32**	1.11	**46.53**
Small Vegetables	**0.47**	**1.02**	**3.18**	**4.75**	**3.00**	0.71	0.02	1.09	**1.27**	**1.46**	**1.27**	**1.35**	**19.58**
Tomatoes and Peppers	0.47	1.01	2.61	**2.60**	**3.88**	**7.13**	**7.48**	**0.74**	0.29	0.68	1.14	1.11	**29.14**
Potatoes, Sugar beets, Turnips etc.	0.47	**1.02**	**2.89**	**4.95**	**4.69**	**7.44**	**7.43**	**0.10**	0.29	0.68	1.14	1.11	**32.20**
Melons, Squash, and Cucumbers	0.47	1.01	2.22	2.08	2.68	**1.46**	**4.92**	**6.01**	**1.95**	0.68	1.14	1.11	**25.73**
Onions and Garlic	**0.47**	**1.02**	**3.25**	**4.39**	**3.97**	**1.88**	0.02	0.01	0.29	0.68	1.37	**1.20**	**18.55**
Citrus (no ground cover)	**0.44**	**0.97**	**3.43**	**4.43**	**4.54**	**5.65**	**5.61**	**5.12**	**3.67**	**3.34**	**1.35**	**1.38**	**39.94**
Immature Citrus	**0.45**	**0.99**	**2.98**	**3.34**	**3.90**	**3.58**	**3.58**	**3.15**	**2.35**	**2.28**	**1.25**	**1.26**	**29.11**
Avocado	**0.43**	**0.96**	**2.46**	**3.82**	**4.68**	**6.53**	**7.09**	**6.77**	**4.59**	**2.88**	**1.10**	**1.10**	**42.41**
Grape Vines with 80% canopy	0.44	0.98	**2.29**	**2.75**	**4.01**	**5.71**	**6.45**	**5.31**	**2.73**	0.73	1.11	1.11	**33.62**
Grape Vines with cover crop (80% canopy)	0.45	0.99	**3.33**	**4.04**	**4.56**	**6.67**	**7.06**	**6.21**	**3.54**	2.10	1.22	1.34	**41.51**
Immature Grapes Vines with 50% canopy	0.45	0.98	**2.27**	**2.51**	**3.41**	**4.04**	**4.62**	**3.64**	**2.01**	0.70	1.12	1.11	**26.84**
Idle	0.48	1.02	2.22	2.08	2.58	0.71	0.02	0.01	0.29	0.68	1.15	1.12	**12.35**

ETc Table 24. Zone 15 Wet Year

ETc Table for Irrigation Scheduling and Design

Zone 15 Monthly Evapotranspiration

Surface Irrigation Wet Year

IRRIGATION TRAINING AND RESEARCH CENTER, California Polytechnic State University, San Luis Obispo

Table does not include adjustments for bare spots and reduced vigor

	1998 (Wet Year)												
	January	February	March	April	May	June	July	August	September	October	November	December	Annual
	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches
Precipitation	1.65	7.30	2.74	1.11	1.59	0.35	0.02	0.00	0.15	0.76	0.88	0.70	**17.25**
Grass Reference ETo	0.93	1.37	3.13	4.73	5.39	7.11	8.52	7.69	5.30	3.61	1.60	1.20	**50.58**
Apple, Pear, Cherry, Plum and Prune	0.94	1.54	**2.27**	**4.38**	**5.41**	**6.94**	**7.93**	**6.95**	**4.37**	**2.84**	0.82	0.85	**45.23**
Apples, Plums, Cherries etc w/covercrop	1.00	1.55	**3.58**	**5.29**	**5.64**	**8.08**	**9.55**	**8.55**	**5.69**	**3.45**	1.49	1.07	**54.94**
Peach, Nectarine and Apricots	0.94	1.54	**2.13**	**3.62**	**5.55**	**6.85**	**7.89**	**7.10**	**4.63**	**2.74**	0.80	0.85	**44.63**
Immature Peaches, Nectarines, etc	0.95	1.56	**2.02**	**2.71**	**4.02**	**4.80**	**4.97**	**4.73**	**3.06**	**1.83**	0.83	0.85	**32.33**
Almonds	0.94	**1.55**	**2.46**	**4.92**	**5.03**	**6.21**	**7.22**	**6.52**	**4.06**	**2.36**	0.79	0.85	**42.91**
Almonds w/covercrop	0.96	**1.55**	**3.49**	**5.15**	**5.15**	**7.32**	**8.27**	**7.49**	**4.60**	**3.13**	1.60	1.23	**49.93**
Immature Almonds	0.95	**1.56**	**2.25**	**3.59**	**4.52**	**5.30**	**6.09**	**5.45**	**3.37**	**1.90**	0.80	0.85	**36.65**
Walnuts	0.93	1.53	**2.38**	**3.69**	**5.97**	**8.09**	**9.59**	**8.58**	**5.19**	**2.92**	1.01	0.85	**50.75**
Pistachio	0.94	1.54	1.91	**2.60**	**3.50**	**5.72**	**9.05**	**8.29**	**5.35**	**2.72**	0.96	0.85	**43.42**
Pistachio w/ covercrop	1.01	1.55	3.44	**4.36**	**5.27**	**7.43**	**9.91**	**8.88**	**5.95**	**3.76**	1.78	1.33	**54.66**
Immature Pistachio	0.95	1.56	1.91	**2.16**	**2.58**	**4.12**	**6.19**	**5.77**	**3.61**	**2.09**	0.92	0.85	**32.71**
Misc. Deciduous	0.94	1.54	**2.27**	**4.27**	**5.44**	**6.50**	**7.52**	**6.66**	**4.55**	**2.50**	0.79	0.85	**43.82**
Grain and Grain Hay	**1.04**	**1.62**	**3.62**	**5.31**	**3.44**	0.38	0.02	0.00	0.15	0.60	1.20	**1.01**	**18.40**
Rice	1.00	1.60	1.91	2.11	**6.01**	**8.66**	**10.61**	**9.45**	**2.49**	0.60	0.79	0.86	**46.10**
Cotton	1.00	1.60	1.91	1.77	**2.42**	**4.56**	**9.21**	**8.36**	**5.54**	**2.17**	0.79	0.86	**40.18**
Safflower and Sunflower	1.00	**1.61**	**2.59**	**5.33**	**6.36**	**7.16**	**1.00**	0.00	0.15	0.60	0.79	0.86	**27.45**
Corn and Grain Sorghum	1.00	1.60	2.41	**2.59**	**3.48**	**6.69**	**8.83**	**6.55**	**0.54**	0.60	0.79	0.86	**35.94**
Misc. field crops	1.00	1.60	2.41	**2.59**	**3.47**	**6.98**	**8.41**	**3.27**	0.15	0.60	0.79	0.86	**32.12**
Alfalfa Hay and Clover	**1.08**	**1.61**	**3.51**	**5.54**	**6.24**	**7.20**	**7.71**	**6.88**	**4.86**	**2.12**	**1.63**	**1.36**	**49.74**
Pasture and Misc. Grasses	1.00	**1.62**	**3.04**	**4.69**	**5.77**	**7.18**	**8.52**	**7.69**	**5.30**	**3.29**	**1.25**	0.87	**50.22**
Small Vegetables	**1.08**	**1.62**	**3.30**	**5.18**	**2.63**	0.36	0.02	1.12	**1.34**	**1.23**	**1.44**	**1.34**	**20.66**
Tomatoes and Peppers	1.00	1.60	2.41	**2.28**	**4.20**	**7.74**	**7.70**	**0.65**	0.15	0.60	0.79	0.86	**29.98**
Potatoes, Sugar beets, Turnips etc.	1.04	**1.61**	**2.80**	**5.40**	**6.17**	**8.01**	**8.28**	0.09	0.15	0.60	0.79	0.86	**35.80**
Melons, Squash, and Cucumbers	1.00	1.60	1.91	1.71	1.85	**1.25**	**5.44**	**6.32**	**1.71**	0.60	0.79	0.86	**25.05**
Onions and Garlic	**1.04**	**1.62**	**3.37**	**4.68**	**4.00**	**0.93**	0.02	0.00	0.15	0.60	1.38	**1.03**	**18.81**
Citrus (no ground cover)	**1.01**	**1.55**	**3.51**	**4.66**	**5.24**	**5.61**	**6.20**	**5.59**	**3.97**	**2.90**	**1.74**	**1.32**	**43.29**
Immature Citrus	**1.00**	**1.57**	**2.75**	**3.25**	**3.93**	**3.55**	**3.91**	**3.49**	**2.48**	**2.01**	**1.50**	**1.21**	**30.65**
Misc Subtropical	**0.94**	**1.54**	**2.27**	**4.27**	**5.44**	**6.50**	**7.52**	**6.66**	**4.55**	**2.50**	**0.79**	**0.85**	**43.82**
Grape Vines with 80% canopy	0.95	1.56	**2.07**	**2.82**	**4.43**	**5.52**	**6.62**	**5.46**	**2.57**	0.60	0.79	0.85	**34.24**
Grape Vines with cover crop (80% canopy)	1.02	1.57	**3.24**	**4.20**	**4.85**	**6.81**	**7.50**	**6.10**	**3.30**	1.96	1.37	1.13	**43.05**
Immature Grapes Vines with 50% canopy	0.97	1.57	**2.02**	**2.41**	**3.30**	**4.34**	**5.12**	**3.97**	**1.94**	0.60	0.79	0.85	**27.88**
Idle	1.02	1.62	1.91	1.71	1.60	0.36	0.02	0.00	0.15	0.60	0.79	0.86	**10.65**

ETc Table 25. Zone 16 Wet Year

ETc Table for Irrigation Scheduling and Design

Zone 16 Monthly Evapotranspiration

Surface Irrigation Wet Year

IRRIGATION TRAINING AND RESEARCH CENTER, California Polytechnic State University, San Luis Obispo

Table does not include adjustments for bare spots and reduced vigor

	1998 (Wet Year)												
	January	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**	**October**	**November**	**December**	**Annual**
	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches	**inches**
Precipitation	6.30	4.93	2.67	0.98	3.33	0.83	0.01	0.01	0.16	0.29	0.56	0.41	**20.47**
Grass Reference ETo	0.92	1.25	2.97	4.78	5.20	6.93	8.43	8.00	5.51	3.89	1.60	1.16	**50.63**
Apple, Pear, Cherry, Plum and Prune	0.94	1.37	**1.78**	**4.32**	**5.87**	**6.86**	**7.83**	**7.27**	**4.90**	**2.41**	0.48	0.46	**44.48**
Apples, Plums, Cherries etc w/covercrop	0.99	1.40	**3.32**	**5.37**	**5.27**	**8.19**	**9.34**	**9.02**	**5.97**	**3.55**	1.40	1.08	**54.89**
Peach, Nectarine and Apricots	0.94	1.37	**1.65**	**3.52**	**5.80**	**7.02**	**7.96**	**7.41**	**4.87**	**2.56**	0.48	0.46	**44.05**
Immature Peaches, Nectarines, etc	0.96	1.38	**1.54**	**2.59**	**4.57**	**4.70**	**5.29**	**4.82**	**3.26**	**1.37**	0.48	0.46	**31.42**
Almonds	0.94	**1.38**	**1.97**	**4.91**	**5.61**	**6.42**	**6.69**	**6.82**	**4.67**	**2.17**	0.48	0.46	**42.52**
Almonds w/covercrop	0.98	**1.40**	**3.09**	**5.39**	**5.38**	**7.26**	**8.24**	**7.58**	**5.01**	**2.77**	1.22	0.97	**49.29**
Immature Almonds	0.96	**1.40**	**1.76**	**3.51**	**5.17**	**5.49**	**5.96**	**5.59**	**3.61**	**1.69**	0.48	0.46	**36.09**
Walnuts	0.94	1.36	**1.89**	**3.59**	**6.08**	**8.11**	**9.40**	**9.01**	**5.53**	**2.70**	0.63	0.47	**49.70**
Pistachio	0.94	1.37	1.41	**2.51**	**4.31**	**6.08**	**8.93**	**8.73**	**5.69**	**2.76**	0.63	0.47	**43.84**
Pistachio w/ covercrop	0.99	1.40	3.02	**4.34**	**5.65**	**7.76**	**9.74**	**9.46**	**6.27**	**3.96**	1.49	1.12	**55.19**
Immature Pistachio	0.96	1.38	1.42	**2.06**	**3.54**	**4.31**	**6.11**	**6.06**	**3.84**	**1.89**	0.52	0.47	**32.57**
Misc. Deciduous	0.94	1.37	**1.78**	**4.20**	**5.84**	**6.66**	**7.36**	**6.97**	**4.79**	**2.46**	0.48	0.46	**43.30**
Grain and Grain Hay	**1.04**	**1.47**	**3.41**	**5.37**	**4.27**	0.92	0.01	0.01	0.14	0.24	0.92	**0.65**	**18.46**
Cotton	1.01	1.43	1.44	1.62	**3.39**	**4.84**	**9.15**	**8.77**	**5.71**	**2.01**	0.48	0.46	**40.32**
Safflower and Sunflower	1.01	**1.45**	**2.15**	**5.35**	**6.17**	**6.67**	**1.31**	0.01	0.14	0.24	0.48	0.46	**25.46**
Corn and Grain Sorghum	1.01	1.43	2.07	**2.64**	**4.12**	**6.67**	**8.88**	**6.38**	**0.54**	0.24	0.48	0.46	**34.92**
Misc. field crops	1.01	1.43	2.07	**2.64**	**4.14**	**6.84**	**8.29**	**3.26**	0.14	0.24	0.48	0.46	**31.01**
Alfalfa Hay and Clover	**1.06**	**1.46**	**3.27**	**5.51**	**5.99**	**7.58**	**7.63**	**7.16**	**5.01**	**1.92**	**1.45**	**1.26**	**49.30**
Pasture and Misc. Grasses	1.01	**1.47**	**2.58**	**4.67**	**5.81**	**7.19**	**8.50**	**8.02**	**5.50**	**3.45**	**0.95**	0.48	**49.61**
Small Vegetables	**1.06**	**1.46**	**3.00**	**5.22**	**3.34**	0.87	0.01	1.14	**1.39**	**1.24**	**1.26**	**1.25**	**21.25**
Tomatoes and Peppers	1.01	1.43	2.04	**2.19**	**4.68**	**7.49**	**7.59**	**0.55**	0.14	0.24	0.48	0.46	**28.32**
Potatoes, Sugar beets, Turnips etc.	1.01	**1.45**	**2.40**	**5.47**	**5.98**	**7.90**	**7.92**	0.09	0.14	0.24	0.48	0.46	**33.55**
Melons, Squash, and Cucumbers	1.01	1.43	1.44	1.62	3.13	**1.74**	**5.43**	**6.51**	**2.14**	0.24	0.48	0.46	**25.64**
Onions and Garlic	**1.04**	**1.47**	**3.09**	**4.66**	**4.28**	**1.42**	0.01	0.01	0.14	0.24	1.18	**0.65**	**18.20**
Citrus (no ground cover)	**0.99**	**1.40**	**3.14**	**4.64**	**5.73**	**5.88**	**6.19**	**5.78**	**4.17**	**3.00**	**1.56**	**1.26**	**43.72**
Immature Citrus	**1.00**	**1.41**	**2.26**	**3.16**	**4.56**	**3.91**	**3.95**	**3.66**	**2.66**	**1.91**	**1.06**	**0.92**	**30.45**
Misc Subtropical	**0.94**	**1.37**	**1.78**	**4.20**	**5.84**	**6.66**	**7.36**	**6.97**	**4.79**	**2.46**	**0.48**	**0.46**	**43.30**
Grape Vines with 80% canopy	0.96	1.38	**1.59**	**2.70**	**5.05**	**5.55**	**6.84**	**5.55**	**2.53**	0.31	0.48	0.46	**33.41**
Grape Vines with cover crop (80% canopy)	0.98	1.42	**2.77**	**4.06**	**5.33**	**6.62**	**7.51**	**6.45**	**3.38**	1.66	0.91	0.78	**41.87**
Immature Grapes Vines with 50% canopy	0.97	1.40	**1.54**	**2.28**	**4.04**	**4.74**	**4.88**	**4.29**	**1.99**	0.36	0.48	0.46	**27.42**
Idle	1.03	1.46	1.44	1.62	2.67	0.88	0.01	0.01	0.14	0.24	0.48	0.46	**10.45**

ETc Table 26. Zone 18 Wet Year

ETc Table for Irrigation Scheduling and Design

Zone 18 Monthly Evapotranspiration

Surface Irrigation Wet Year

IRRIGATION TRAINING AND RESEARCH CENTER, California Polytechnic State University, San Luis Obispo

Table does not include adjustments for bare spots and reduced vigor

	1997 (Wet Year)												
	January	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**	**October**	**November**	**December**	**Annual**
	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches	**inches**
Precipitation	0.66	0.06	0.04	0.17	0.10	0.08	0.25	0.04	1.35	0.07	0.17	0.41	**3.41**
Grass Reference ETo	2.67	3.91	6.09	7.41	8.59	9.49	9.30	8.73	5.97	5.16	2.78	2.27	**72.38**
Peach, Nectarine and Apricots	0.64	0.12	**2.60**	**4.16**	**7.95**	**10.12**	**9.98**	**9.32**	**6.45**	**5.15**	0.24	0.37	**57.09**
Grain and Grain Hay	**1.69**	**4.10**	**6.94**	**6.68**	**0.60**	0.09	0.24	0.06	1.14	0.22	**1.09**	**1.57**	**24.40**
Cotton	0.63	0.11	1.04	**1.63**	**2.42**	**8.35**	**10.76**	**10.19**	**6.70**	**2.52**	0.17	0.35	**44.88**
Safflower and Sunflower	1.17	**0.62**	**2.35**	**7.61**	**10.18**	**9.23**	**1.04**	0.06	1.14	0.22	0.16	0.35	**34.12**
Corn and Grain Sorghum	**1.48**	**1.14**	**5.61**	**8.98**	**9.63**	**3.00**	0.24	0.06	1.14	0.22	0.16	1.38	**33.04**
Misc. field crops	**1.35**	**1.20**	**5.54**	**7.95**	**4.80**	0.10	0.24	0.06	1.14	0.22	0.16	1.45	**24.20**
Alfalfa Hay and Clover	**2.81**	**3.05**	**5.62**	**7.59**	**7.59**	**8.73**	**8.43**	**8.02**	**6.59**	**5.17**	**2.23**	**2.54**	**68.36**
Pasture and Misc. Grasses	**0.63**	**2.10**	**2.27**	**5.30**	**7.64**	**9.22**	**8.87**	**8.27**	**5.63**	**2.63**	**0.18**	**0.35**	**53.08**
Small Vegetables	**2.52**	**2.57**	**6.24**	**2.57**	0.12	0.09	0.24	0.06	2.70	**1.94**	**1.28**	**2.34**	**22.65**
Tomatoes and Peppers	1.53	**0.63**	**4.05**	**8.78**	**10.06**	**4.04**	0.24	0.06	1.14	0.22	0.16	0.35	**31.25**
Potatoes, Sugar beets, Turnips etc.	**3.23**	**4.82**	**7.52**	**9.14**	**8.43**	**0.25**	0.24	0.06	1.95	**0.48**	**0.64**	**1.76**	**38.53**
Melons, Squash, and Cucumbers	1.53	**0.57**	**3.76**	**8.10**	**9.27**	**4.02**	0.24	0.06	1.14	0.22	0.16	0.35	**29.41**
Onions and Garlic	**2.93**	**4.10**	**6.33**	**6.82**	**1.76**	0.13	0.24	0.06	1.95	**0.51**	**1.00**	**2.12**	**27.94**
Citrus (no ground cover)	**2.71**	**2.65**	**4.60**	**5.74**	**6.54**	**7.41**	**7.47**	**6.70**	**5.34**	**4.41**	**2.28**	**2.15**	**57.98**
Grape Vines with 80% canopy	0.64	0.12	**2.60**	**4.16**	**7.95**	**10.12**	**9.98**	**9.32**	**6.45**	**5.15**	0.24	0.37	**57.09**
Idle	0.63	0.11	0.10	0.17	0.10	0.09	0.24	0.06	1.13	0.22	0.16	0.35	**3.36**

ETc Table 27. Zone 1 Dry Year

ETc Table for Irrigation Scheduling and Design

Zone 1 Monthly Evapotranspiration

Surface Irrigation Dry Year

IRRIGATION TRAINING AND RESEARCH CENTER, California Polytechnic State University, San Luis Obispo

Table does not include adjustments for bare spots and reduced vigor

	1999 (Dry Year)												
	January	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**	**October**	**November**	**December**	**Annual**
	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches	**inches**
Precipitation	3.23	3.98	0.47	0.00	0.00	0.00	0.39	0.12	0.00	0.12	2.04	0.13	**10.48**
Grass Reference ETo	1.41	1.54	2.64	3.97	4.28	4.19	4.12	3.33	2.11	2.66	1.18	1.57	**33.00**
Apple, Pear, Cherry, Plum and Prune	0.62	1.59	**1.06**	**0.90**	**1.86**	**2.99**	**3.64**	**2.85**	**1.67**	**2.00**	1.01	0.67	**20.85**
Apples, Plums, Cherries etc w/covercrop	1.38	1.67	**2.65**	**3.03**	**4.02**	**3.99**	**4.43**	**3.40**	**2.33**	**2.42**	1.15	1.66	**32.13**
Peach, Nectarine and Apricots	0.62	1.59	**1.06**	**0.94**	**2.38**	**3.33**	**3.67**	**2.86**	**1.71**	**2.27**	1.00	0.67	**22.11**
Immature Peaches, Nectarines, etc	0.63	1.62	**0.89**	**0.47**	**1.09**	**1.69**	**2.06**	**1.62**	**0.85**	**1.04**	1.00	0.66	**13.62**
Misc. Deciduous	0.62	1.60	**1.27**	**1.21**	**2.51**	**3.45**	**3.39**	**2.74**	**1.73**	**2.30**	**1.21**	0.67	**22.68**
Grain and Grain Hay	**1.25**	**1.79**	**2.94**	**4.34**	**2.36**	0.01	0.30	0.18	0.02	0.80	**1.08**	**1.16**	**16.24**
Corn and Grain Sorghum	0.66	1.69	**1.16**	**1.11**	**0.89**	**3.44**	**4.50**	**3.33**	0.53	0.10	1.04	0.65	**19.10**
Misc. field crops	0.66	1.71	**0.95**	**1.02**	**3.15**	**4.08**	**3.90**	**1.34**	0.02	0.10	1.04	0.65	**18.60**
Alfalfa Hay and Clover	**1.50**	**1.79**	**2.83**	**3.77**	**3.85**	**3.77**	**3.76**	**3.23**	**2.10**	**1.53**	**1.22**	**1.71**	**31.06**
Pasture and Misc. Grasses	0.66	**1.78**	**2.17**	**3.23**	**4.01**	**3.96**	**4.01**	**3.20**	**2.00**	**2.53**	**1.30**	0.79	**29.64**
Small Vegetables	**0.68**	**1.77**	**2.70**	**2.73**	**2.34**	**4.25**	2.07	0.19	0.02	0.10	1.04	1.06	**18.95**
Tomatoes and Peppers	0.66	1.69	**1.11**	**1.84**	**4.20**	**4.44**	**4.26**	**1.49**	0.02	0.10	1.04	0.65	**21.49**
Potatoes, Sugar beets, Turnips etc.	0.68	1.69	1.40	**0.79**	**0.66**	**2.15**	**3.99**	**3.70**	**2.33**	**2.96**	**1.39**	1.45	**23.20**
Melons, Squash, and Cucumbers	0.66	1.70	**0.94**	**1.73**	**4.28**	**4.14**	**2.08**	0.22	0.02	0.10	1.04	0.65	**17.55**
Citrus (no ground cover)	**1.29**	**1.67**	**2.43**	**2.48**	**2.74**	**2.38**	**2.68**	**2.25**	**1.15**	**1.79**	**1.14**	**1.62**	**23.63**
Immature Citrus	**1.29**	**1.70**	**1.63**	**1.11**	**1.26**	**1.19**	**1.49**	**1.23**	**0.57**	**0.76**	**1.08**	**1.18**	**14.48**
Avocado	**0.62**	**1.60**	**1.27**	**1.21**	**2.51**	**3.45**	**3.39**	**2.74**	**1.73**	**2.30**	**1.21**	**0.67**	**22.68**
Idle	0.67	1.72	0.70	0.00	0.00	0.00	0.31	0.18	0.02	0.10	1.06	0.64	**5.40**

ETc Table 28. Zone 3 Dry Year

ETc Table for Irrigation Scheduling and Design

Zone 3 Monthly Evapotranspiration

Surface Irrigation Dry Year

IRRIGATION TRAINING AND RESEARCH CENTER, California Polytechnic State University, San Luis Obispo

Table does not include adjustments for bare spots and reduced vigor

	1999 (Dry Year)												
	January	February	March	April	May	June	July	August	September	October	November	December	Annual
	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches
Precipitation	2.35	1.06	1.85	0.57	0.05	0.00	0.01	0.00	0.03	0.00	0.33	0.11	**6.35**
Grass Reference ETo	0.90	1.77	3.40	5.27	7.74	8.10	8.47	7.34	5.84	4.09	1.82	1.53	**56.27**
Apple, Pear, Cherry, Plum and Prune	0.64	1.80	**2.76**	**2.41**	**2.38**	**3.98**	**5.13**	**3.76**	**3.12**	**2.23**	1.14	0.95	**30.28**
Apples, Plums, Cherries etc w/covercrop	1.40	1.86	**3.32**	**4.64**	**4.38**	**5.85**	**6.07**	**4.84**	**3.71**	**2.94**	1.39	1.86	**42.25**
Peach, Nectarine and Apricots	0.64	1.80	**2.76**	**2.45**	**2.91**	**4.63**	**4.74**	**4.09**	**2.78**	**2.61**	1.16	0.95	**31.52**
Immature Peaches, Nectarines, etc	0.65	1.81	**2.71**	**1.95**	**1.41**	**2.28**	**2.54**	**1.92**	**1.40**	**1.65**	1.13	0.94	**20.39**
Almonds	0.64	1.80	**2.76**	**2.80**	**3.40**	**4.43**	**4.65**	**3.82**	**2.83**	**2.50**	**1.38**	0.95	**31.94**
Almonds w/covercrop	1.24	1.86	**3.32**	**4.29**	**4.25**	**5.54**	**5.40**	**4.50**	**3.30**	**2.92**	**1.35**	1.78	**39.75**
Immature Almonds	0.65	1.81	**2.71**	**2.11**	**1.63**	**2.23**	**2.50**	**1.91**	**1.38**	**1.66**	**1.28**	0.94	**20.81**
Walnuts	0.64	1.80	**2.62**	**2.13**	**2.10**	**4.28**	**5.43**	**4.54**	**3.32**	**2.70**	1.38	0.95	**31.88**
Misc. Deciduous	0.64	1.80	**2.90**	**2.76**	**3.25**	**4.43**	**4.68**	**3.75**	**2.90**	**2.66**	1.40	0.95	**32.12**
Grain and Grain Hay	**1.19**	**1.93**	**3.39**	**5.05**	**2.74**	0.17	0.02	0.02	0.06	0.92	**1.19**	**1.43**	**18.11**
Safflower and Sunflower	0.84	**1.89**	**3.05**	**4.69**	**5.70**	**5.54**	**1.32**	0.02	0.06	0.19	1.16	0.93	**25.38**
Corn and Grain Sorghum	0.66	1.85	3.02	**1.90**	**1.18**	**4.65**	**6.24**	**4.40**	**0.63**	0.19	1.16	0.93	**26.80**
Misc. field crops	0.66	1.86	**2.78**	**2.56**	**3.89**	**5.21**	**5.34**	**1.91**	0.06	0.19	1.16	0.93	**26.55**
Alfalfa Hay and Clover	**1.41**	**1.92**	**3.41**	**5.16**	**4.61**	**5.03**	**4.95**	**4.44**	**3.22**	**1.69**	**1.41**	**1.88**	**39.12**
Pasture and Misc. Grasses	0.66	**1.93**	**3.34**	**4.27**	**4.92**	**5.12**	**5.40**	**4.43**	**3.28**	**3.15**	**1.51**	0.98	**38.98**
Small Vegetables	**0.67**	**1.91**	**3.30**	**3.21**	**3.14**	**5.55**	**2.19**	0.02	0.06	0.19	1.16	1.22	**22.62**
Tomatoes and Peppers	0.66	1.85	**2.90**	**3.25**	**5.11**	**5.80**	**5.82**	**1.64**	0.06	0.19	1.16	0.93	**29.37**
Potatoes, Sugar beets, Turnips etc.	0.69	1.85	2.68	**1.90**	**0.88**	**3.04**	**5.53**	**5.21**	**3.79**	**3.67**	**1.62**	1.63	**32.48**
Melons, Squash, and Cucumbers	0.66	1.85	**2.78**	**3.09**	**5.20**	**5.39**	**2.57**	0.02	0.06	0.19	1.16	0.93	**23.91**
Onions and Garlic	**1.04**	**1.92**	**3.30**	**4.44**	**4.64**	**2.07**	0.02	0.02	0.06	0.19	1.48	**1.21**	**20.39**
Flowers, Nursery and Christmas Tree	0.64	1.80	**2.90**	**2.76**	**3.25**	**4.43**	**4.68**	**3.75**	**2.90**	**2.66**	**1.40**	0.95	**32.12**
Citrus (no ground cover)	**1.27**	**1.86**	**3.32**	**3.96**	**3.12**	**3.50**	**3.42**	**2.66**	**2.15**	**2.13**	**1.34**	**1.81**	**30.54**
Immature Citrus	**1.03**	**1.87**	**3.13**	**2.61**	**1.43**	**1.64**	**1.83**	**1.36**	**0.94**	**1.02**	**1.28**	**1.42**	**19.57**
Avocado	**0.64**	**1.80**	**2.90**	**2.76**	**3.25**	**4.43**	**4.68**	**3.75**	**2.90**	**2.66**	**1.40**	**0.95**	**32.12**
Grape with 40% cover	0.64	1.79	**2.75**	**2.63**	**2.05**	**2.23**	**2.12**	**1.33**	**0.75**	0.20	1.10	0.94	**18.54**
Grape with cover crop	0.99	1.87	**3.18**	**3.13**	**2.54**	**2.75**	**2.67**	**2.01**	**1.45**	1.28	1.27	1.50	**24.64**
Grape with 60% cover	0.64	1.79	**2.75**	**3.10**	**3.09**	**3.33**	**3.20**	**1.98**	**1.02**	0.21	1.10	0.94	**23.15**
Idle	0.67	1.86	2.66	1.45	0.07	0.16	0.02	0.02	0.06	0.19	1.18	0.92	**9.26**

ETc Table 29. Zone 4 Dry Year

ETc Table for Irrigation Scheduling and Design

Zone 4 Monthly Evapotranspiration

Surface Irrigation Dry Year

IRRIGATION TRAINING AND RESEARCH CENTER, California Polytechnic State University, San Luis Obispo

Table does not include adjustments for bare spots and reduced vigor

	1999 (Dry Year)												
	January	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**	**October**	**November**	**December**	**Annual**
	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches	**inches**
Precipitation	2.65	4.24	2.31	1.37	0.13	0.17	0.05	0.00	0.00	0.00	0.02	0.22	**11.17**
Grass Reference ETo	1.52	1.83	2.96	4.41	5.21	5.77	6.29	5.72	3.98	3.55	1.66	2.02	**44.92**
Apple, Pear, Cherry, Plum and Prune	0.87	2.06	**2.66**	**2.44**	**2.47**	**4.39**	**5.42**	**5.03**	**3.06**	**2.71**	0.03	0.14	**31.30**
Apples, Plums, Cherries etc w/covercrop	1.50	2.13	**3.36**	**4.53**	**4.76**	**5.86**	**6.76**	**6.12**	**4.21**	**3.07**	0.98	1.03	**44.33**
Peach, Nectarine and Apricots	0.87	2.06	**2.66**	**2.48**	**3.03**	**4.97**	**5.19**	**4.87**	**3.29**	**2.84**	0.04	0.14	**32.45**
Immature Peaches, Nectarines, etc	0.88	2.08	**2.55**	**1.95**	**1.51**	**2.36**	**2.93**	**2.28**	**1.81**	**1.24**	0.02	0.14	**19.75**
Walnuts	0.87	2.06	2.44	**2.17**	**2.22**	**4.54**	**6.03**	**5.63**	**3.64**	**3.14**	**0.69**	0.15	**33.57**
Misc. Deciduous	0.87	2.07	**2.90**	**2.76**	**3.20**	**4.95**	**4.99**	**4.78**	**3.18**	**2.93**	**0.57**	0.14	**33.34**
Grain and Grain Hay	**1.44**	**2.18**	**3.44**	**4.93**	**2.60**	0.17	0.05	0.00	0.00	0.75	**0.16**	**0.79**	**16.51**
Corn and Grain Sorghum	0.90	2.12	2.96	**1.86**	**1.31**	**4.91**	**6.89**	**5.35**	**0.67**	0.01	0.02	0.14	**27.14**
Misc. field crops	0.90	2.17	**2.62**	**2.52**	**3.98**	**5.47**	**5.94**	**2.01**	0.00	0.01	0.02	0.14	**25.79**
Alfalfa Hay and Clover	**1.65**	**2.17**	**3.48**	**4.93**	**4.80**	**5.26**	**5.62**	**5.24**	**3.54**	**1.63**	**1.38**	**2.13**	**41.86**
Pasture and Misc. Grasses	0.90	**2.17**	**3.43**	**4.29**	**4.94**	**5.55**	**5.91**	**5.41**	**3.79**	**3.37**	**1.38**	0.15	**41.29**
Small Vegetables	**0.93**	**2.16**	**3.33**	**3.48**	**3.22**	**5.91**	**2.20**	0.00	0.00	0.01	0.02	1.17	**22.43**
Tomatoes and Peppers	0.90	2.12	**2.80**	**3.15**	**5.16**	**6.12**	**6.47**	**2.31**	0.00	0.01	0.02	0.14	**29.21**
Melons, Squash, and Cucumbers	0.90	2.15	**2.61**	**2.96**	**5.27**	**5.69**	**2.67**	0.00	0.00	0.01	0.02	0.14	**22.42**
Onions and Garlic	**1.29**	**2.18**	**3.32**	**4.39**	**4.63**	**1.85**	0.05	0.00	0.00	0.01	0.77	**0.76**	**19.24**
Citrus (no ground cover)	**1.49**	**2.13**	**3.36**	**4.05**	**3.43**	**3.55**	**3.82**	**3.33**	**2.33**	**2.26**	**0.96**	**1.44**	**32.15**
Immature Citrus	**1.36**	**2.13**	**3.18**	**2.68**	**1.51**	**2.05**	**1.81**	**1.44**	**1.17**	**1.21**	**0.56**	**0.73**	**19.82**
Avocado	**0.87**	**2.07**	**2.90**	**2.76**	**3.20**	**4.95**	**4.99**	**4.78**	**3.18**	**2.93**	**0.57**	**0.14**	**33.34**
Idle	0.91	2.14	2.44	1.41	0.13	0.16	0.05	0.00	0.00	0.01	0.02	0.14	**7.42**

ETc Table 30. Zone 6 Dry Year

ETc Table for Irrigation Scheduling and Design

Zone 6 Monthly Evapotranspiration

Surface Irrigation Dry Year

IRRIGATION TRAINING AND RESEARCH CENTER, California Polytechnic State University, San Luis Obispo

Table does not include adjustments for bare spots and reduced vigor

	1999 (Dry Year)												
	January	February	March	April	May	June	July	August	September	October	November	December	Annual
	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches
Precipitation	2.31	2.02	1.87	1.21	0.31	0.16	0.08	0.02	0.00	0.19	0.58	0.20	**8.93**
Grass Reference ETo	2.03	2.34	3.35	4.53	5.44	5.91	6.52	5.79	4.27	3.98	2.05	2.35	**48.56**
Apple, Pear, Cherry, Plum and Prune	0.94	1.89	**2.10**	**2.44**	**2.73**	**4.53**	**5.63**	**5.09**	**3.52**	**2.87**	0.67	0.21	**32.61**
Apples, Plums, Cherries etc w/covercrop	1.62	2.66	**3.56**	**4.89**	**5.06**	**6.15**	**7.18**	**6.29**	**4.48**	**3.56**	1.92	1.63	**49.01**
Peach, Nectarine and Apricots	0.94	1.89	**2.04**	**2.47**	**3.33**	**5.08**	**5.56**	**4.95**	**3.56**	**3.23**	0.54	0.21	**33.80**
Immature Peaches, Nectarines, etc	0.94	1.89	**1.87**	**1.92**	**1.72**	**2.77**	**2.77**	**2.46**	**1.69**	**1.81**	0.53	0.21	**20.58**
Almonds	0.94	1.89	**2.04**	**2.80**	**3.73**	**5.03**	**5.36**	**4.65**	**3.38**	**3.20**	**1.15**	0.22	**34.40**
Almonds w/covercrop	1.67	2.67	**3.51**	**4.59**	**4.79**	**5.91**	**6.53**	**5.68**	**4.07**	**3.46**	**1.66**	1.35	**45.88**
Immature Almonds	0.94	1.89	**1.87**	**2.08**	**1.91**	**2.62**	**2.77**	**2.39**	**1.88**	**1.66**	**0.99**	0.21	**21.22**
Walnuts	0.94	1.89	1.70	**2.17**	**2.40**	**4.85**	**6.31**	**5.68**	**4.16**	**3.42**	**1.27**	0.22	**35.00**
Misc. Deciduous	0.94	1.89	**2.33**	**2.73**	**3.69**	**5.03**	**5.33**	**4.67**	**3.40**	**3.39**	**1.33**	0.25	**34.98**
Grain and Grain Hay	**1.81**	**2.74**	**3.85**	**5.12**	**2.89**	**0.19**	0.08	0.02	0.00	0.85	**0.68**	**0.96**	**19.21**
Safflower and Sunflower	1.36	**2.16**	**2.54**	**4.66**	**6.07**	**6.02**	**1.42**	0.02	0.00	0.19	0.53	0.21	**25.17**
Corn and Grain Sorghum	0.95	1.90	2.72	**2.15**	**1.48**	**5.12**	**7.17**	**5.52**	**0.73**	0.19	0.53	0.21	**28.68**
Misc. field crops	0.95	2.34	**1.99**	**2.46**	**4.23**	**5.66**	**6.10**	**2.21**	0.00	0.19	0.53	0.21	**26.87**
Alfalfa Hay and Clover	**2.21**	**2.72**	**3.86**	**4.97**	**4.97**	**5.41**	**5.79**	**5.35**	**3.82**	**1.95**	**1.92**	**2.52**	**45.48**
Pasture and Misc. Grasses	0.95	**2.54**	**3.17**	**4.54**	**5.25**	**5.66**	**6.20**	**5.47**	**4.04**	**3.76**	**1.89**	0.27	**43.75**
Small Vegetables	**1.06**	**2.44**	**3.50**	**3.61**	**3.55**	**6.06**	**2.40**	0.02	0.00	0.19	0.53	1.20	**24.56**
Tomatoes and Peppers	0.95	1.90	**2.17**	**3.19**	**5.50**	**6.29**	**6.70**	**2.27**	0.00	0.19	0.53	0.21	**29.91**
Potatoes, Sugar beets, Turnips etc.	0.97	1.90	2.01	**2.10**	**1.24**	**3.39**	**6.37**	**6.47**	**4.76**	**4.46**	**2.28**	**2.19**	**38.12**
Melons, Squash, and Cucumbers	0.95	2.35	**1.99**	**3.30**	**5.48**	**5.94**	**2.78**	0.02	0.00	0.19	0.53	0.21	**23.74**
Onions and Garlic	**1.56**	**2.63**	**3.49**	**4.60**	**4.70**	**1.43**	0.08	0.02	0.00	0.19	1.16	**0.63**	**20.49**
Citrus (no ground cover)	**1.74**	**2.75**	**3.71**	**4.39**	**3.53**	**3.66**	**4.05**	**3.37**	**2.65**	**2.33**	**1.81**	**1.84**	**35.82**
Immature Citrus	**1.42**	**2.42**	**2.67**	**2.72**	**2.00**	**1.82**	**1.87**	**1.69**	**1.41**	**1.21**	**1.09**	**1.15**	**21.47**
Avocado	**0.94**	**1.89**	**2.33**	**2.73**	**3.69**	**5.03**	**5.33**	**4.67**	**3.40**	**3.39**	**1.33**	**0.25**	**34.98**
Grape with 40% cover	0.93	1.89	**2.03**	**2.70**	**2.51**	**2.57**	**2.58**	**1.74**	**0.86**	0.21	0.52	0.21	**18.75**
Grape with cover crop	1.35	2.48	**2.91**	**3.30**	**2.90**	**2.99**	**3.11**	**2.51**	**1.71**	1.51	1.10	0.82	**26.67**
Grape with 60% cover	0.93	1.89	**2.03**	**3.13**	**3.52**	**3.70**	**3.76**	**2.49**	**1.19**	0.22	0.52	0.21	**23.59**
Idle	0.95	1.91	1.70	1.40	0.33	0.18	0.08	0.02	0.00	0.19	0.53	0.21	**7.49**

ETc Table 31. Zone 8 Dry Year

ETc Table for Irrigation Scheduling and Design

Zone 8 Monthly Evapotranspiration

Surface Irrigation Dry Year

IRRIGATION TRAINING AND RESEARCH CENTER, California Polytechnic State University, San Luis Obispo

Table does not include adjustments for bare spots and reduced vigor

	1999 (Dry Year)												
	January	February	March	April	May	June	July	August	September	October	November	December	Annual
	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches
Precipitation	3.50	7.21	2.22	1.67	0.20	0.08	0.00	0.01	0.03	0.53	3.46	0.56	**19.47**
Grass Reference ETo	0.88	1.16	2.60	4.91	6.12	6.58	6.97	5.73	4.39	3.35	1.14	1.50	**45.34**
Apple, Pear, Cherry, Plum and Prune	0.73	1.33	**2.57**	**2.48**	**3.15**	**5.52**	**6.38**	**5.49**	**4.12**	**2.85**	1.04	1.17	**36.84**
Apples, Plums, Cherries etc w/covercrop	0.99	1.34	**3.02**	**4.91**	**5.77**	**7.17**	**8.05**	**6.55**	**4.99**	**3.44**	1.23	1.75	**49.23**
Peach, Nectarine and Apricots	0.73	1.33	**2.57**	**2.54**	**3.91**	**6.26**	**6.53**	**5.27**	**4.11**	**3.01**	1.06	1.17	**38.50**
Immature Peaches, Nectarines, etc	0.73	1.34	**2.48**	**1.96**	**2.13**	**3.38**	**3.38**	**2.94**	**2.26**	**1.79**	0.99	1.17	**24.56**
Almonds	0.73	1.33	**2.57**	**3.00**	**4.58**	**6.19**	**6.36**	**5.16**	**4.06**	**3.00**	**1.19**	1.17	**39.34**
Almonds w/covercrop	0.96	1.34	**3.00**	**4.61**	**5.78**	**6.91**	**7.53**	**6.10**	**4.60**	**3.26**	**1.24**	1.69	**47.01**
Immature Almonds	0.73	1.34	**2.48**	**2.21**	**2.53**	**3.43**	**3.37**	**3.09**	**2.22**	**1.77**	**1.13**	1.17	**25.46**
Walnuts	0.73	1.33	2.37	**2.16**	**2.76**	**5.52**	**7.27**	**6.02**	**4.58**	**3.14**	**1.19**	1.17	**38.26**
Misc. Deciduous	0.73	1.34	**2.70**	**2.93**	**4.31**	**6.05**	**6.24**	**5.10**	**3.97**	**3.10**	**1.24**	1.17	**38.87**
Grain and Grain Hay	**0.93**	**1.38**	**3.07**	**5.59**	**3.26**	0.09	0.00	0.01	0.03	1.07	**1.00**	**1.47**	**17.89**
Safflower and Sunflower	0.79	**1.37**	**2.79**	**5.20**	**7.05**	**6.44**	**1.21**	0.01	0.03	0.34	0.98	1.18	**27.37**
Corn and Grain Sorghum	0.74	1.37	2.52	**1.86**	**1.56**	**5.98**	**8.13**	**5.59**	**0.61**	0.34	0.98	1.18	**30.85**
Misc. field crops	0.74	1.37	**2.54**	**2.66**	**5.02**	**6.59**	**6.73**	**2.09**	0.03	0.34	0.98	1.18	**30.26**
Alfalfa Hay and Clover	**1.00**	**1.38**	**3.08**	**5.64**	**5.56**	**6.06**	**6.17**	**5.56**	**4.03**	**1.75**	**1.19**	**1.71**	**43.14**
Pasture and Misc. Grasses	0.74	**1.38**	**3.00**	**4.74**	**6.14**	**6.62**	**6.88**	**5.76**	**4.38**	**3.34**	**1.30**	1.18	**45.47**
Small Vegetables	**0.74**	**1.38**	**3.01**	**3.35**	**4.05**	**6.82**	**2.70**	0.01	0.03	0.34	0.98	1.18	**24.58**
Tomatoes and Peppers	0.74	1.37	**2.65**	**3.47**	**6.40**	**7.25**	**7.42**	**2.35**	0.03	0.34	0.98	1.18	**34.18**
Potatoes, Sugar beets, Turnips etc.	0.77	1.37	2.59	**1.86**	**1.24**	**3.83**	**6.86**	**6.62**	**5.08**	**3.90**	**1.38**	**1.59**	**37.09**
Melons, Squash, and Cucumbers	0.74	1.37	**2.53**	**3.33**	**6.35**	**6.82**	**3.31**	0.01	0.03	0.34	0.98	1.18	**26.99**
Onions and Garlic	**0.88**	**1.38**	**2.99**	**4.95**	**5.57**	**1.48**	0.00	0.01	0.03	0.34	1.28	**1.36**	**20.26**
Citrus (no ground cover)	**0.98**	**1.34**	**3.01**	**4.50**	**4.51**	**4.87**	**4.90**	**4.08**	**3.24**	**2.46**	**1.23**	**1.74**	**36.87**
Immature Citrus	**0.86**	**1.35**	**2.85**	**2.92**	**2.40**	**2.68**	**2.67**	**2.35**	**1.50**	**1.70**	**1.10**	**1.47**	**23.84**
Avocado	**0.73**	**1.34**	**2.70**	**2.93**	**4.31**	**6.05**	**6.24**	**5.10**	**3.97**	**3.10**	**1.24**	**1.17**	**38.87**
Grape with 40% cover	0.73	1.34	**2.55**	**2.74**	**2.58**	**2.69**	**2.60**	**1.67**	**0.89**	0.36	0.94	1.17	**20.26**
Grape with cover crop	0.88	1.35	**2.86**	**3.42**	**3.42**	**3.48**	**3.63**	**2.57**	**1.81**	1.40	1.09	1.50	**27.42**
Grape with 60% cover	0.73	1.34	**2.55**	**3.26**	**3.78**	**3.97**	**3.93**	**2.41**	**1.23**	0.36	0.94	1.17	**25.67**
Idle	0.75	1.39	2.39	1.38	0.20	0.09	0.00	0.01	0.03	0.34	0.99	1.18	**8.74**

ETc Table 32. Zone 9 Dry Year

ETc Table for Irrigation Scheduling and Design

Zone 9 Monthly Evapotranspiration

Surface Irrigation Dry Year

IRRIGATION TRAINING AND RESEARCH CENTER, California Polytechnic State University, San Luis Obispo

Table does not include adjustments for bare spots and reduced vigor

	1999 (Dry Year)												
	January	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**	**October**	**November**	**December**	**Annual**
	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches	**inches**
Precipitation	2.25	1.55	1.91	2.54	0.26	0.53	0.00	0.00	0.00	0.00	0.00	0.00	**9.04**
Grass Reference ETo	2.30	2.49	2.90	3.60	4.69	5.61	6.83	6.85	4.81	5.07	2.83	3.20	**51.19**
Apple, Pear, Cherry, Plum and Prune	0.67	1.66	**2.09**	**2.96**	**2.36**	**4.76**	**5.91**	**5.80**	**4.10**	**3.44**	0.00	0.00	**33.74**
Apples, Plums, Cherries etc w/covercrop	0.95	2.31	**2.71**	**4.33**	**4.45**	**6.18**	**7.44**	**7.41**	**5.10**	**4.29**	2.03	1.66	**48.86**
Peach, Nectarine and Apricots	0.67	1.66	**2.09**	**2.99**	**3.01**	**5.02**	**5.82**	**5.72**	**4.07**	**3.84**	0.00	0.00	**34.88**
Immature Peaches, Nectarines, etc	0.67	1.65	**1.95**	**2.64**	**1.59**	**2.82**	**2.94**	**2.92**	**1.90**	**2.04**	0.00	0.00	**21.13**
Walnuts	0.67	1.66	1.81	**2.82**	**2.17**	**4.89**	**6.56**	**6.72**	**4.68**	**4.12**	**1.16**	0.00	**37.26**
Misc. Deciduous	0.67	1.66	**2.55**	**3.21**	**3.24**	**4.85**	**5.50**	**5.73**	**3.81**	**4.16**	**1.19**	0.00	**36.57**
Grain and Grain Hay	**2.04**	**2.89**	**3.39**	**4.13**	**2.77**	0.55	0.00	0.00	0.00	0.77	**0.19**	**1.09**	**17.83**
Safflower and Sunflower	1.28	**1.94**	**2.40**	**3.96**	**5.18**	**5.34**	**1.41**	0.00	0.00	0.00	0.00	0.00	**21.52**
Corn and Grain Sorghum	0.66	1.64	2.76	**2.61**	**1.41**	**5.14**	**7.51**	**6.27**	**0.64**	0.00	0.00	0.00	**28.64**
Misc. field crops	0.66	2.12	**2.04**	**2.94**	**3.65**	**5.47**	**6.30**	**2.46**	0.00	0.00	0.00	0.00	**25.65**
Alfalfa Hay and Clover	**2.40**	**2.81**	**3.36**	**4.20**	**4.48**	**5.55**	**6.21**	**6.33**	**4.28**	**2.11**	**2.50**	**3.24**	**47.47**
Pasture and Misc. Grasses	0.67	**2.29**	**2.89**	**3.94**	**4.61**	**5.47**	**6.46**	**6.50**	**4.52**	**4.82**	**2.26**	0.01	**44.45**
Small Vegetables	**0.94**	**2.37**	**3.03**	**3.43**	**2.87**	**5.83**	**2.19**	0.00	0.00	0.00	0.00	1.19	**21.86**
Tomatoes and Peppers	0.66	1.64	**2.22**	**3.27**	**4.72**	**6.03**	**6.97**	**2.29**	0.00	0.00	0.00	0.00	**27.81**
Potatoes, Sugar beets, Turnips etc.	0.70	1.64	2.10	**2.62**	**1.12**	**3.59**	**6.65**	**7.66**	**5.38**	**5.71**	**3.15**	**2.78**	**43.12**
Melons, Squash, and Cucumbers	0.66	2.15	**2.04**	**3.16**	**4.69**	**5.66**	**2.75**	0.00	0.00	0.00	0.00	0.00	**21.12**
Onions and Garlic	**1.60**	**2.69**	**3.10**	**3.88**	**4.22**	**2.11**	0.00	0.00	0.00	0.00	0.77	**0.94**	**19.31**
Citrus (no ground cover)	**1.92**	**2.86**	**3.04**	**4.03**	**3.27**	**3.75**	**4.06**	**4.20**	**2.82**	**3.09**	**1.60**	**2.28**	**36.93**
Immature Citrus	**1.58**	**2.24**	**2.60**	**3.14**	**1.64**	**2.14**	**1.96**	**2.06**	**1.48**	**1.46**	**0.76**	**1.22**	**22.28**
Avocado	**0.67**	**1.66**	**2.55**	**3.21**	**3.24**	**4.85**	**5.50**	**5.73**	**3.81**	**4.16**	**1.19**	**0.00**	**36.57**
Idle	0.66	1.64	1.82	2.29	0.35	0.53	0.00	0.00	0.00	0.00	0.00	0.00	**7.29**

ETc Table 33. Zone 10 Dry Year

ETc Table for Irrigation Scheduling and Design

Zone 10 Monthly Evapotranspiration

Surface Irrigation Dry Year

IRRIGATION TRAINING AND RESEARCH CENTER, California Polytechnic State University, San Luis Obispo

Table does not include adjustments for bare spots and reduced vigor

	1999 (Dry Year)												
	January	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**	**October**	**November**	**December**	**Annual**
	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches	**inches**
Precipitation	1.84	1.82	3.34	1.45	0.32	0.02	0.00	0.04	0.02	0.00	0.92	0.09	**9.86**
Grass Reference ETo	1.78	2.16	3.19	4.62	5.65	6.14	6.56	5.75	4.19	3.94	2.06	2.21	**48.25**
Apple, Pear, Cherry, Plum and Prune	0.79	1.67	**2.22**	**3.24**	**4.91**	**5.88**	**6.09**	**5.26**	**3.72**	**2.18**	0.81	0.18	**36.95**
Apples, Plums, Cherries etc w/covercrop	1.72	2.58	**3.59**	**4.81**	**6.20**	**6.88**	**7.47**	**6.50**	**4.61**	**3.35**	1.92	1.60	**51.22**
Peach, Nectarine and Apricots	0.79	1.67	**2.19**	**3.08**	**4.73**	**5.76**	**6.15**	**5.33**	**3.73**	**1.92**	0.81	0.18	**36.33**
Immature Peaches, Nectarines, etc	0.79	1.67	**2.12**	**2.24**	**2.95**	**3.39**	**3.76**	**3.18**	**2.23**	**1.13**	0.81	0.18	**24.46**
Almonds	0.79	1.67	**2.39**	**3.66**	**4.87**	**5.70**	**5.82**	**5.02**	**3.56**	**1.89**	0.81	0.18	**36.36**
Almonds w/covercrop	1.44	2.46	**3.50**	**4.90**	**5.87**	**6.29**	**6.91**	**6.02**	**3.80**	**3.07**	1.79	1.27	**47.33**
Immature Almonds	0.79	1.67	**2.28**	**2.61**	**3.67**	**3.92**	**4.21**	**3.65**	**2.57**	**1.53**	0.81	0.18	**27.89**
Walnuts	0.79	1.67	**2.27**	**2.71**	**4.64**	**6.65**	**7.02**	**6.13**	**4.14**	**2.43**	**0.85**	0.18	**39.49**
Pistachio	0.79	1.67	2.03	**2.15**	**2.22**	**4.44**	**6.85**	**6.03**	**3.89**	**2.57**	**0.96**	0.18	**33.80**
Pistachio w/ covercrop	1.53	2.52	3.26	**4.16**	**4.33**	**5.98**	**7.37**	**6.39**	**4.60**	**3.60**	**2.03**	1.45	**47.23**
Immature Pistachio	0.79	1.67	2.04	**1.77**	**1.30**	**3.05**	**4.47**	**4.19**	**2.70**	**1.58**	**1.00**	0.19	**24.75**
Misc. Deciduous	0.79	1.67	**2.22**	**3.17**	**4.74**	**5.56**	**5.74**	**5.12**	**3.56**	**2.08**	0.81	0.18	**35.63**
Grain and Grain Hay	**1.02**	**2.48**	**3.69**	**5.16**	**3.15**	0.03	0.00	0.04	0.02	0.00	1.30	**0.46**	**17.35**
Rice	0.80	1.68	2.07	1.77	**5.63**	**7.37**	**8.01**	**6.98**	**2.26**	0.00	0.81	0.18	**37.56**
Cotton	0.80	1.68	2.06	2.02	**1.20**	**3.54**	**6.92**	**6.26**	**4.13**	**1.36**	0.80	0.18	**30.96**
Safflower and Sunflower	1.24	**1.92**	**2.57**	**4.84**	**6.47**	**6.27**	**0.94**	0.04	0.02	0.00	0.81	0.18	**25.31**
Corn and Grain Sorghum	0.80	1.68	3.09	**1.81**	**2.24**	**5.33**	**6.76**	**4.32**	**0.33**	0.00	0.81	0.18	**27.35**
Misc. field crops	0.80	1.68	3.09	**1.81**	**2.16**	**5.83**	**6.18**	**2.28**	0.02	0.00	0.81	0.18	**24.83**
Alfalfa Hay and Clover	**1.86**	**2.48**	**3.66**	**5.23**	**5.26**	**5.63**	**5.91**	**5.45**	**3.81**	**1.75**	**1.95**	**2.29**	**45.28**
Pasture and Misc. Grasses	0.80	**2.19**	**2.99**	**4.27**	**5.61**	**6.09**	**6.49**	**5.65**	**4.12**	**3.08**	**1.30**	0.19	**42.78**
Small Vegetables	**1.81**	**2.10**	**3.20**	**4.94**	**1.87**	0.02	0.00	1.02	1.15	**0.78**	**1.87**	**2.26**	**21.03**
Tomatoes and Peppers	0.80	1.68	2.35	**1.89**	**3.03**	**6.35**	**5.78**	**0.49**	0.02	0.00	0.81	0.18	**23.37**
Potatoes, Sugar beets, Turnips etc.	1.50	**1.93**	**2.73**	**5.07**	**6.31**	**6.77**	**6.12**	0.11	0.02	0.00	0.81	0.18	**31.55**
Melons, Squash, and Cucumbers	0.80	1.68	2.06	1.38	1.08	**0.79**	**4.00**	**4.69**	1.13	0.00	0.81	0.18	**18.59**
Onions and Garlic	**1.02**	**2.38**	**3.42**	**4.44**	**4.13**	**0.98**	0.00	0.04	0.02	0.00	1.55	**0.52**	**18.50**
Citrus (no ground cover)	**1.70**	**2.57**	**3.39**	**4.36**	**4.24**	**4.27**	**4.38**	**4.01**	**2.79**	**2.87**	**2.05**	**1.85**	**38.48**
Immature Citrus	**1.16**	**2.16**	**2.72**	**2.89**	**2.73**	**2.62**	**2.59**	**2.29**	**1.91**	**1.54**	**1.42**	**1.34**	**25.36**
Avocado	**0.79**	**1.67**	**2.22**	**3.17**	**4.74**	**5.56**	**5.74**	**5.12**	**3.56**	**2.08**	**0.81**	**0.18**	**35.63**
Idle	0.80	1.68	2.07	1.38	0.34	0.02	0.00	0.04	0.02	0.00	0.81	0.18	**7.34**

ETc Table 34. Zone 12 Dry Year

ETc Table for Irrigation Scheduling and Design

Zone 12 Monthly Evapotranspiration

Surface Irrigation Dry Year

IRRIGATION TRAINING AND RESEARCH CENTER, California Polytechnic State University, San Luis Obispo

Table does not include adjustments for bare spots and reduced vigor

	1999 (Dry Year)												
	January	February	March	April	May	June	July	August	September	October	November	December	Annual
	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches
Precipitation	2.37	3.87	1.46	1.15	0.11	0.20	0.00	0.02	0.23	0.15	1.79	0.17	**11.51**
Grass Reference ETo	0.77	1.24	2.78	5.34	7.14	7.23	7.73	6.38	5.23	3.62	1.26	1.36	**50.07**
Apple, Pear, Cherry, Plum and Prune	0.69	1.43	**2.09**	**3.55**	**6.19**	**6.80**	**7.38**	**5.93**	**4.78**	**2.08**	0.94	0.82	**42.69**
Apples, Plums, Cherries etc w/covercrop	0.87	1.43	**3.30**	**5.50**	**7.69**	**8.30**	**8.87**	**7.21**	**5.77**	**3.33**	1.23	1.48	**54.97**
Peach, Nectarine and Apricots	0.69	1.43	**2.09**	**3.34**	**6.03**	**6.79**	**7.16**	**6.00**	**4.79**	**2.14**	0.94	0.82	**42.23**
Immature Peaches, Nectarines, etc	0.70	1.44	**1.96**	**2.30**	**3.72**	**4.05**	**4.47**	**3.64**	**2.97**	**1.22**	0.95	0.82	**28.24**
Almonds	0.69	**1.43**	**2.29**	**4.11**	**6.26**	**6.44**	**7.05**	**5.63**	**4.69**	**2.68**	0.97	0.82	**43.05**
Almonds w/covercrop	0.86	**1.43**	**3.22**	**5.58**	**7.52**	**7.54**	**8.06**	**6.70**	**5.33**	**3.02**	1.17	1.43	**51.86**
Immature Almonds	0.70	**1.44**	**2.12**	**2.99**	**4.66**	**4.70**	**4.98**	**4.14**	**3.39**	**1.79**	1.02	0.82	**32.75**
Walnuts	0.69	1.42	**2.18**	**2.89**	**5.81**	**7.97**	**8.38**	**6.87**	**5.16**	**2.47**	1.00	0.82	**45.66**
Pistachio	0.69	1.43	1.84	**2.17**	**2.53**	**5.68**	**7.92**	**6.71**	**5.22**	**2.39**	1.00	0.82	**38.41**
Pistachio w/ covercrop	0.86	1.43	3.21	**4.56**	**5.27**	**7.33**	**8.69**	**7.27**	**5.83**	**3.51**	1.26	1.51	**50.72**
Immature Pistachio	0.70	1.44	1.83	**1.71**	**1.44**	**3.81**	**5.50**	**4.48**	**3.64**	**1.41**	0.97	0.82	**27.75**
Misc. Deciduous	0.69	1.43	**2.09**	**3.46**	**5.87**	**6.51**	**6.90**	**5.78**	**4.50**	**2.25**	0.94	0.82	**41.25**
Grain and Grain Hay	**0.76**	**1.48**	**3.24**	**5.94**	**3.51**	0.21	0.00	0.02	0.23	0.11	0.98	**0.92**	**17.39**
Rice	0.72	1.48	1.82	1.81	**7.23**	**8.74**	**9.44**	**7.75**	**2.64**	0.11	0.98	0.81	**43.51**
Cotton	0.71	1.48	1.81	1.94	**1.47**	**4.52**	**8.20**	**6.88**	**5.19**	**1.32**	0.98	0.80	**35.30**
Safflower and Sunflower	0.77	**1.48**	**2.49**	**5.65**	**8.18**	**7.68**	**1.48**	0.02	0.23	0.11	0.98	0.81	**29.87**
Corn and Grain Sorghum	0.71	1.48	2.43	**2.01**	**2.55**	**6.69**	**7.84**	**4.80**	0.62	0.11	0.98	0.80	**31.01**
Misc. field crops	0.71	1.48	2.43	**2.01**	**2.61**	**6.82**	**7.43**	**2.57**	0.24	0.11	0.98	0.80	**28.19**
Alfalfa Hay and Clover	**0.88**	**1.47**	**3.22**	**6.12**	**6.56**	**6.75**	**6.86**	**6.03**	**4.79**	**1.68**	**1.24**	**1.53**	**47.14**
Pasture and Misc. Grasses	0.72	**1.48**	**2.91**	**5.07**	**7.05**	**7.18**	**7.59**	**6.32**	**5.19**	**2.77**	**1.19**	0.81	**48.28**
Small Vegetables	**0.86**	**1.48**	**2.98**	**5.82**	**1.84**	0.20	0.00	1.03	**1.50**	**0.72**	**1.18**	**1.47**	**19.07**
Tomatoes and Peppers	0.71	1.48	2.37	**1.87**	**3.95**	**7.65**	**6.72**	**0.43**	0.24	0.11	0.98	0.80	**27.31**
Potatoes, Sugar beets, Turnips etc.	0.85	**1.48**	**2.66**	**5.90**	**7.99**	**8.00**	**7.24**	**0.09**	0.24	0.11	0.98	0.80	**36.34**
Melons, Squash, and Cucumbers	0.71	1.48	1.81	1.25	0.89	**1.41**	**4.70**	**5.27**	**1.63**	0.11	0.98	0.80	**21.04**
Onions and Garlic	**0.77**	**1.48**	**3.05**	**5.00**	**4.98**	**0.85**	0.00	0.02	0.24	0.11	1.39	**0.99**	**18.87**
Citrus (no ground cover)	**0.87**	**1.43**	**3.26**	**4.78**	**5.08**	**5.16**	**5.33**	**4.46**	**3.75**	**2.52**	**1.25**	**1.54**	**39.42**
Immature Citrus	**0.79**	**1.44**	**2.67**	**3.29**	**2.96**	**3.19**	**3.37**	**2.72**	**2.25**	**1.61**	**1.13**	**1.23**	**26.63**
Avocado	**0.69**	**1.43**	**2.09**	**3.46**	**5.87**	**6.51**	**6.90**	**5.78**	**4.50**	**2.25**	**0.94**	**0.82**	**41.25**
Grape Vines with 80% canopy	0.70	1.44	**1.92**	**2.17**	**3.45**	**5.68**	**5.84**	**4.59**	**2.96**	0.11	0.95	0.82	**30.64**
Grape Vines with cover crop (80% canopy)	0.84	1.44	**3.06**	**4.04**	**5.19**	**6.38**	**7.02**	**5.27**	**3.47**	1.56	1.05	1.28	**40.60**
Immature Grapes Vines with 50% canopy	0.70	1.45	**1.89**	**1.85**	**2.23**	**4.07**	**4.39**	**3.21**	**2.00**	0.19	0.96	0.81	**23.74**
Idle	0.72	1.49	1.81	1.25	0.11	0.20	0.00	0.02	0.23	0.11	0.99	0.80	**7.73**

ETc Table 35. Zone 13 Dry Year

ETc Table for Irrigation Scheduling and Design

Zone 13 Monthly Evapotranspiration

Surface Irrigation Dry Year

IRRIGATION TRAINING AND RESEARCH CENTER, California Polytechnic State University, San Luis Obispo

Table does not include adjustments for bare spots and reduced vigor

	1999 (Dry Year)												
	January	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**	**October**	**November**	**December**	**Annual**
	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches	**inches**
Precipitation	4.67	7.74	1.95	1.59	0.75	0.35	0.00	0.19	0.00	1.64	2.86	0.45	**22.19**
Grass Reference ETo	1.21	1.46	3.09	4.70	6.81	7.64	9.00	7.17	5.97	4.10	1.80	1.28	**54.24**
Apple, Pear, Cherry, Plum and Prune	0.69	1.72	**2.13**	**2.38**	**3.90**	**6.62**	**8.65**	**6.78**	**5.43**	**3.76**	1.78	0.95	**44.80**
Apples, Plums, Cherries etc w/covercrop	1.37	1.75	**3.58**	**4.77**	**6.90**	**8.84**	**10.58**	**8.38**	**6.94**	**4.23**	2.20	1.53	**61.06**
Almonds	0.69	1.72	**2.13**	**2.32**	**3.49**	**5.99**	**8.08**	**6.56**	**5.41**	**3.69**	2.04	0.95	**43.07**
Almonds w/covercrop	1.25	1.75	**3.29**	**4.10**	**5.93**	**7.53**	**9.64**	**7.73**	**6.35**	**4.08**	2.13	1.46	**55.24**
Immature Almonds	0.69	1.72	**2.04**	**2.07**	**2.51**	**4.56**	**5.68**	**4.70**	**4.01**	**2.68**	1.90	0.95	**33.50**
Walnuts	0.69	1.72	**2.04**	**2.45**	**3.51**	**6.00**	**9.65**	**7.82**	**6.19**	**3.85**	2.06	0.95	**46.92**
Pistachio	0.69	1.72	1.87	**2.37**	**2.84**	**5.51**	**9.24**	**7.81**	**6.31**	**3.95**	2.06	0.95	**45.31**
Pistachio w/ covercrop	1.25	1.75	3.29	**4.15**	**5.53**	**7.45**	**10.29**	**8.46**	**7.07**	**4.62**	2.21	1.48	**57.55**
Immature Pistachio	0.69	1.72	1.87	**1.99**	**1.80**	**3.94**	**6.14**	**5.27**	**4.23**	**2.87**	1.88	0.95	**33.34**
Misc. Deciduous	0.69	1.72	**1.87**	**2.18**	**2.61**	**5.31**	**8.37**	**6.80**	**5.59**	**3.75**	1.83	0.95	**41.67**
Grain and Grain Hay	**0.85**	**1.75**	**3.61**	**5.28**	**3.60**	0.37	0.00	0.19	0.00	0.68	1.61	**1.06**	**18.99**
Rice	0.68	1.72	1.86	2.01	**7.54**	**9.35**	**11.14**	**8.86**	**2.66**	0.68	1.61	0.95	**49.08**
Cotton	0.68	1.72	2.42	1.85	**2.20**	**6.60**	**9.61**	**7.27**	**1.67**	**0.68**	1.61	0.95	**37.27**
Corn and Grain Sorghum	0.68	1.72	1.91	**2.06**	**3.36**	**7.69**	**9.72**	**6.88**	**0.92**	0.67	1.61	0.95	**38.18**
Misc. field crops	0.68	1.72	1.91	**2.06**	**3.23**	**7.38**	**8.78**	**2.85**	0.00	0.68	1.61	0.95	**31.87**
Alfalfa Hay and Clover	**1.34**	**1.75**	**3.51**	**5.39**	**6.66**	**7.32**	**8.08**	**6.95**	**5.38**	**2.29**	**2.03**	**1.47**	**52.16**
Pasture and Misc. Grasses	0.68	**1.73**	**2.93**	**4.52**	**6.99**	**7.73**	**9.01**	**7.25**	**5.88**	**3.64**	**1.96**	0.95	**53.29**
Small Vegetables	**1.10**	**1.74**	**3.26**	**1.80**	**0.70**	0.35	0.00	1.15	**1.46**	**1.69**	**1.97**	**1.40**	**16.61**
Tomatoes and Peppers	0.68	1.72	2.14	**2.17**	**4.52**	**8.18**	**8.21**	**0.73**	0.00	0.68	1.61	0.95	**31.60**
Misc Subtropical	0.69	1.72	**1.87**	**2.18**	**2.61**	**5.31**	**8.37**	**6.80**	**5.59**	**3.75**	1.83	0.95	**41.67**
Grape Vines with 80% canopy	0.69	1.72	**2.13**	**2.56**	**4.52**	**5.99**	**6.58**	**5.10**	**2.97**	0.68	1.62	0.95	**35.52**
Grape Vines with cover crop (80% canopy)	1.15	1.75	**3.07**	**3.88**	**5.44**	**6.84**	**7.69**	**6.07**	**3.63**	2.01	1.90	1.34	**44.77**
Immature Grapes Vines with 50% canopy	0.69	1.72	**2.04**	**2.20**	**3.22**	**4.74**	**4.96**	**3.83**	**2.06**	0.72	1.62	0.95	**28.74**
Idle	0.68	1.72	1.85	1.60	0.70	0.35	0.00	0.19	0.00	0.68	1.61	0.95	**10.34**

ETc Table 36. Zone 14 Dry Year

ETc Table for Irrigation Scheduling and Design

Zone 14 Monthly Evapotranspiration

Surface Irrigation Dry Year

IRRIGATION TRAINING AND RESEARCH CENTER, California Polytechnic State University, San Luis Obispo

Table does not include adjustments for bare spots and reduced vigor

	1999 (Dry Year)												
	January	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**	**October**	**November**	**December**	**Annual**
	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches	**inches**
Precipitation	2.56	4.69	1.34	1.01	0.10	0.26	0.13	0.05	0.04	0.47	2.14	0.24	**13.03**
Grass Reference ETo	0.83	1.35	2.97	5.67	7.31	7.59	8.18	6.78	5.61	4.14	1.45	1.67	**53.55**
Apple, Pear, Cherry, Plum and Prune	0.76	1.58	**2.21**	**3.57**	**6.57**	**7.38**	**8.01**	**6.54**	**5.10**	**2.90**	1.12	0.84	**46.58**
Apples, Plums, Cherries etc w/covercrop	0.97	1.59	**3.57**	**5.74**	**8.00**	**9.01**	**9.73**	**7.92**	**6.24**	**3.87**	1.47	1.81	**59.93**
Peach, Nectarine and Apricots	0.76	1.58	**2.22**	**3.34**	**6.36**	**7.44**	**7.90**	**6.53**	**5.14**	**2.66**	1.13	0.84	**45.90**
Immature Peaches, Nectarines, etc	0.76	1.59	**2.07**	**2.23**	**3.92**	**4.73**	**5.02**	**3.99**	**3.09**	**1.76**	1.12	0.84	**31.11**
Almonds	0.76	1.58	**2.37**	**4.09**	**6.58**	**7.07**	**7.60**	**6.32**	**4.88**	**2.75**	1.12	0.84	**45.96**
Almonds w/covercrop	0.94	1.59	**3.46**	**5.85**	**7.75**	**8.26**	**8.84**	**7.30**	**5.49**	**3.32**	1.45	1.74	**55.99**
Immature Almonds	0.76	1.59	**2.21**	**2.98**	**4.79**	**5.29**	**5.75**	**4.44**	**3.52**	**1.84**	1.12	0.84	**35.12**
Walnuts	0.76	1.58	**2.31**	**2.84**	**6.06**	**8.59**	**9.16**	**7.60**	**5.52**	**3.04**	1.23	0.84	**49.52**
Pistachio	0.76	1.58	1.92	**2.06**	**2.58**	**6.16**	**8.77**	**7.14**	**5.52**	**3.04**	1.23	0.84	**41.61**
Pistachio w/ covercrop	0.94	1.59	3.45	**4.69**	**5.54**	**7.81**	**9.42**	**7.87**	**6.40**	**4.11**	1.56	1.83	**55.22**
Immature Pistachio	0.76	1.59	1.91	**1.57**	**1.48**	**4.15**	**6.19**	**4.95**	**3.70**	**2.15**	1.19	0.84	**30.47**
Misc. Deciduous	0.76	1.58	**2.21**	**3.47**	**6.23**	**7.07**	**7.73**	**6.26**	**4.99**	**2.71**	1.12	0.84	**44.97**
Grain and Grain Hay	**0.81**	**1.61**	**3.46**	**6.36**	**4.04**	0.28	0.15	0.05	0.04	0.35	1.15	**0.97**	**19.26**
Rice	0.76	1.60	1.90	1.67	**7.41**	**9.28**	**10.13**	**8.34**	**2.38**	0.35	1.15	0.83	**45.79**
Cotton	0.76	1.60	1.90	1.83	**1.58**	**4.92**	**8.73**	**7.41**	**5.66**	**2.11**	1.15	0.83	**38.47**
Safflower and Sunflower	0.82	**1.61**	**2.69**	**5.93**	**8.43**	**7.57**	**1.21**	0.05	0.04	0.35	1.15	0.83	**30.67**
Corn and Grain Sorghum	0.76	1.60	2.36	**1.93**	**2.70**	**7.10**	**8.47**	**5.15**	**0.36**	0.35	1.15	0.83	**32.74**
Misc. field crops	0.76	1.60	**2.36**	**1.93**	**2.64**	**7.32**	**8.07**	**2.28**	0.04	0.35	1.15	0.83	**29.32**
Alfalfa Hay and Clover	**0.96**	**1.61**	**3.41**	**6.40**	**6.70**	**7.11**	**7.41**	**6.43**	**5.18**	**1.99**	**1.48**	**1.87**	**50.55**
Pasture and Misc. Grasses	0.76	**1.60**	**3.08**	**5.33**	**7.24**	**7.69**	**8.20**	**6.74**	**5.53**	**3.62**	**1.46**	0.83	**52.09**
Small Vegetables	**0.93**	**1.61**	**3.22**	**6.23**	**1.74**	0.27	0.15	1.07	**1.60**	**1.24**	**1.41**	**1.77**	**21.24**
Tomatoes and Peppers	0.76	1.60	2.47	**1.71**	**4.08**	**8.21**	**7.04**	**0.51**	0.04	0.35	1.15	0.83	**28.75**
Potatoes, Sugar beets, Turnips etc.	0.90	**1.61**	**2.88**	**6.27**	**8.14**	**8.54**	**8.17**	**0.16**	0.04	0.35	1.15	0.83	**39.05**
Melons, Squash, and Cucumbers	0.76	1.60	1.90	1.09	0.89	**1.51**	**5.21**	**5.48**	**1.85**	0.35	1.15	0.83	**22.60**
Onions and Garlic	**0.81**	**1.61**	**3.26**	**5.31**	**4.63**	**0.75**	0.15	0.05	0.04	0.35	1.59	**1.07**	**19.62**
Citrus (no ground cover)	**0.96**	**1.59**	**3.51**	**5.13**	**5.31**	**5.73**	**5.97**	**4.81**	**4.10**	**3.25**	**1.54**	**1.90**	**43.82**
Immature Citrus	**0.85**	**1.60**	**2.81**	**3.44**	**3.24**	**3.66**	**3.71**	**3.13**	**2.52**	**1.94**	**1.37**	**1.48**	**29.76**
Avocado	**0.76**	**1.58**	**2.21**	**3.47**	**6.23**	**7.07**	**7.73**	**6.26**	**4.99**	**2.71**	**1.12**	**0.84**	**44.97**
Grape Vines with 80% canopy	0.76	1.59	**2.03**	**2.07**	**3.59**	**6.14**	**6.68**	**4.93**	**3.04**	0.37	1.12	0.84	**33.14**
Grape Vines with cover crop (80% canopy)	0.91	1.60	**3.26**	**4.08**	**5.37**	**6.87**	**7.60**	**5.93**	**3.64**	1.94	1.29	1.52	**44.02**
Immature Grapes Vines with 50% canopy	0.76	1.59	**1.98**	**1.72**	**2.45**	**4.53**	**4.81**	**3.38**	**1.99**	0.35	1.13	0.84	**25.53**
Idle	0.76	1.61	1.89	1.09	0.10	0.27	0.15	0.05	0.04	0.34	1.16	0.83	**8.27**

ETc Table 37. Zone 15 Dry Year

ETc Table for Irrigation Scheduling and Design

Zone 15 Monthly Evapotranspiration

Surface Irrigation Dry Year

IRRIGATION TRAINING AND RESEARCH CENTER, California Polytechnic State University, San Luis Obispo

Table does not include adjustments for bare spots and reduced vigor

	1999 (Dry Year)												
	January	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**	**October**	**November**	**December**	**Annual**
	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches	**inches**
Precipitation	2.35	1.06	1.85	0.57	0.05	0.00	0.01	0.00	0.03	0.00	0.33	0.11	**6.35**
Grass Reference ETo	0.90	1.77	3.40	5.27	7.74	8.10	8.47	7.34	5.84	4.09	1.82	1.53	**56.27**
Apple, Pear, Cherry, Plum and Prune	0.67	1.36	**2.21**	**3.63**	**6.97**	**7.34**	**7.83**	**6.80**	**5.14**	**2.30**	0.27	0.15	**44.65**
Apples, Plums, Cherries etc w/covercrop	0.78	1.89	**4.00**	**5.27**	**8.34**	**9.01**	**9.47**	**8.36**	**6.17**	**3.14**	0.95	0.65	**58.03**
Peach, Nectarine and Apricots	0.67	1.36	**2.05**	**2.70**	**6.44**	**7.43**	**7.88**	**6.92**	**5.20**	**2.21**	0.27	0.15	**43.27**
Immature Peaches, Nectarines, etc	0.67	1.37	**1.87**	**1.71**	**4.20**	**4.84**	**5.27**	**4.35**	**3.28**	**1.37**	0.28	0.15	**29.36**
Almonds	0.67	**1.56**	**2.52**	**4.00**	**6.63**	**6.54**	**6.92**	**6.59**	**4.40**	**2.30**	0.27	0.15	**42.55**
Almonds w/covercrop	0.89	**1.98**	**3.39**	**5.22**	**7.48**	**7.87**	**8.40**	**7.15**	**4.89**	**2.93**	1.16	0.88	**52.23**
Immature Almonds	0.67	**1.46**	**2.18**	**3.36**	**5.50**	**5.59**	**6.03**	**5.25**	**3.58**	**1.62**	0.28	0.15	**35.66**
Walnuts	0.67	1.36	**2.31**	**2.84**	**7.32**	**9.03**	**9.54**	**8.27**	**5.73**	**2.67**	0.37	0.15	**50.26**
Pistachio	0.67	1.36	1.69	**1.70**	**2.73**	**6.37**	**8.95**	**7.73**	**5.94**	**2.82**	0.31	0.15	**40.40**
Pistachio w/ covercrop	0.95	1.99	3.36	**4.18**	**5.67**	**8.05**	**9.76**	**8.45**	**6.68**	**3.90**	1.24	0.91	**55.13**
Immature Pistachio	0.67	1.37	1.69	**1.08**	**1.65**	**4.20**	**6.29**	**5.50**	**3.97**	**1.74**	0.34	0.15	**28.66**
Misc. Deciduous	0.67	1.36	**2.36**	**3.43**	**6.58**	**7.07**	**7.54**	**6.30**	**5.10**	**2.16**	0.27	0.15	**42.98**
Grain and Grain Hay	**0.79**	**2.02**	**3.86**	**5.75**	**3.97**	0.01	0.01	0.00	0.03	0.00	0.85	**0.40**	**17.71**
Rice	0.70	1.39	1.68	1.36	**7.66**	**9.87**	**10.55**	**9.06**	**2.62**	0.00	0.28	0.15	**45.30**
Cotton	0.70	1.39	1.68	1.37	**1.66**	**5.05**	**9.02**	**8.08**	**5.83**	**1.26**	0.28	0.15	**36.45**
Safflower and Sunflower	0.91	**1.57**	**2.53**	**5.46**	**9.05**	**7.79**	**0.73**	0.00	0.03	0.00	0.28	0.15	**28.51**
Corn and Grain Sorghum	0.70	1.39	2.67	**1.67**	**2.77**	**7.52**	**8.99**	**5.43**	**0.37**	0.00	0.28	0.15	**31.92**
Misc. field crops	0.70	1.39	2.67	**1.67**	**2.74**	**7.85**	**8.34**	**2.73**	0.03	0.00	0.28	0.15	**28.54**
Alfalfa Hay and Clover	**1.02**	**2.01**	**3.87**	**5.65**	**7.10**	**7.44**	**7.65**	**6.77**	**5.20**	**1.80**	**1.56**	**1.57**	**51.65**
Pasture and Misc. Grasses	0.70	**1.96**	**3.13**	**4.76**	**7.70**	**8.15**	**8.46**	**7.44**	**5.80**	**3.27**	**0.75**	0.15	**52.28**
Small Vegetables	**0.93**	**1.73**	**3.36**	**5.67**	**1.82**	0.00	0.01	1.04	**1.35**	**0.98**	**1.46**	**1.53**	**19.89**
Tomatoes and Peppers	0.70	1.39	2.21	**1.26**	**4.36**	**8.73**	**7.47**	**0.47**	0.03	0.00	0.28	0.15	**27.03**
Potatoes, Sugar beets, Turnips etc.	1.00	**1.58**	**2.79**	**5.77**	**8.74**	**9.05**	**8.06**	0.07	0.03	0.00	0.28	0.15	**37.52**
Melons, Squash, and Cucumbers	0.70	1.39	1.68	0.64	0.84	**1.26**	**5.38**	**6.12**	**1.79**	0.00	0.28	0.15	**20.23**
Onions and Garlic	**0.78**	**1.95**	**3.51**	**4.81**	**5.13**	**0.79**	0.02	0.00	0.03	0.00	1.03	**0.38**	**18.42**
Citrus (no ground cover)	**0.99**	**2.01**	**3.72**	**4.66**	**5.63**	**5.94**	**6.15**	**5.31**	**4.19**	**3.03**	**1.43**	**1.36**	**44.44**
Immature Citrus	**0.83**	**1.74**	**2.70**	**3.00**	**3.47**	**3.71**	**3.90**	**3.25**	**2.75**	**1.76**	**1.02**	**0.76**	**28.89**
Misc Subtropical	**0.67**	**1.36**	**2.36**	**3.43**	**6.58**	**7.07**	**7.54**	**6.30**	**5.10**	**2.16**	**0.27**	**0.15**	**42.98**
Grape Vines with 80% canopy	0.67	1.37	**2.01**	**1.81**	**4.26**	**6.19**	**6.64**	**4.89**	**3.10**	0.00	0.27	0.15	**31.38**
Grape Vines with cover crop (80% canopy)	0.77	1.77	**3.15**	**3.60**	**5.65**	**6.91**	**7.49**	**5.98**	**3.58**	1.52	0.79	0.55	**41.77**
Immature Grapes Vines with 50% canopy	0.68	1.37	**1.86**	**1.38**	**3.23**	**4.61**	**5.18**	**3.66**	**2.26**	0.01	0.27	0.15	**24.66**
Idle	0.71	1.40	1.68	0.65	0.05	0.00	0.01	0.00	0.03	0.00	0.28	0.15	**4.95**

ETc Table 38. Zone 16 Dry Year

ETc Table for Irrigation Scheduling and Design

Zone 16 Monthly Evapotranspiration

Surface Irrigation Dry Year

IRRIGATION TRAINING AND RESEARCH CENTER, California Polytechnic State University, San Luis Obispo

Table does not include adjustments for bare spots and reduced vigor

	1999 (Dry Year)												
	January	February	March	April	May	June	July	August	September	October	November	December	Annual
	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches
Precipitation	2.33	0.76	2.11	1.49	0.05	0.06	0.00	0.00	0.11	0.43	0.08	0.22	**7.63**
Grass Reference ETo	0.82	1.90	3.55	5.51	7.98	8.32	8.75	7.41	6.10	4.45	2.10	1.55	**58.44**
Apple, Pear, Cherry, Plum and Prune	0.51	1.03	**2.18**	**4.95**	**7.23**	**7.61**	**8.15**	**6.97**	**5.26**	**2.85**	0.10	0.19	**47.05**
Apples, Plums, Cherries etc w/covercrop	0.71	1.97	**4.23**	**6.42**	**8.68**	**9.48**	**9.82**	**8.48**	**6.62**	**3.92**	1.51	0.92	**62.75**
Peach, Nectarine and Apricots	0.51	1.03	**1.83**	**4.20**	**6.67**	**7.67**	**8.22**	**6.79**	**5.55**	**2.69**	0.10	0.19	**45.46**
Immature Peaches, Nectarines, etc	0.52	1.04	**1.67**	**3.11**	**4.19**	**5.29**	**5.29**	**4.51**	**3.48**	**1.90**	0.10	0.19	**31.29**
Almonds	0.51	**1.31**	**2.28**	**5.50**	**6.65**	**6.81**	**7.28**	**6.64**	**4.71**	**2.71**	0.10	0.19	**44.72**
Almonds w/covercrop	0.67	**1.95**	**3.31**	**6.18**	**7.95**	**7.89**	**8.75**	**7.05**	**5.71**	**2.66**	0.96	0.64	**53.71**
Immature Almonds	0.52	**1.15**	**1.97**	**4.68**	**5.65**	**5.90**	**6.37**	**5.23**	**3.75**	**2.14**	0.10	0.19	**37.65**
Walnuts	0.51	1.03	**2.34**	**4.33**	**7.54**	**9.40**	**9.90**	**8.43**	**6.03**	**3.23**	0.18	0.19	**53.13**
Pistachio	0.51	1.03	1.52	**2.96**	**2.80**	**6.52**	**9.38**	**7.95**	**6.13**	**3.30**	0.25	0.19	**42.56**
Pistachio w/ covercrop	0.75	1.97	3.00	**5.41**	**5.89**	**8.39**	**10.21**	**8.72**	**6.93**	**4.39**	1.27	0.78	**57.71**
Immature Pistachio	0.52	1.04	1.52	**2.49**	**1.68**	**4.36**	**6.47**	**5.57**	**4.23**	**2.19**	0.15	0.19	**30.40**
Misc. Deciduous	0.51	1.03	**2.18**	**4.71**	**6.99**	**7.24**	**7.73**	**6.64**	**5.18**	**2.83**	0.10	0.19	**45.34**
Grain and Grain Hay	**0.64**	**2.09**	**3.95**	**6.22**	**4.05**	0.07	0.00	0.00	0.12	0.40	0.76	**0.40**	**18.69**
Cotton	0.53	1.04	1.50	2.43	**1.74**	**5.21**	**9.33**	**8.15**	**6.22**	**2.13**	0.11	0.19	**38.57**
Safflower and Sunflower	0.86	**1.26**	**2.37**	**6.08**	**9.34**	**8.06**	**0.75**	0.00	0.12	0.40	0.10	0.19	**29.54**
Corn and Grain Sorghum	0.53	1.04	2.65	**2.83**	**2.90**	**7.70**	**9.23**	**5.22**	**0.44**	0.40	0.10	0.19	**33.24**
Misc. field crops	0.53	1.04	2.65	**2.83**	**2.83**	**8.09**	**8.70**	**2.83**	0.14	0.40	0.10	0.19	**30.32**
Alfalfa Hay and Clover	**0.90**	**2.08**	**4.02**	**6.22**	**7.34**	**7.67**	**7.85**	**6.93**	**5.51**	**2.25**	**1.76**	**1.64**	**54.17**
Pasture and Misc. Grasses	0.53	**1.58**	**2.89**	**5.67**	**7.96**	**8.36**	**8.82**	**7.48**	**6.07**	**3.87**	**0.65**	0.19	**54.07**
Small Vegetables	**0.81**	**1.52**	**3.55**	**6.06**	**1.65**	0.06	0.00	1.01	**1.46**	**1.57**	**1.57**	**1.58**	**20.83**
Tomatoes and Peppers	0.53	1.04	2.05	**2.63**	**4.50**	**9.02**	**8.31**	**0.64**	0.14	0.40	0.10	0.19	**29.55**
Potatoes, Sugar beets, Turnips etc.	0.92	**1.31**	**2.70**	**6.28**	**9.05**	**9.47**	**8.17**	0.06	0.14	0.40	0.10	0.19	**38.78**
Melons, Squash, and Cucumbers	0.53	1.04	1.50	2.03	0.85	**1.45**	**5.54**	**6.17**	**2.05**	0.40	0.10	0.19	**21.84**
Onions and Garlic	**0.63**	**1.95**	**3.53**	**5.38**	**5.26**	**0.82**	0.00	0.00	0.12	0.40	0.84	**0.47**	**19.39**
Citrus (no ground cover)	**0.89**	**2.05**	**3.61**	**5.89**	**5.89**	**6.06**	**6.34**	**5.36**	**4.44**	**3.66**	**1.72**	**1.25**	**47.16**
Immature Citrus	**0.68**	**1.56**	**2.58**	**4.26**	**3.64**	**3.76**	**4.00**	**3.43**	**2.86**	**2.30**	**0.95**	**0.76**	**30.78**
Misc Subtropical	**0.51**	**1.03**	**2.18**	**4.71**	**6.99**	**7.24**	**7.73**	**6.64**	**5.18**	**2.83**	**0.10**	**0.19**	**45.34**
Grape Vines with 80% canopy	0.52	1.04	**1.86**	**3.19**	**4.51**	**6.38**	**6.77**	**5.08**	**3.20**	0.40	0.10	0.19	**33.23**
Grape Vines with cover crop (80% canopy)	0.58	1.65	**3.09**	**4.99**	**5.96**	**7.09**	**7.81**	**5.96**	**3.84**	2.11	0.76	0.54	**44.37**
Immature Grapes Vines with 50% canopy	0.52	1.04	**1.67**	**2.79**	**3.29**	**4.78**	**5.39**	**3.68**	**2.36**	0.46	0.10	0.19	**26.27**
Idle	0.54	1.04	1.49	2.03	0.06	0.06	0.00	0.00	0.12	0.39	0.10	0.19	**6.02**

ETc Table 39. Zone 18 Dry Year

ETc Table for Irrigation Scheduling and Design

Zone 18 Monthly Evapotranspiration

Surface Irrigation Dry Year

IRRIGATION TRAINING AND RESEARCH CENTER, California Polytechnic State University, San Luis Obispo

Table does not include adjustments for bare spots and reduced vigor

	1999 (Dry Year)												
	January	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**	**October**	**November**	**December**	**Annual**
	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches	**inches**
Precipitation	0.04	0.21	0.06	0.29	0.05	0.01	0.33	0.05	0.36	0.00	0.04	0.04	**1.50**
Grass Reference ETo	3.02	3.50	5.79	6.88	8.87	9.17	9.09	8.83	6.58	5.80	3.36	2.81	**73.70**
Peach, Nectarine and Apricots	0.06	0.22	**2.33**	**3.98**	**8.08**	**9.78**	**9.56**	**9.40**	**6.87**	**5.72**	0.15	0.03	**56.18**
Grain and Grain Hay	**1.45**	**3.69**	**6.60**	**6.69**	**0.79**	0.01	0.30	0.09	0.32	0.04	**1.00**	**1.34**	**22.32**
Cotton	0.05	0.22	1.00	**1.71**	**2.47**	**7.95**	**10.50**	**10.24**	**7.17**	**2.13**	0.05	0.02	**43.51**
Safflower and Sunflower	0.93	**0.71**	**2.17**	**7.12**	**10.52**	**9.16**	**1.20**	0.09	0.32	0.04	0.04	0.02	**32.32**
Corn and Grain Sorghum	**1.00**	**1.17**	**5.25**	**8.34**	**9.99**	**2.45**	0.30	0.09	0.32	0.04	0.04	1.34	**30.33**
Misc. field crops	**1.12**	**1.28**	**5.19**	**7.34**	**5.10**	0.02	0.30	0.09	0.32	0.04	0.04	1.20	**22.03**
Alfalfa Hay and Clover	**3.14**	**3.02**	**5.39**	**7.29**	**7.91**	**8.66**	**8.43**	**8.17**	**6.43**	**5.63**	**2.73**	**3.06**	**69.87**
Pasture and Misc. Grasses	**0.05**	**2.17**	**2.17**	**4.91**	**7.86**	**8.94**	**8.59**	**8.42**	**5.91**	**2.10**	**0.05**	**0.02**	**51.18**
Small Vegetables	**2.44**	**2.32**	**6.02**	**2.30**	0.08	0.01	0.30	0.09	2.36	**2.02**	**1.75**	**2.73**	**22.43**
Tomatoes and Peppers	0.97	**0.74**	**3.69**	**8.21**	**10.34**	**3.79**	0.30	0.09	0.32	0.04	0.04	0.02	**28.54**
Potatoes, Sugar beets, Turnips etc.	**3.62**	**4.33**	**7.15**	**8.50**	**8.67**	**0.10**	0.30	0.09	1.28	**0.36**	**0.60**	**2.13**	**37.12**
Melons, Squash, and Cucumbers	0.97	**0.70**	**3.46**	**7.57**	**9.61**	**4.11**	0.31	0.09	0.32	0.04	0.04	0.02	**27.22**
Onions and Garlic	**3.12**	**3.67**	**6.06**	**6.69**	**1.96**	0.01	0.30	0.09	1.28	**0.39**	**1.06**	**2.59**	**27.21**
Citrus (no ground cover)	**2.45**	**2.54**	**4.18**	**5.42**	**6.86**	**7.01**	**7.31**	**6.95**	**5.30**	**4.59**	**2.81**	**2.25**	**57.65**
Grape Vines with 80% canopy	0.06	0.22	**2.33**	**3.98**	**8.08**	**9.78**	**9.56**	**9.40**	**6.87**	**5.72**	0.15	0.03	**56.18**
Idle	0.05	0.22	0.06	0.30	0.06	0.01	0.30	0.09	0.32	0.04	0.04	0.02	**1.50**

ETc Table 40. Evaporation from Precipitation, Zones 1-9

Cal Poly ITRC
Evaporation from Precipitation
Annual Values by DWR ETo Zone and Year

	Zone 1			Zone 3			Zone 4			Zone 6			Zone 8			Zone 9		
	1937 (Typ)	1938 (Wet)	1939 (Dry)	1937 (Typ)	1938 (Wet)	1939 (Dry)	1937 (Typ)	1938 (Wet)	1939 (Dry)	1937 (Typ)	1938 (Wet)	1939 (Dry)	1937 (Typ)	1938 (Wet)	1939 (Dry)	1937 (Typ)	1938 (Wet)	1939 (Dry)
Crop	Inches	Inches	Inches	Inches	Inches	Inches	Inches	Inches	Inches	Inches	Inches	Inches	Inches	Inches	Inches	Inches	Inches	Inches
Apple, Pear, Cherry, Plum and Prune	5	10.7	4.8	6.7	11.4	8.9	7.2	11.8	6.8	6	11.7	7.3	9.2	11.2	8.9	7	9.5	6.8
Apple, Pear, Cherry etc w/cover crop	3.3	5.7	2.9	4.7	6.2	5.1	5	6.8	4	4	7.4	5.4	7.1	5.7	4.8	5.4	6.3	4.8
Immature Apple, Pear, Cherry etc	5	11.1	4.7	7	11.8	9	7.2	12.3	7	6	12	7.5	9.5	11.6	9	6.9	9.9	7
Peach, Nectarine and Apricots	5	10.5	4.9	6.6	10.8	8.3	7.1	11.7	6.9	6.1	11.9	7.4	9.2	11.1	8.9	7.1	9.4	6.8
Immature Peach, Nectarine and Apricots	5.1	11.2	4.9	6.7	11.2	8.6	7.4	12.2	7	6.2	12.1	7.5	9.6	11.7	9.1	7	9.9	6.9
Almonds	n/a	n/a	n/a	6.4	10.4	8.1	n/a	n/a	n/a	6	11.6	7.4	8.3	9.8	8.3	n/a	n/a	n/a
Almonds w/ cover crop	n/a	n/a	n/a	5.1	7	5.8	n/a	n/a	n/a	4.5	8.7	6.4	7.1	6.5	5.6	n/a	n/a	n/a
Immature Almonds	n/a	n/a	n/a	6.6	10.9	8.5	n/a	n/a	n/a	6.2	12.1	7.4	9.1	10.8	8.6	n/a	n/a	n/a
Walnuts	n/a	n/a	n/a	6.3	10.5	8.2	6.8	11.6	6.9	5.6	11.9	7.4	8.6	10.5	8.4	6.8	9.3	6.8
Immature Walnuts	n/a	n/a	n/a	6.6	11.2	8.5	7.2	12.3	7	6	12.1	7.5	9.3	11.3	8.8	6.9	9.9	7
Pistachio	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	5.9	12.4	7.6	8.9	11.1	8.7	5.8	8	5.9
Pistachio w/ cover crop	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	1.7	3.4	2.4	7.2	7.2	5.7	4.2	5.3	3.3
Immature Pistachio	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	6.3	12.5	7.6	9.4	11.5	9	5.6	8.3	5.8
Misc. Deciduous	4.8	10.3	4.8	6.4	10.5	8.2	7.1	11.6	6.9	5.7	11.3	7.2	9	11	8.7	6.9	9.5	6.8
Immature Misc. Deciduous	5.1	11.2	4.9	6.7	11.1	8.5	7.4	12.2	7	5.9	11.5	7.3	9.5	11.6	9	7	9.9	6.9
Grain and Grain Hay	3.3	5.5	2.5	4.8	5.4	3.4	5.6	5.9	1.4	4.5	5.6	2.5	5.4	4.7	3.3	4.6	3.6	1.7
Rice	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Cotton	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	5.9	11.3	6.9	n/a	n/a	n/a	n/a	n/a	n/a
Safflower and Sunflower	n/a	n/a	n/a	6.4	8	7.9	n/a	n/a	n/a	6.2	8.5	6.4	6.7	6.3	7.4	6.2	6.4	4.5
Corn and Grain Sorghum	4.7	10.7	3.9	6.4	10.8	7.8	7.2	11.8	6.4	5.9	11.3	6.9	8.5	10.7	7.7	7.2	9.5	6.5
Beans	n/a	n/a	n/a	6.5	9.5	8.1	7.1	10.4	6.5	5.9	10	6.8	8.5	10	8	6.9	8.6	6
Misc. field crops	4.8	9.5	4.2	6.5	9.5	8.1	n/a	n/a	n/a	6	10.1	6.8	8.5	9.9	7.9	7	8.7	6.1
Alfalfa Hay and Clover	2.1	4.8	2.1	2.8	4.9	3.9	3.4	5.5	2.9	2	5	3.7	3.1	4.2	3.1	3.5	4.7	3.3
Pasture and Misc. Grasses	4.4	7.6	4.7	5.7	8	7	6.5	9.1	6.2	5.4	8.8	6.4	7.7	7.5	7.1	6.3	7.8	4.9
Small Vegetables (Double Crop)	3.9	6.8	3.2	5.4	6.6	5.1	6.2	7.7	4.1	5.1	7.3	4.8	6.8	6.9	4.9	6	6.4	4
Tomatoes and Peppers	4.5	9.2	4.2	6.1	9.3	8.2	6.7	10.3	6.5	5.8	10	6.7	8.3	9.9	8.4	6.9	8.3	5.9
Potatoes, Sugar beets, Turnip etc.	2.9	7.8	3	4.2	9	6.4	n/a	n/a	n/a	3.6	9.5	6.2	6.6	7.9	6.9	4.6	8.7	6.5
Melons, Squash, and Cucumbers	5	9.8	4.6	6.8	9.9	8.6	7.5	10.7	6.9	6.4	10.5	7.2	9.2	10.8	9	7.2	8.9	6.4
Onions and Garlic	4.2	6.6	3.3	5.2	5.6	4.4	5.8	6.2	2.5	4.8	6.1	3.4	6.4	5.5	4.4	5.4	4.6	2.5
Strawberries	5.3	10.9	4.4	6.8	10.5	8.3	7.4	11.4	6.6	6.1	11	7	8.7	10.3	8.1	7.2	9.3	6.3
Flowers, Nursery and Christmas Tree	5	10.8	4.9	6.7	11.2	8.7	7.3	12.4	7.1	6	12	7.6	9.8	12.1	9.4	7.2	10	7.2
Citrus (no ground cover)	3.6	7.3	3.4	5.3	7.4	5.7	5.5	8.4	4.5	4.2	8.3	5.6	7.3	6.9	5.3	5.7	7.1	5.3
Immature Citrus	4.4	10.1	4.3	6.2	10	7.6	6.6	10.8	6.2	5.1	10.3	6.7	8.5	10.1	7.6	6.5	8.9	6.4
Avocado	4.8	10.3	4.5	6.6	11.3	8.7	7.1	12	6.9	0.6	1.2	0.7	7.7	9.5	7.6	7	9.7	6.9
Misc Subtropical	3.6	7.3	3.4	5.2	7.4	5.6	5.5	8.4	4.5	4.2	8.4	5.8	7.4	7	5.5	5.6	7	5.2
Grape Vines with 40% canopy	n/a	n/a	n/a	6.8	11.1	8.5	n/a	n/a	n/a	5.9	11.5	7.3	9.8	11.8	9.1	n/a	n/a	n/a
Grape Vines with cover crop (60% canopy)	n/a	n/a	n/a	5.7	9.1	6.8	n/a	n/a	n/a	4.7	9.9	6.3	8.7	9.7	7	n/a	n/a	n/a
Grape Vines with 60% canopy	n/a	n/a	n/a	6.8	11	8.5	n/a	n/a	n/a	5.9	11.5	7.2	9.6	11.6	9.1	n/a	n/a	n/a
Grape Vines	n/a	n/a	n/a	n/a	n/a	n/a	7.5	12	6.9	n/a	n/a	n/a	n/a	n/a	n/a	6.5	8.8	6.4
Grape Vines w/ cover crop	n/a	n/a	n/a	n/a	n/a	n/a	6	10	5.7	n/a	n/a	n/a	n/a	n/a	n/a	5.6	7.8	5.7
Immature Grape Vines	n/a	n/a	n/a	n/a	n/a	n/a	7.4	12.1	6.9	n/a	n/a	n/a	n/a	n/a	n/a	6.4	9.1	6.5
Idle	4.9	10.9	4.7	7	11.7	9	7.9	13	7.4	6.2	12.1	7.4	9.7	11.5	8.8	7.1	9.9	7
Total Precipitation	18.5	32.8	10.5	19.6	32	19.4	18.5	33.3	11.2	15.6	25.7	8.9	25.1	48.6	19.5	15.6	32.1	9

ETc Table 41. Evaporation from Precipitation, Zones 10-18

Cal Poly ITRC
Evaporation from Precipitation
Annual Values by DWR ETo Zone and Year

	Zone 10			Zone 12			Zone 13			Zone 14			Zone 15			Zone 16			Zone 18		
	1937 (Typ)	1938 (Wet)	1939 (Dry)	1937 (Typ)	1938 (Wet)	1939 (Dry)	1937 (Typ)	1938 (Wet)	1939 (Dry)	1937 (Typ)	1938 (Wet)	1939 (Dry)	1937 (Typ)	1938 (Wet)	1939 (Dry)	1937 (Typ)	1938 (Wet)	1939 (Dry)	1937 (Wet)	1938 (Typ)	1939 (Dry)
Crop	Inches	Inches	Inches	Inches	Inches	Inches	Inches	Inches	Inches	Inches	Inches	Inches	Inches	Inches	Inches	Inches	Inches	Inches	Inches	Inches	Inches
Apple, Pear, Cherry, Plum and Prune	6.9	11.9	6.9	5.8	9.6	7.5	7.6	12.3	10.5	6.6	10.6	8.3	5.3	9.4	4.9	6.1	8.2	5.5	n/a	n/a	n/a
Apple, Pear, Cherry etc w/cover crop	4.4	7.5	5	4.3	4.9	4.9	5.5	6.8	6.6	4.7	5.6	5.6	3.2	5.6	3.4	3.9	5.1	4.7	n/a	n/a	n/a
Immature Apple, Pear, Cherry etc	7.2	12.9	7.1	6.1	11	7.6	7.9	13.9	10.6	6.9	12.5	8.4	5.5	10.6	4.9	6.5	9.8	5.9	n/a	n/a	n/a
Peach, Nectarine and Apricots	7.1	12	6.9	5.6	9.7	7.5	n/a	n/a	n/a	6.5	10.9	8.2	5.5	10	5	6.1	8.7	5.7	2.6	2.6	1.2
Immature Peach, Nectarine and Apricots	7.4	12.8	7	5.8	10.4	7.5	n/a	n/a	n/a	6.8	12	8.4	5.5	10.5	5	6.4	9.3	5.7	n/a	n/a	n/a
Almonds	6.9	11.9	6.9	5.7	9.3	7.2	7.5	12.4	10.2	6.4	10.5	8.2	5.2	9	4.8	6.1	8.3	5.5	n/a	n/a	n/a
Almonds w/ cover crop	5.3	8.8	5.7	4.5	6.1	5.5	6.1	8.7	7.7	5.3	7	6.4	3.6	6.7	3.8	4.4	6.2	4.8	n/a	n/a	n/a
Immature Almonds	7.3	12.8	7.1	5.9	10.2	7.4	7.7	13.6	10.6	6.8	11.8	8.3	5.5	10	4.9	6.7	9.3	5.6	n/a	n/a	n/a
Walnuts	6.7	12	6.9	5.6	9.5	7.5	7.6	12.2	10.2	6.4	10.5	8.2	5.2	9.7	5	6	8.1	5.7	n/a	n/a	n/a
Immature Walnuts	7.2	12.9	7.1	6.1	11	7.6	7.9	13.8	10.6	6.9	12.4	8.3	5.6	10.7	5.1	6.5	10	6	n/a	n/a	n/a
Pistachio	6.5	12.2	7	5.8	10.8	7.6	7.7	13.4	10.4	6.5	12.1	8.2	5.4	10.4	4.9	6.5	10.4	6.1	n/a	n/a	n/a
Pistachio w/ cover crop	4.7	8.8	5.8	4.8	7.9	5.9	6.1	9.3	7.7	5.5	8.8	6.6	4	8.1	4.3	4.7	8.5	5.4	n/a	n/a	n/a
Immature Pistachio	7.2	12.9	7.1	6.1	11	7.6	8	14	10.7	6.7	12.2	8.2	5.5	10.6	4.9	6.7	10.5	6.1	n/a	n/a	n/a
Misc. Deciduous	6.9	12.1	6.9	5.6	9.7	7.5	7.3	12.3	9.9	6.4	10.8	8.3	5.3	9.6	4.8	6.1	8.6	5.6	2.6	2.7	1.2
Immature Misc. Deciduous	7.4	12.8	7	5.9	10.5	7.5	7.6	12.9	10.1	6.8	12	8.4	5.5	10.4	4.9	6.4	9.4	5.7	n/a	n/a	n/a
Grain and Grain Hay	6.3	7.2	2.5	3.7	5.2	3.1	5.4	7.7	5.2	4.8	6	3.8	4	4.7	1.6	3.8	4.9	2	2.9	1.2	1
Rice	7.1	11.9	7	5.6	10	8.1	n/a	n/a	n/a	6.8	11.1	8.6	5.7	10.6	5.4	n/a	n/a	n/a	n/a	n/a	n/a
Cotton	6.6	12.1	6.5	5.3	10.2	7.4	n/a	n/a	n/a	6.1	11.8	8.3	5.4	9.9	5.1	6.2	9.7	5.2	2.2	2.3	1
Safflower and Sunflower	6.9	8.6	5.3	5	6.2	6.3	n/a	n/a	n/a	5.5	6.9	7	4.2	6.7	4	5.3	4.9	4.2	3	2.3	1.2
Corn and Grain Sorghum	6.8	12.4	6.8	5.6	9.7	6.8	7.5	11.6	8.3	6.4	11.1	7.1	5.3	9.8	4.9	6.1	8.8	5.7	3.1	2.2	1.1
Beans	7.1	12.5	6.8	5.9	9.7	6.7	n/a	n/a	n/a	6.5	10.9	7	5.3	9.8	4.8	6.1	8.6	5.7	2.6	2.3	1.2
Misc. field crops	7.1	12.5	6.8	5.7	9.6	6.6	n/a	n/a	n/a	6.5	10.9	7	5.3	9.8	4.9	6.2	8.7	5.7	2.5	2.2	1.2
Alfalfa Hay and Clover	2.8	5.9	2.9	2.3	4.5	3	2.6	5.1	4	2.5	4.8	3.2	1.9	4.9	1.8	2.2	4.3	2.5	1.6	1.8	1.1
Pasture and Misc. Grasses	6.8	10.1	6.3	5.6	8	6.9	6.7	9.3	8.5	6	9	7.6	5.3	8.5	4.5	5.9	7.1	4.9	2.3	2.5	1
Small Vegetables (Double Crop)	4.8	8.4	4.4	3.2	5.8	4	5.7	10.2	6.6	4.4	6.8	4.5	2.6	5.5	2.9	2.8	6.6	3.7	2.7	2.1	1.3
Tomatoes and Peppers	7.5	12.9	7.1	6.2	10.3	7.8	n/a	n/a	n/a	6.7	11.2	8.1	5.5	10.5	5	6.7	9.1	6.1	3.1	2.4	1.2
Potatoes, Sugar beets, Turnip etc.	6.4	9	4.9	4.5	6.3	5.9	n/a	n/a	n/a	5.2	7.2	6.7	4.6	6.7	3.7	5	5.2	3.6	2.2	0.9	1
Melons, Squash, and Cucumbers	7.4	13.8	7.4	6.3	11.7	8.2	n/a	n/a	n/a	7.2	13.1	8.8	5.9	11.1	5.4	7	11	6.4	3.2	2.5	1.3
Onions and Garlic	7.1	8.2	3.5	4.8	6	4.4	n/a	n/a	n/a	5.5	6.8	4.8	4.5	5.8	2.4	4.6	5.3	3	2.3	1.3	1.2
Strawberries	7.4	12.9	7	5.7	9.8	6.8	7.8	12	9.1	6.6	11.4	7.3	5.6	10.2	5.1	n/a	n/a	n/a	n/a	n/a	n/a
Flowers, Nursery and Christmas Tree	6.8	12.6	7.2	5.7	10.1	7.7	7.9	12.2	10.8	6.6	11.2	8.6	5.4	9.7	4.9	6.6	8.9	6	2.5	2.6	1.2
Citrus (no ground cover)	5.1	8.6	5.1	4.6	7.2	5.4	n/a	n/a	n/a	5.3	8.2	5.9	3.6	7.4	3.6	3.8	7.1	4.5	2.9	2.3	1
Immature Citrus	6.5	11.5	6.3	5.4	9.7	6.8	n/a	n/a	n/a	6.2	10.8	7.6	4.8	9.6	4.6	5.4	8.7	5.1	3	2.3	1.4
Avocado	7	12.1	6.9	6.1	10.3	7.9	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Misc Subtropical	5.1	8.6	5.1	4.5	7.1	5.3	5.9	8.9	7.3	5.3	8.2	5.9	3.6	7.5	3.6	3.9	7.2	4.5	2.8	2.3	1
Grape Vines with 40% canopy	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Grape Vines with cover crop (60% canopy)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Grape Vines with 60% canopy	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Grape Vines	7.2	12.3	6.8	5.7	10.3	7.4	7.8	13	10.7	6.7	11.9	8.4	5.3	10.1	4.9	6.1	8.6	5.6	2.9	2.3	1.3
Grape Vines w/ cover crop	5.7	9.8	6	4.8	8.4	6.2	6.6	9.9	8.5	5.8	9.6	6.9	4.2	8.5	4.3	4.7	7.5	5.2	n/a	n/a	n/a
Immature Grape Vines	7.4	12.8	6.9	5.9	10.7	7.5	8.1	13.8	10.9	6.9	12.3	8.4	5.4	10.3	4.9	6.3	9.2	5.5	1.4	1.1	0.6
Idle	7.8	13.3	6.9	6.1	11.1	7.7	8.2	14.4	10.8	7	12.7	8.4	5.6	10.8	5.1	6.7	10.7	6.1	3.3	2.6	1.5
Total Precipitation	16.6	36	9.9	16.5	30.6	11.5	21.2	35.6	22.2	19.6	34.2	13	8.4	17.2	6.4	9.2	20.5	7.6	3.4	2.6	1.5

ETc Table 42. Transpiration from Precipitation, Zones 1-9

Cal Poly ITRC
Transpiration from Precipitation
Annual Values by DWR ETo Zone and Year

	Zone 1			Zone 3			Zone 4			Zone 6			Zone 8			Zone 9		
	1937 (Typ)	1938 (Wet)	1939 (Dry)	1937 (Typ)	1938 (Wet)	1939 (Dry)	1937 (Typ)	1938 (Wet)	1939 (Dry)	1937 (Typ)	1938 (Wet)	1939 (Dry)	1937 (Typ)	1938 (Wet)	1939 (Dry)	1937 (Typ)	1938 (Wet)	1939 (Dry)
Crop	Inches	Inches	Inches	Inches	Inches	Inches	Inches	Inches	Inches	Inches	Inches	Inches	Inches	Inches	Inches	Inches	Inches	Inches
Apple, Pear, Cherry, Plum and Prune	3.7	1.9	2.8	4.3	3.7	3.4	3	2.3	1.1	2.8	1.7	1.5	3.4	5	2.9	2.8	2.6	1.7
Apple, Pear, Cherry etc w/cover crop	4.4	8	5.2	7	9	8.3	7	9.3	5.7	6.3	7.4	3.2	6	10.3	7.8	6.1	9.6	3.8
Immature Apple, Pear, Cherry etc	1.9	1.3	2.4	2.6	1.3	1.1	2.7	1.8	0.8	2.7	1.2	0.9	1.9	4.1	1.5	2.8	1.4	1.1
Peach, Nectarine and Apricots	2.4	2.3	2.1	3.3	2.3	2.5	3	2.5	1.4	2.8	2.1	1.1	3.3	5.7	1.9	3.2	3.2	1.8
Immature Peach, Nectarine and Apricots	0.9	1.3	2.3	3.1	1.4	1.4	2.8	2	0.7	1.7	1.4	1.2	2.2	4.3	1.8	2.1	1.3	1.5
Almonds	n/a	n/a	n/a	3.7	3.8	4	n/a	n/a	n/a	4.2	2.9	1.2	5.2	6.1	3.7	n/a	n/a	n/a
Almonds w/ cover crop	n/a	n/a	n/a	6.6	7.2	6.3	n/a	n/a	n/a	5.4	6.3	2.3	5.7	8.9	5.9	n/a	n/a	n/a
Immature Almonds	n/a	n/a	n/a	3	2.3	2	n/a	n/a	n/a	2.5	1.7	1.2	2.6	4.6	1.8	n/a	n/a	n/a
Walnuts	n/a	n/a	n/a	3.7	3.8	4	3.9	3	2.2	3.7	2.2	1.1	3	5.1	2.7	3.8	2.2	1.4
Immature Walnuts	n/a	n/a	n/a	2.6	1.3	1.1	2.7	1.8	0.8	2.7	1.2	0.9	1.9	4.1	1.5	2.8	1.4	1.1
Pistachio	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	3.2	1.5	0.9	4.4	4.9	2.7	3.5	2.4	1.2
Pistachio w/ cover crop	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	12.4	13.2	4.5	n/a	n/a	n/a	11.1	17.6	5.6
Immature Pistachio	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	2.7	1.2	0.9	1.9	4.1	1.5	2.8	1.4	1.1
Misc. Deciduous	3.8	3.2	2.3	4.1	3.2	4.3	4.3	3.3	1.8	4.7	3.3	1.3	4.9	6.6	3.6	2.8	3.9	1.6
Immature Misc. Deciduous	0.9	1.3	2.3	3.1	1.4	1.4	2.8	2	0.7	1.7	1.4	1.2	2.2	4.3	1.8	2.1	1.3	1.5
Grain and Grain Hay	2.9	8.7	4	4.4	7.6	7.8	3.8	9.1	7.2	3.2	9.1	6.3	5.1	9.4	6.8	4.1	10.6	7
Rice	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Cotton	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	3.7	1.3	1.1	1.1	1.1	0.4	n/a	n/a	n/a
Safflower and Sunflower	n/a	n/a	n/a	1.7	1.7	0.8	n/a	n/a	n/a	4.7	6.6	1.6	9.4	11.3	3.4	4.3	8.5	3.6
Corn and Grain Sorghum	2.8	0.1	2.4	3.3	2	1.9	3.8	1.7	2.1	3.7	1.3	1.1	4.1	3.9	1.9	3.8	1.4	1
Beans	n/a	n/a	n/a	3.3	4.4	3.1	3.2	4	1.5	3.5	3.5	1.9	5.4	6.9	3.2	3.3	3.6	2.6
Misc. field crops	2.7	3	2	3.3	4.4	3.1	n/a	n/a	n/a	3.5	3.5	1.9	5.4	6.9	3.2	3.3	3.6	2.6
Alfalfa Hay and Clover	5.3	8.3	5.7	8.4	8.8	7.5	8.1	9.9	6.6	7.6	9.2	4.4	8.3	10.1	7.1	8.6	8.5	5.7
Pasture and Misc. Grasses	2.8	5.8	2.8	4.6	5.6	4	4.5	5.9	2.2	3.7	5.5	1.8	5	8.1	3.4	3.2	5.9	3.9
Small Vegetables (Double Crop)	0.9	3.7	0	0.2	3.3	2.6	0.1	4	2	0.4	3.8	1.1	0.9	4	2.4	0	4.1	2
Tomatoes and Peppers	2.8	3.4	1.9	4.1	4.5	2.6	3.8	4.7	1.7	3.9	4.1	1.4	5.5	7.2	2.7	3.8	5	2.7
Potatoes, Sugar beets, Turnip etc.	0.7	1.1	0.9	5.8	3.8	3.7	n/a	n/a	n/a	5.4	4.3	2.2	5.1	4.8	4.2	4.8	3	1.3
Melons, Squash, and Cucumbers	1.3	3	1.6	2.5	3.6	1.8	2.7	4.1	1.2	1.8	3.1	1.5	3.4	5.4	2.4	2	3.4	2.4
Onions and Garlic	0.5	2	0.7	3.6	7	6.3	3.2	8.4	5.8	2.5	8.4	5.1	3.2	6.5	4.3	3.1	8.9	6
Strawberries	2.7	3	2	3.3	4.4	3.1	3.2	4	1.5	3.5	3.5	1.9	5.4	6.9	3.2	3.3	3.6	2.6
Flowers, Nursery and Christmas Tree	3.8	3.2	2.3	4.1	3.2	4.3	4.3	3.3	1.8	4.7	3.3	1.3	4.9	6.6	3.6	2.8	3.9	1.6
Citrus (no ground cover)	4.3	5.8	5	4.9	6.4	6	5.4	6.5	4.8	4.9	6.3	2.7	3.8	8.7	5.4	5.8	7.9	3
Immature Citrus	1.8	3.2	1.4	3.8	3.4	3	4	3.7	1.6	2.8	3.6	1.3	3.1	5.1	3.5	3.3	3.9	1.9
Avocado	3.8	3.2	2.3	4.1	3.2	4.3	4.3	3.3	1.8	4.7	3.3	1.3	2.1	3.5	1.7	2.8	3.9	1.6
Misc Subtropical	4.3	5.8	5	4.9	6.4	6	5.4	6.5	4.8	4.9	6.3	2.7	3.8	8.7	5.4	5.8	7.9	3
Grape Vines with 40% canopy	n/a	n/a	n/a	3.5	1.7	1.6	n/a	n/a	n/a	2.5	1.7	1.3	4.2	4.2	1.9	n/a	n/a	n/a
Grape Vines with cover crop (60% canopy)	n/a	n/a	n/a	6	4.7	5.9	n/a	n/a	n/a	5.3	4.9	2.2	5.9	7	5.6	n/a	n/a	n/a
Grape Vines with 60% canopy	n/a	n/a	n/a	4.4	2.1	2.3	n/a	n/a	n/a	2.7	2.5	1.4	2	4.5	2.2	n/a	n/a	n/a
Grape Vines	n/a	n/a	n/a	n/a	n/a	n/a	2.6	1.9	1.2	n/a	n/a	n/a	n/a	n/a	n/a	2.8	1.7	1.3
Grape Vines w/ cover crop	n/a	n/a	n/a	n/a	n/a	n/a	6.7	5.5	4.1	n/a	n/a	n/a	n/a	n/a	n/a	6	7.4	2.3
Immature Grape Vines	n/a	n/a	n/a	n/a	n/a	n/a	2.2	2.1	1.1	n/a	n/a	n/a	n/a	n/a	n/a	2.6	1.5	1.6
Idle	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Total Precipitation	18.5	32.8	10.5	19.6	32	19.4	18.5	33.3	11.2	15.6	25.7	8.9	25.1	48.6	19.5	15.6	32.1	9

ETc Table 43. Transpiration from Precipitation, Zones 10-18

Cal Poly ITRC
Transpiration from Precipitation
Annual Values by DWR ETo Zone and Year

	Zone 10			Zone 12			Zone 13			Zone 14			Zone 15			Zone 16			Zone 18		
	1937 (Typ)	1938 (Wet)	1939 (Dry)	1937 (Typ)	1938 (Wet)	1939 (Dry)	1937 (Typ)	1938 (Wet)	1939 (Dry)	1937 (Typ)	1938 (Wet)	1939 (Dry)	1937 (Typ)	1938 (Wet)	1939 (Dry)	1937 (Typ)	1938 (Wet)	1939 (Dry)	1937 (Wet)	1938 (Typ)	1939 (Dry)
Crop	Inches	Inches	Inches	Inches	Inches	Inches	Inches	Inches	Inches	Inches	Inches	Inches	Inches	Inches	Inches	Inches	Inches	Inches	Inches	Inches	Inches
Apple, Pear, Cherry, Plum and Prune	4	5.9	0.8	4	5.4	1.6	3.5	4.5	3.5	3.4	6.1	1.5	1.6	2.9	1	2.2	4.2	1.6	n/a	n/a	n/a
Apple, Pear, Cherry etc w/cover crop	7.1	12	4.1	6	10.6	4.8	5.8	11.9	7.1	6	11	4.3	4.9	8.5	2.8	4.4	9.1	2.7	n/a	n/a	n/a
Immature Apple, Pear, Cherry etc	1.7	2.6	0.2	0.6	2.4	0.1	1.7	2.6	1.3	0.8	1.6	0.4	1.1	0.7	0.7	0.9	1.2	1	n/a	n/a	n/a
Peach, Nectarine and Apricots	3.2	5.5	1	2.1	5	1.2	n/a	n/a	n/a	2.6	3.9	0.5	2.2	2.1	1.3	2.6	4.8	1.4	0.6	0	0.2
Immature Peach, Nectarine and Apricots	1.9	1.7	0.5	0.9	2.7	0.3	n/a	n/a	n/a	1	2.6	0.4	1.6	1.4	0.5	0.4	1.8	1.5	n/a	n/a	n/a
Almonds	3.9	4.9	0.8	3.3	5.2	1.7	4	5.9	3	3.1	5.7	1.2	2.3	4.5	1.2	2.4	4.9	1.9	n/a	n/a	n/a
Almonds w/ cover crop	6.3	10.1	3.6	5.9	9.4	3.2	4.2	9.5	5.9	5.1	9.5	3.7	4.5	6.9	2.2	4.1	8.7	2.7	n/a	n/a	n/a
Immature Almonds	1.7	2	0.2	0.5	2.7	0.3	1.9	2.3	1.4	0.7	2.3	0.2	1.3	1.6	0.7	0.6	2.4	1.2	n/a	n/a	n/a
Walnuts	3	5.1	1.7	2.9	5.2	1.5	4.9	6.4	3.9	3.5	6	1.8	1.8	2.8	1.1	1.9	3.8	1.4	n/a	n/a	n/a
Immature Walnuts	1.7	2.6	0.2	0.6	2.4	0.1	1.7	2.6	1.3	0.8	1.6	0.4	1.1	0.7	0.7	0.9	1.2	1	n/a	n/a	n/a
Pistachio	4.5	5.2	0.8	2.8	3.8	1.2	2.7	4.2	2.8	3.2	4	2	2.5	1.9	1.2	2.4	2.9	1.3	n/a	n/a	n/a
Pistachio w/ cover crop	6.2	9.5	3.6	3.2	6.7	2.8	5.3	10.2	6.1	3.9	7.5	3	3.8	5.2	1.8	4.2	6	2.3	n/a	n/a	n/a
Immature Pistachio	1.7	2.6	0.2	0.6	2.4	0.1	1.7	2.6	1.3	0.8	1.6	0.4	1.1	0.7	0.7	0.9	1.2	1	n/a	n/a	n/a
Misc. Deciduous	2.8	4.5	0.7	2.9	5.1	1.2	3.9	5	3.3	2.6	5.4	2	2.9	3.7	1.4	1.7	4.7	1.7	n/a	n/a	n/a
Immature Misc. Deciduous	1.9	1.7	0.5	0.9	2.7	0.3	1.5	2.7	1.7	1	2.6	0.4	1.6	1.4	0.5	0.4	1.8	1.5	n/a	n/a	n/a
Grain and Grain Hay	2.1	3.5	6.5	2.7	8.2	4.6	3.3	8.9	6.2	2.2	8.5	4.4	1.9	7	3.8	2.7	6.9	4.5	0.5	1.4	0.5
Rice	4.5	5.4	0.8	4	4.6	1.1	n/a	n/a	n/a	3.9	5.1	1.4	2.7	3.4	1	n/a	n/a	n/a	n/a	n/a	n/a
Cotton	5.6	6.7	1.7	4.8	4.7	1.3	n/a	n/a	n/a	4.4	4.3	1.3	2.8	3.9	1.2	2.9	4.5	2.3	1.3	0.3	0.5
Safflower and Sunflower	4.8	10.5	2.7	5.7	9.8	1.4	n/a	n/a	n/a	6.7	11	1.5	3	4.8	0.8	2.5	9.3	1.9	0.4	0.3	0.3
Corn and Grain Sorghum	3.8	2.5	0.2	4.6	5	1.9	2.6	4.4	2.4	4.4	4.8	2.5	2.4	3.4	0.6	2.6	5.2	1.2	0.4	0.1	0.2
Beans	3.3	4	0	3.2	4.2	1.6	n/a	n/a	n/a	3.1	4.3	1.3	2	2.8	0.6	2.3	4	1.2	0.4	0.2	0.3
Misc. field crops	3.3	4	0	3.2	4.2	1.6	n/a	n/a	n/a	3.1	4.3	1.3	2	2.8	0.6	2.3	4	1.2	0.4	0.2	0.3
Alfalfa Hay and Clover	8.5	11.2	5.9	6.2	9.5	4.6	7	10.9	7.5	6.6	10.2	5	5.9	7.6	3.7	6.6	8.5	4.7	1.7	0.7	0.4
Pasture and Misc. Grasses	4.1	7.6	2.5	3.1	6.1	1.3	3.4	8	4.3	4.4	6.6	1.3	2.7	4.6	1.8	2.8	6.6	2.4	0.9	0.1	0.3
Small Vegetables (Double Crop)	3	5.9	2.8	2.5	6	3	2	4.4	4.5	2.3	6.1	3.1	2.8	5.1	1	3.5	4.5	1.8	0.2	0.2	0
Tomatoes and Peppers	4.8	5.7	0.8	4.9	6.1	2.2	n/a	n/a	n/a	5.1	6.9	2.7	3	4	1.5	2.7	6.4	1.8	0.4	0.3	0.4
Potatoes, Sugar beets, Turnip etc.	3.5	7.8	3.7	3.9	8.3	1.9	n/a	n/a	n/a	4.2	9	2.1	2.3	4.8	1.3	2.5	6.4	2.5	1.3	1.8	0.6
Melons, Squash, and Cucumbers	3.2	2.4	0.5	2.1	2.3	0.4	n/a	n/a	n/a	2.2	1.9	0.7	2.1	1.3	1.2	1.9	1.9	1.5	0.4	0.3	0.3
Onions and Garlic	1.8	8.7	5.7	1.9	7.5	3.5	n/a	n/a	n/a	1.8	7.9	3.8	1.8	6.2	3.2	2.4	6.9	3.8	1.2	1.4	0.4
Strawberries	3.3	4	0	3.2	4.2	1.6	3.5	5.5	2.7	3.1	4.3	1.3	2	2.8	0.6	n/a	n/a	n/a	n/a	n/a	n/a
Flowers, Nursery and Christmas Tree	2.8	4.5	0.7	2.9	5.1	1.2	3.9	5	3.3	2.6	5.4	2	2.9	3.7	1.4	1.7	4.7	1.7	0.6	0	0.2
Citrus (no ground cover)	5	9.1	3.6	4.5	7.3	3.5	n/a	n/a	n/a	3	8.4	3.4	3.8	5.5	1.6	3.6	4.7	1.9	0.5	0	0
Immature Citrus	2.6	4.9	2.7	2.3	4	1	n/a	n/a	n/a	1.9	4.4	1.5	2.3	2.8	1.3	1.9	3.3	1.3	n/a	n/a	n/a
Avocado	2.8	4.5	0.7	2.9	5.1	1.2	n/a	n/a	n/a	2.6	5.4	2	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Misc Subtropical	5	9.1	3.6	4.5	7.3	3.5	5.7	9.7	5.9	3	8.4	3.4	3.8	5.5	1.6	3.6	4.7	1.9	0.5	0	0
Grape Vines with 40% canopy	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Grape Vines with cover crop (60% canopy)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Grape Vines with 60% canopy	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Grape Vines	4.3	5.5	1.3	2.6	4	1.3	3.1	6	2.7	3.1	4.6	2	2	2.8	1.1	2.1	3.6	1.3	0.6	0	0.2
Grape Vines w/ cover crop	6.1	10.7	3.3	5.3	7.4	3.2	5.9	10.3	5.8	5.8	8.3	3.8	3.7	5.5	1.8	3.7	7.1	2.1	n/a	n/a	n/a
Immature Grape Vines	1.6	2.4	0.4	1.2	2.5	0.2	1.3	2.3	0.9	1.1	2.7	0.4	1.1	1	1	1.2	2.3	0.6	n/a	n/a	n/a
Idle	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Total Precipitation	16.6	36	3.9	16.5	30.6	11.5	21.2	35.6	22.2	19.6	34.2	13	8.4	17.2	6.4	9.2	20.5	7.6	3.4	2.6	1.5