IRRIGATION AND NITROGEN MANAGEMENT PLAN (INMP) WORKSHEET INSTRUCTIONS

Complete an Irrigation and Nitrogen Management Plan (INMP) Worksheet for every field or management unit in your membership. All INMP Worksheets must be kept on farm for all fields/parcels and made available upon request during inspections by the Central Valley Regional Water Quality Control Board (Regional Board).

Each section heading below (all CAPS) corresponds to the section heading on the INMP Worksheet. The numbered references correspond to each numbered box on the INMP Worksheet.

IRRIGATION AND NITROGEN MANAGEMENT PLAN

Enter the membership identification number (**Member ID#**) issued by your water quality coalition and the **Member Name** associated with this membership.

Indicate if the field(s)/management unit you are writing the plan for was identified as a **Statistical Outlier** by the Coalition for the previous crop year. The Coalition conducts a statistical analysis on the data provided from members for the nitrogen applied and nitrogen removed (based on yield) to determine statistical outliers. The Coalition provides annual feedback to members on reported nitrogen use including if the field/management unit was identified as a statistical outlier. If the field/management unit was identified as a statistical outlier by the Coalition in the previous crop year, mark "Yes". Please contact your Coalition for more information about this notification and statistical outliers.

Enter the **Crop Year (Harvested)**. Information on INMP Worksheets should be based on the calendar year in which harvest was completed. This includes winter crops (i.e. winter cereal grains and some citrus crops such as navel oranges) for which fertilization may have occurred in the previous calendar year but harvest was completed in the following calendar year. Fertilization does not need to occur within the same calendar year to be considered a part of the current crop year.

PARCEL MANAGEMENT

Use this table to account for all parcels for which the plan applies. Multiple parcels, portions of parcels, or fields (not to exceed 640 acres) may be included in a single plan if they all have the same:

- Crop
- Fertilizer inputs
- Irrigation management
- Nitrogen management practices

Enter the **Assessor's Parcel Number (APN)** and **County** for each parcel associated with your plan.

Enter the **Crop** name (almonds, walnuts, table grapes, wine grapes, raisin grapes, watermelons, canning tomatoes, fresh market tomatoes, etc.). Check with your Coalition regarding specific crop naming conventions. If you have a permanent crop, enter the **Crop Age** (in years).

Enter the **Irrigated Acres** for each parcel or portion of parcel to which this plan applies.

Sum the irrigated acres from each parcel for the **Total Acres** covered under the plan.

Use the **Comment/Notes** box to provide any further information that may be pertinent to the worksheet (e.g. nitrogen use efficiency, nitrogen removal rates, reasons for substantial differences between plan and actual numbers, etc.).

IRRIGATION MANAGEMENT

***Items with an asterisk shall be submitted to the Coalition on the INMP Summary Report.**

#1. Irrigation Method*. Check the box to indicate the irrigation method used the most for crop irrigation (primary irrigation) during the growing season for the field/management unit under this plan. If applicable, indicate any secondary irrigation systems. Secondary irrigation systems include those used for crop germination, frost protection, crop cooling, or salinity management.

#2. Crop Evapotranspiration. Enter the potential crop evapotranspiration (ETc) in inches anticipated for the season. Evapotranspiration rates are provided by geographical location, and multiplied by a crop-specific coefficient to estimate the amount transpired by your crops. This information and additional resources may be available from your Coalition.

#3. Anticipated Crop Irrigation. Enter the amount of irrigation water in inches expected to be applied over the course of the season. This information and additional resources may be available from your Coalition.

#4. Irrigation Water N Concentration. Enter the concentration of nitrogen in the irrigation water used on your crop as parts per million (ppm) or milligrams per liter (mg/L). The concentration of nitrogen in your irrigation water can be obtained from sources such as local district testing, laboratory analysis, or other sources. These results can be reported as either Nitrate as N, nitrate-nitrogen, or NO3-N.

#5. Irrigation Efficiency Practices*. Check all boxes that apply to indicate irrigation efficiency practices used on your fields during the season. Indicate if, to your knowledge, the parcels have been laser leveled.

HARVEST / YIELD INFORMATION

***Items with an asterisk will need to be submitted to the Coalition on the INMP Summary Report.**

#6. Production Unit*. This is the standard unit that is the basis for your nitrogen management planning (tons, pounds, bins, cartons, bales, etc.); refer to your Coalition for specific production unit lists. If you use a production unit that is not pounds or tons, please provide the weight of the reported unit (i.e. "28 lb lug boxes" instead of "lug boxes"), as crops often have multiple possible harvest production units.

#7. Harvested Yield*. This includes all crop yield harvested for the season. For pre-season planning, use **Box 7A** to fill in the Expected Yield for the season. The Expected Yield should be reported on a per-acre basis for the field or management unit covered by the plan. Expected Yield expectations will guide nitrogen management decisions and will inform the **TOTAL NITROGEN Recommended (14A)** to be used in the Nitrogen Management section below. If you grow grain crops and harvest straw separately, contact your Coalition.

NITROGEN MANAGEMENT

***Items with an asterisk will need to be submitted to the Coalition on the INMP Summary Report.**

#8. Nitrogen Efficiency Practices*. Check all boxes that apply to indicate any nitrogen efficiency practices used on your fields during the season.

(Column A) Recommended/Planned N: Complete the boxes in the Nitrogen Sources section in **Column A** based on the anticipated Nitrogen Sources required to obtain the Expected Yield from **Box 7A**. The values listed in **Column A** require certification. Use crop recommendations from CDFA, UCCE, NRCS, commodity organizations or site-specific knowledge to appropriately estimate the amount of nitrogen (N) necessary. Use Recommended/Planned N totals for each source of N and schedule applications for the crop year. Use additional tools/ spreadsheets to plan timing for each application. Proper scheduling of N applications and irrigations is essential for efficient nitrogen management.

Recommended / Planned TOTAL NITROGEN (14A): All Nitrogen Sources in this section should be the total for **Recommended / Planned TOTAL NITROGEN (14A).**

Recommended / Planned TOTAL NITROGEN (14A) = 9A + 10A + 11A + 12A + 13A

Complete the following sections based on the nitrogen source:

- **(9A and 9B) Soil – Available N in Root Zone.** Represents nitrogen in the soil root zone that is available to the crop during the growing season. Enter the amount of residual soil nitrogen based on soil samples or other available data.
- **(10A and 10B*) N in Irrigation Water.** Enter the amount of nitrogen applied via irrigation water over the course of the crop year in pounds per acre. For planning (**10A**), this value is calculated based on the **#3. Anticipated Crop Irrigation** and the **#4. Irrigation Water N Concentration**. For the Actual N column (**10B**), this value is calculated based on the *actual* crop irrigation and irrigation water N concentration. To calculate N in irrigation water, use the following formula:

  N concentration (ppm or mg/L) x inches of irrigation applied x 0.226

  Nitrate as nitrogen is also referred to as Nitrate as N, nitrate-nitrogen, or NO3-N.

- **(11A and 11B*) Organic Amendments.** Organic Amendments include any nutrient applications from sources that do not have a guaranteed nutrient content, such as compost and manure applications. Applied organic amendments should be reported as the amount of nitrogen available to the plant during the crop year, in pounds per acre.
- **(12A and 12B*) Dry/Liquid Fertilizer N.** The Dry/Liquid Fertilizers include any nitrogen-containing product with a guaranteed nutrient content. This number should be reported as the amount of nitrogen applied as pounds per acre; this may be different than the amount of fertilizer applied which may include other nutrients.
- **(13A and 13B*) Foliar Fertilizer N.** Foliar nitrogen applications include any nitrogen-containing product applied to the crop canopy or above ground plant parts, and should be reported in pounds per acre.

(Column B) Actual N: Fill in the **Actual N** in Column B based on actual applied nitrogen amounts. This should be completed after the crop is harvested for each of the nitrogen sources outlined above. **These values do not require certification.** Use the Recommended/Planned N schedule to guide nitrogen applications throughout the growing season. Actual application amounts and timing can be adjusted based upon changing conditions (weather, pest damage,

expected yield, tissue samples, etc.). The information in this column should reflect the actual application during the Crop Year. Refer to the Nitrogen Source section above for additional instructions and definitions.

Actual TOTAL NITROGEN (14B): Actual applied Nitrogen Sources should be the total for Actual **TOTAL NITROGEN (14B).**

Actual TOTAL NITROGEN (14B) = 9B + 10B + 11B + 12B + 13B

INMP CERTIFICATION

Plans for parcels in a **High Vulnerability Area** (HVA) to groundwater must be certified. Please contact your Coalition for more information regarding the vulnerability to groundwater of your parcels. The person certifying the plan must complete the **INMP Certification** section including signature, date, and method of certification. Any plan certifier should also initial the INMP Worksheet page in the box in the bottom right corner.

Any INMP requiring certification must be certified by an Irrigation and Nitrogen Management Specialist, such as:

- Crop Advisers certified by the American Society of Agronomy (CCA). Any Certified Crop Adviser who certifies an INMP must also have completed the nitrogen management training program offered by the University of California Agriculture and Natural Resources (UCANR) and the California Department of Food and Agriculture (CDFA).
- Certified Professional Soil Scientists (CPSS)
- Certified Professional Agronomists (CPAg)
- Technical Service Providers (TSP) certified in nutrient management in California by the Natural Resources Conservation Service (NRCS)
- Certified Agricultural Irrigation Management Specialists (CAIS) certified by The Irrigation Association.

Additionally, plans may be self-certified by the Member if:

- The certifying Member has attended the California Department of Food and Agriculture (CDFA) or other approved training program for INMP certification. The Member must retain written documentation of their attendance in the training program.
- The certifying Member adheres to a site-specific recommendation from the Natural Resources Conservation Service (NRCS Nutrient Management Plan) or the University of California Cooperative Extension (UCCE). The Member must retain written documentation of the recommendation.

If you do not apply nitrogen fertilizer:

- **You must state that you do not apply nitrogen fertilizer to the field on your INMP Worksheet.**

IRRIGATION AND NITROGEN MANAGEMENT PLAN (INMP) WORKSHEET

Member ID #: _____ **Member Name:** _____

Was this management unit identified as a statistical outlier by the Coalition last year?
☐ **Yes** ☐ **No**

Crop Year (Harvested): _____

PARCEL MANAGEMENT					
Management Unit (MU) or Field	**APN**	**County**	**Crop**	**Crop Age** (Years)	**Irrigated Acres**
				Total Acres:	

Comments/Notes:

IRRIGATION AND NITROGEN MANAGEMENT PLAN (INMP) WORKSHEET

Member ID: _____ INMP Field or MU: _____ Crop: _____ Total Acres: _____

IRRIGATION MANAGEMENT

1. Irrigation Method* (check one for Primary; if applicable, check one for Secondary)			Pre-Season Planning	
Primary	Secondary[1]			
☐	☐	Drip	2. Crop Evapotranspiration (ET, inches)	
☐	☐	Micro Sprinkler	3. Anticipated Crop Irrigation (inches)	
☐	☐	Furrow		
☐	☐	Sprinkler	4. Irrigation Water N Concentration (ppm or mg/L, as NO_3-N)	
☐	☐	Border Strip		
☐	☐	Flood		

5. Irrigation Efficiency Practices* (Check all that apply)

- ☐ Laser Leveling
- ☐ Use of ET in scheduling irrigations
- ☐ Water application schedule to need
- ☐ Use of moisture probe (e.g. tensiometer)
- ☐ Soil Moisture Neutron Probe
- ☐ Pressure Bomb
- ☐ Other _____
- ☐ Other _____

HARVEST / YIELD INFORMATION

Harvest / Yield Information			Expected (A)	Actual (B)
6. Production Unit (lbs, tons, etc.)		**7. Harvested Yield***		

NITROGEN MANAGEMENT

8. Nitrogen Efficiency Practices* (Check all that apply)	Nitrogen Sources	Recommended/ Planned N (A)	Actual N (B)
☐ Split Fertilizer Applications	9. Soil – Available N in Root Zone (Annualized, lbs/ac)		
☐ Irrigation Water N Testing	**10. N in Irrigation Water*** (Annualized, lbs/ac)		
☐ Soil Testing	**11. Organic Amendments*** (Manure/Compost/Other, lbs/ac estimate)		
☐ Tissue/Petiole Testing	**12. Dry/Liquid Fertilizer N*** (lbs/ac)		
☐ Fertigation	**13. Foliar Fertilizer N*** (lbs/ac)		
☐ Foliar N Application	14. TOTAL NITROGEN (lbs/ac)		
☐ Cover Crops			
☐ Variable Rate Applications using GPS			
☐ Other: _____			
☐ Other: _____			

[1] A secondary irrigation system could be used for crop germination, frost protection, crop cooling, etc.

***(Bold Text)** Data to be reported to the Coalition on the INMP Summary Report, based on Actual Yield and Actual N.

Plan Certifier Initials ☐

INMP CERTIFICATION

The person signing this Irrigation and Nitrogen Management Plan (INMP) certifies, under penalty of law, that the INMP was prepared under his/her direction and supervision, that the information and data reported is to the best of his/her knowledge and belief, true, accurate, and complete, and that he/she is aware that there are penalties for knowingly submitting false information. Where the person signing the INMP is not the Member, he/she may rely on the information and data provided by the Member and is not required to independently verify the information and data.

The person signing the INMP below further certifies that he/she used sound irrigation and nitrogen management planning practices to develop irrigation and nitrogen application recommendations and that the recommendations are informed by applicable training for meeting the crop's agronomic needs while minimizing nitrogen loss to surface water and groundwater. Where the person signing the INMP is not the Member, he/she is not responsible for any damages, loss, or liability arising from subsequent implementation of the INMP by the Member in a manner that is inconsistent with the INMP's recommendations for nitrogen application. **This certification does not create any liability for claims for environmental violations.**

Certification:

- ☐ Certified INMP Specialist (e.g. Certified Crop Adviser who has completed the CDFA training program)
- ☐ Self-Certified by Member who has completed the CDFA training program
- ☐ Self-Certified by Member who follows NRCS or UC site-specific recommendations (documentation required)
- ☐ I do not apply nitrogen

I, _____, certify this INMP in accordance with the statement above.

_____ (Signature) _____ (Date)

If the certifier is not the Member, the Member additionally agrees as follows:

I, _____, Member, have provided information and data to the certifier above that is, to the best of my knowledge and belief, true, accurate, and complete, that I understand that the certifier may rely on the information and data provided by me and is not required to independently verify the information and data, and that I further understand that the certifier is not responsible for any damages, loss, or liability arising from subsequent implementation of the INMP by me in a manner that is inconsistent with the INMP's recommendations for nitrogen application. I further understand that the certification does not create any liability for claims for environmental violations.

_____ (Signature) _____ (Date)

Seasonal Crop ET Estimates (inches/year) These estimates should be adjusted as necessary for age, crop vigor, atypical density, etc. ND=No data																			
Crop	Butte	Colusa	El Dorado	Glenn	Lake	Lassen	Modoc	Napa	Nevada	Placer	Plumas	Sacramento	Shasta	Sierra	Siskiyou	Solano	Sutter/Yuba	Tehama	Yolo
Alfalfa	53.3	54.7	54.7	54.7	49.5	53.3	43.4	49.5	53.3	54.7	53.3	56.1	51.2	53.3	46.3	52.8	54.7	54.7	56.1
Almond, mature	48.9	49.6	49.8	49.6	ND	49.1	ND	ND	49.1	49.8	49.1	50.5	49.1	49.1	ND	50.5	49.6	49.8	50.5
Almond, 4th leaf	44.0	44.7	44.8	44.7	ND	44.2	ND	ND	44.2	44.8	44.2	45.4	44.2	44.2	ND	45.4	44.7	44.8	45.4
Almond, 3rd leaf	36.7	37.2	37.4	37.2	ND	36.8	ND	ND	36.8	37.4	36.8	37.9	36.8	36.8	ND	37.9	37.2	37.4	37.9
Almond, 2nd leaf	26.9	27.3	27.4	27.3	ND	27.0	ND	ND	27.0	27.4	27.0	27.8	27.0	27.0	ND	27.8	27.3	27.4	27.8
Almond, 1st leaf	19.6	19.9	19.9	19.9	ND	19.6	ND	ND	19.6	19.9	19.6	20.2	19.6	19.6	ND	20.2	19.9	19.9	20.2
Apple	41.0	43.6	42.9	43.6	ND	40.4	ND	ND	40.4	42.9	40.4	45.5	40.2	40.4	40.0	45.5	43.6	42.9	45.5
Apricot/Aprium	41.0	43.6	42.9	43.6	ND	40.4	ND	ND	40.4	42.9	40.4	45.5	40.2	40.4	40.0	45.5	43.6	42.9	45.5
Asparagus	19.2	22.1	20.2	22.1	ND	17.3	ND	ND	17.3	20.2	17.3	23.1	20.6	17.3	23.9	23.1	22.1	20.2	23.1
Barley	28.4	28.7	29.4	28.7	ND	29.1	ND	ND	29.1	29.4	29.1	29.7	26.4	29.1	23.6	29.7	28.7	29.4	29.7
Bean - Green	19.2	22.1	20.2	22.1	ND	17.3	ND	ND	17.3	20.2	17.3	23.1	20.6	17.3	23.9	23.1	22.1	20.2	23.1
Bean Dry	28.4	28.7	29.4	28.7	ND	29.1	ND	ND	29.1	29.4	29.1	29.7	27.7	29.1	26.3	29.7	28.7	29.4	29.7
Beet	37.6	38.5	39.4	38.5	ND	ND	ND	ND	ND	39.4	ND	39.4	36.1	ND	36.1	39.4	38.5	39.4	39.4
Berry	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Blackberry	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0
Blueberry	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0
Cabbage	19.2	22.1	20.2	22.1	ND	17.3	ND	ND	17.3	20.2	17.3	23.1	20.6	17.3	23.9	23.1	22.1	20.2	23.1
Canola	28.4	28.7	29.4	28.7	ND	29.1	ND	ND	29.1	29.4	29.1	29.7	27.7	29.1	26.3	29.7	28.7	29.4	29.7
Carrot	19.2	22.1	20.2	22.1	ND	17.3	ND	ND	17.3	20.2	17.3	23.1	20.6	17.3	23.9	23.1	22.1	20.2	23.1
Cherry	41.0	43.6	42.9	43.6	ND	40.4	ND	ND	40.4	42.9	40.4	45.5	40.2	40.4	40.0	45.5	43.6	42.9	45.5
Chestnut	38.7	42.0	40.4	42.0	ND	37.2	ND	ND	37.2	40.4	37.2	43.7	37.8	37.2	38.5	43.7	42.0	40.4	43.7
Christmas Trees	41.9	42.2	43.7	42.2	ND	43.3	ND	ND	43.3	43.7	43.3	44.1	41.1	43.3	38.9	44.1	42.2	43.7	44.1
Cilantro	19.2	22.1	20.2	22.1	ND	17.3	ND	ND	17.3	20.2	17.3	23.1	20.6	17.3	23.9	23.1	22.1	20.2	23.1
Citrus	39.0	42.9	41.1	42.9	ND	37.2	ND	ND	37.2	41.1	37.2	45.0	38.1	37.2	39.1	45.0	42.9	41.1	45.0
Citrus	35.3	36.1	36.1	36.1	ND	35.3	ND	ND	35.3	36.1	35.3	37.0	35.3	35.3	ND	37.0	36.1	36.1	37.0
Corn - Fodder/Silage	33.2	32.4	34.6	32.4	ND	35.5	ND	ND	35.5	34.6	35.5	33.7	32.3	35.5	29.2	33.7	32.4	34.6	33.7
Corn - Grain	33.2	32.4	34.6	32.4	ND	35.5	ND	ND	35.5	34.6	35.5	33.7	32.3	35.5	29.2	33.7	32.4	34.6	33.7
Corn - Popcorn	33.2	32.4	34.6	32.4	ND	35.5	ND	ND	35.5	34.6	35.5	33.7	32.3	35.5	29.2	33.7	32.4	34.6	33.7
Corn - Sweet	33.2	32.4	34.6	32.4	ND	35.5	ND	ND	35.5	34.6	35.5	33.7	32.3	35.5	29.2	33.7	32.4	34.6	33.7
Cotton	33.7	35.9	35.2	35.9	ND	33.1	ND	ND	33.1	35.2	33.1	37.4	32.7	33.1	32.4	37.4	35.9	35.2	37.4
Cover Crop	CHOOSE SPECIFIC CROP			CHOOSE SPECIFIC CROP			CHOOSE SPECIFIC CROP			CHOOSE SPECIFIC CROP			CHOOSE SPECIFIC CROP			CHOOSE SPECIFIC CROP			
Cucumber	19.9	20.7	21.5	20.7	ND	ND	ND	ND	ND	21.5	ND	21.5	19.4	ND	19.4	21.5	20.7	21.5	21.5
Dichondra	41.9	42.2	43.7	42.2	ND	43.3	ND	ND	43.3	43.7	43.3	44.1	41.1	43.3	38.9	44.1	42.2	43.7	44.1
Fallow	7.1	6.5	7.4	6.5	ND	8.0	ND	ND	8.0	7.4	8.0	6.9	8.1	8.0	8.2	6.9	6.5	7.4	6.9
Fig	38.7	42.0	40.4	42.0	ND	37.2	ND	ND	37.2	40.4	37.2	43.7	37.8	37.2	38.5	43.7	42.0	40.4	43.7
Filbert	38.7	42.0	40.4	42.0	ND	37.2	ND	ND	37.2	40.4	37.2	43.7	37.8	37.2	38.5	43.7	42.0	40.4	43.7
Flower/Ornamental	41.9	42.2	43.7	42.2	ND	43.3	ND	ND	43.3	43.7	43.3	44.1	41.1	43.3	38.9	44.1	42.2	43.7	44.1
Grain Hay	28.4	28.7	29.4	28.7	ND	29.1	ND	ND	29.1	29.4	29.1	29.7	27.7	29.1	26.3	39.8	28.7	29.4	29.7
Grape - Other	ND	32.3	32.3	32.3	ND	ND	ND	ND	ND	32.3	ND	32.3	ND	ND	ND	32.3	32.3	32.3	32.3
Grape - Rootstock	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Grape - Wine	41.2	41.5	41.9	41.5	37.6	41.6	ND	37.6	41.6	41.9	41.6	42.1	40.1	41.6	38.5	39.8	41.5	41.9	42.1
Greenhouse	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Hay/Forage	CHOOSE SPECIFIC CROP			CHOOSE SPECIFIC CROP			CHOOSE SPECIFIC CROP			CHOOSE SPECIFIC CROP			CHOOSE SPECIFIC CROP			CHOOSE SPECIFIC CROP			
Herb/Spice	41.9	42.2	43.7	42.2	ND	43.3	ND	ND	43.3	43.7	43.3	44.1	41.1	43.3	38.9	44.1	42.2	43.7	44.1
Hops	42.5	42.5	42.5	42.5	ND	42.5	ND	ND	42.5	42.5	42.5	42.5	42.5	42.5	42.5	42.5	42.5	42.5	42.5
Kale	19.2	22.1	20.2	22.1	ND	17.3	ND	ND	17.3	20.2	17.3	23.1	20.6	17.3	23.9	23.1	22.1	20.2	23.1
Kiwi	48.0	48.0	48.0	48.0	ND	48.0	ND	ND	48.0	48.0	48.0	48.0	48.0	48.0	48.0	48.0	48.0	48.0	48.0
Lavender	41.9	42.2	43.7	42.2	ND	43.3	ND	ND	43.3	43.7	43.3	44.1	41.1	43.3	38.9	44.1	42.2	43.7	44.1
Leeks	19.2	22.1	20.2	22.1	ND	17.3	ND	ND	17.3	20.2	17.3	23.1	20.6	17.3	23.9	23.1	22.1	20.2	23.1
Melon	19.9	20.7	21.5	20.7	ND	0.0	ND	ND	0.0	21.5	0.0	21.5	19.4	0.0	19.4	21.5	20.7	21.5	21.5
Millet	28.4	28.7	29.4	28.7	ND	29.1	ND	ND	29.1	29.4	29.1	29.7	27.7	29.1	26.3	29.7	28.7	29.4	29.7
Misc Fruit Tree	38.7	42.0	40.4	42.0	ND	37.2	ND	ND	37.2	40.4	37.2	43.7	37.8	37.2	38.5	43.7	42.0	40.4	43.7
Misc Nut Tree	43.7	43.7	43.7	43.7	ND	ND	ND	ND	43.7	43.7	43.7	ND	ND	ND	ND	43.7	43.7	43.7	ND
Misc Row Crop	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Seasonal Crop ET Estimates (inches/year) These estimates should be adjusted as necessary for age, crop vigor, atypical density, etc. ND=No data																			
Crop	Butte	Colusa	El Dorado	Glenn	Lake	Lassen	Modoc	Napa	Nevada	Placer	Plumas	Sacramento	Shasta	Sierra	Siskiyou	Solano	Sutter/Yuba	Tehama	Yolo
Misc Truck Crop	19.2	22.1	20.2	22.1	ND	17.3	ND	ND	17.3	20.2	17.3	23.1	20.6	17.3	23.9	23.1	22.1	20.2	23.1
Misc Vegetable	19.2	22.1	20.2	22.1	ND	17.3	ND	ND	17.3	20.2	17.3	23.1	20.6	17.3	23.9	23.1	22.1	20.2	23.1
Nursery	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Oat	28.4	28.7	29.4	28.7	ND	29.1	44.3	ND	29.1	29.4	29.1	29.7	27.7	29.1	26.3	29.7	28.7	29.4	29.7
Okra	19.2	22.1	20.2	22.1	ND	17.3	ND	ND	17.3	20.2	17.3	23.1	20.6	17.3	23.9	23.1	22.1	20.2	23.1
Olive (table)	40.7	41.7	41.7	41.7	ND	40.7	ND	ND	40.7	41.7	40.7	42.7	40.7	40.7	40.7	42.7	41.7	41.7	42.7
Olive (oil)	32.6	33.4	33.4	33.4	ND	32.6	ND	ND	17.3	33.4	17.3	23.1	32.6	17.3	47.1	53.6	33.4	33.4	23.1
Onion	19.5	22.1	19.9	22.1	ND	17.3	ND	ND	17.3	19.9	17.3	22.5	20.6	17.3	23.9	22.5	22.1	19.9	22.5
Orange	35.3	36.1	36.1	36.1	ND	35.3	ND	ND	35.3	36.1	35.3	37.0	35.3	35.3	ND	37.0	36.1	36.1	37.0
Other	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Pasture	54.3	55.6	55.6	55.6	50.3	54.3	44.3	50.3	54.3	55.6	54.3	57.0	52.1	54.3	50.0	57.0	55.6	55.6	57.0
Pea	28.4	28.7	29.4	28.7	ND	29.1	ND	ND	29.1	29.4	29.1	29.7	27.7	29.1	26.3	29.7	28.7	29.4	29.7
Peach/Nectarine, mature	40.5	40.8	41.1	40.8	ND	40.8	ND	ND	40.8	41.1	40.8	41.4	40.8	40.8	ND	41.4	40.8	41.1	41.4
Peach, 5th leaf	32.4	32.6	32.9	32.6	ND	32.6	ND	ND	32.6	32.9	32.6	33.1	32.6	32.6	ND	33.1	32.6	32.9	33.1
Peach, 4th leaf	28.3	28.6	28.8	28.6	ND	28.5	ND	ND	28.5	28.8	28.5	29.0	28.5	28.5	ND	29.0	28.6	28.8	29.0
Peach, 3rd leaf	26.3	26.5	26.7	26.5	ND	26.5	ND	ND	26.5	26.7	26.5	26.9	26.5	26.5	ND	26.9	26.5	26.7	26.9
Peach, 2nd leaf	18.2	18.4	18.5	18.4	ND	18.4	ND	ND	18.4	18.5	18.4	18.6	18.4	18.4	ND	18.6	18.4	18.5	18.6
Peach, 1st leaf	10.9	11.0	11.1	11.0	ND	11.0	ND	ND	11.0	11.1	11.0	11.2	11.0	11.0	ND	11.2	11.0	11.1	11.2
Pear	41.0	43.6	42.9	43.6	ND	40.4	ND	ND	40.4	42.9	40.4	45.5	40.2	40.4	40.0	45.5	43.6	42.9	45.5
Pecan, mature	38.7	42.9	41.3	42.9	ND	37.2	ND	ND	37.2	41.3	37.2	45.5	37.8	37.2	38.5	45.5	42.9	41.3	45.5
Pecan, 3rd leaf	32.9	36.4	35.1	36.4	ND	31.6	ND	ND	31.6	35.1	31.6	38.6	32.2	31.6	32.7	38.6	36.4	35.1	38.6
Pecan, 2nd leaf	19.4	21.4	20.7	21.4	ND	18.6	ND	ND	18.6	20.7	18.6	22.7	18.9	18.6	19.2	22.7	21.4	20.7	22.7
Pecan, 1st leaf	11.6	12.9	12.4	12.9	ND	11.2	ND	ND	11.2	12.4	11.2	13.6	11.3	11.2	11.5	13.6	12.9	12.4	13.6
Pepper	27.0	27.1	27.9	27.1	ND	27.8	ND	ND	27.8	27.9	27.8	28.0	27.0	27.8	26.2	28.0	27.1	27.9	28.0
Persimmon	38.7	42.0	40.4	42.0	ND	37.2	ND	ND	37.2	40.4	37.2	43.7	37.8	37.2	38.5	43.7	42.0	40.4	43.7
Pistachio, mature	42.5	42.6	43.0	42.6	ND	42.8	ND	ND	42.8	43.0	42.8	43.2	42.8	42.8	ND	43.2	42.6	43.0	43.2
Pistachio, 5th leaf	34.0	34.1	34.4	34.1	ND	34.3	ND	ND	34.3	34.4	34.3	34.5	34.3	34.3	ND	34.5	34.1	34.4	34.5
Pistachio, 4th leaf	29.7	29.8	30.1	29.8	ND	30.0	ND	ND	30.0	30.1	30.0	30.2	30.0	30.0	ND	30.2	29.8	30.1	30.2
Pistachio, 3rd leaf	27.6	27.7	28.0	27.7	ND	27.8	ND	ND	27.8	28.0	27.8	28.1	27.8	27.8	ND	28.1	27.7	28.0	28.1
Pistachio, 2nd leaf	19.1	19.2	19.4	19.2	ND	19.3	ND	ND	19.3	19.4	19.3	19.4	19.3	19.3	ND	19.4	19.2	19.4	19.4
Pistachio, 1st leaf	11.5	11.5	11.6	11.5	ND	11.6	ND	ND	11.6	11.6	11.6	11.7	11.6	11.6	ND	11.7	11.5	11.6	11.7
Plum/Pluot	41.0	43.6	42.9	43.6	ND	40.4	ND	ND	40.4	42.9	40.4	45.5	40.2	40.4	40.0	45.5	43.6	42.9	45.5
Pomegranate	38.7	42.0	40.4	42.0	ND	37.2	ND	ND	37.2	40.4	37.2	43.7	37.8	37.2	38.5	43.7	42.0	40.4	43.7
Potato	37.6	38.5	39.4	38.5	ND	ND	ND	ND	ND	39.4	ND	39.4	36.1	ND	36.1	39.4	38.5	39.4	39.4
Prune, mature	43.2	43.7	43.8	43.7	ND	43.3	ND	ND	43.3	43.8	43.3	44.2	43.3	43.3	ND	44.2	43.7	43.8	44.2
Prune, 5th leaf	34.6	34.9	35.0	34.9	ND	34.6	ND	ND	34.6	35.0	34.6	35.4	34.6	34.6	ND	35.4	34.9	35.0	35.4
Prune, 4th leaf	30.2	30.6	30.6	30.6	ND	30.3	ND	ND	30.3	30.6	30.3	31.0	30.3	30.3	ND	31.0	30.6	30.6	31.0
Prune, 3rd leaf	28.1	28.4	28.5	28.4	ND	28.1	ND	ND	28.1	28.5	28.1	28.8	28.1	28.1	ND	28.8	28.4	28.5	28.8
Prune, 2nd leaf	19.4	19.6	19.7	19.6	ND	19.5	ND	ND	19.5	19.7	19.5	19.9	19.5	19.5	ND	19.9	19.6	19.7	19.9
Prune, 1st leaf	11.7	11.8	11.8	11.8	ND	11.7	ND	ND	11.7	11.8	11.7	11.9	11.7	11.7	ND	11.9	11.8	11.8	11.9
Pumpkin	19.9	20.7	21.5	20.7	ND	ND	ND	ND	ND	21.5	ND	21.5	19.4	ND	19.4	21.5	20.7	21.5	21.5
Raspberry	12.0	12.0	12.0	12.0	ND	12.0	ND	ND	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
Ryegrass	28.4	28.7	29.4	28.7	ND	29.1	ND	ND	29.1	29.4	29.1	29.7	27.7	29.1	26.3	29.7	28.7	29.4	29.7
Safflower	28.9	29.9	30.2	29.9	ND	29.1	ND	ND	29.1	30.2	29.1	31.2	27.7	29.1	26.3	31.2	29.9	30.2	31.2
Seed Crop	28.4	28.7	29.4	28.7	ND	29.1	ND	ND	29.1	29.4	29.1	29.7	27.7	29.1	26.3	29.7	28.7	29.4	29.7
Sorghum/Milo	33.2	32.4	34.6	32.4	ND	35.5	ND	ND	35.5	34.6	35.5	33.7	32.3	35.5	29.2	33.7	32.4	34.6	33.7
Squash	19.9	20.7	21.5	20.7	ND	ND	ND	ND	ND	21.5	ND	21.5	19.4	ND	19.4	21.5	20.7	21.5	21.5
Strawberry	28.7	28.7	29.4	28.7	ND	29.4	ND	ND	29.4	29.4	29.4	29.5	28.0	29.4	26.7	29.5	28.7	29.4	29.5
Sudan Grass	28.4	28.7	29.4	28.7	ND	29.1	ND	ND	29.1	29.4	29.1	29.7	27.7	29.1	26.3	29.7	28.7	29.4	29.7
Sunflower	28.9	29.9	30.2	29.9	ND	29.1	ND	ND	29.1	30.2	29.1	31.2	29.6	29.1	30.1	31.2	29.9	30.2	31.2
Tomato - Fresh Market	27.0	27.1	27.9	27.1	ND	27.8	ND	ND	27.8	27.9	27.8	28.0	27.0	27.8	26.2	28.0	27.1	27.9	28.0
Tomato - Processing	27.0	27.1	27.9	27.1	ND	27.8	ND	ND	27.8	27.9	27.8	28.0	27.0	27.8	26.2	28.0	27.1	27.9	28.0
Triticale	28.4	28.7	29.4	28.7	ND	29.1	ND	ND	29.1	29.4	29.1	29.7	27.7	29.1	26.3	29.7	28.7	29.4	29.7
Turf	44.1	45.0	45.0	45.0	40.7	44.1	ND	40.7	44.1	45.0	44.1	46.0	42.5	44.1	40.8	46.0	45.0	45.0	46.0

Seasonal Crop ET Estimates (inches/year) These estimates should be adjusted as necessary for age, crop vigor, atypical density, etc. ND=No data																			
Crop	**Butte**	**Colusa**	**El Dorado**	**Glenn**	**Lake**	**Lassen**	**Modoc**	**Napa**	**Nevada**	**Placer**	**Plumas**	**Sacramento**	**Shasta**	**Sierra**	**Siskiyou**	**Solano**	**Sutter/Yuba**	**Tehama**	**Yolo**
Turnip	37.6	38.5	39.4	38.5	ND	ND	ND	ND	ND	39.4	ND	39.4	36.1	ND	36.1	39.4	38.5	39.4	39.4
Vine Seed	28.4	28.7	29.4	28.7	ND	29.1	ND	ND	29.1	29.4	29.1	29.7	27.7	29.1	26.3	29.7	28.7	29.4	29.7
Walnut, mature	41.7	42.0	42.2	42.0	38.1	42.0	ND	38.1	42.0	42.2	42.0	42.5	42.0	42.0	ND	42.5	42.0	42.2	42.5
Walnut, 3rd leaf	35.5	35.7	35.9	35.7	32.4	35.7	ND	32.4	35.7	35.9	35.7	36.1	35.7	35.7	ND	36.1	35.7	35.9	36.1
Walnut, 2nd leaf	20.9	21.0	21.1	21.0	19.1	21.0	ND	19.1	21.0	21.1	21.0	21.2	21.0	21.0	ND	21.2	21.0	21.1	21.2
Walnut, 1st leaf	12.5	12.6	12.7	12.6	11.4	12.6	ND	11.4	12.6	12.7	12.6	12.7	12.6	12.6	ND	12.7	12.6	12.7	12.7
Watermelon	19.9	20.7	21.5	20.7	ND	21.5	ND	ND	21.5	21.5	21.5	21.5	19.4	19.4	19.4	21.5	20.7	21.5	21.5
Wheat	28.4	28.7	29.4	28.7	ND	29.1	ND	ND	29.1	29.4	29.1	29.7	27.7	29.1	26.3	29.7	28.7	29.4	29.7
Winter Grain	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Winter Vegetable	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

POTENTIAL RANGES OF IRRIGATION EFFICIENCY (%)
FOR TYPICAL IRRIGATION METHODS AND VARYING LEVELS OF IRRIGATION MANAGEMENT
(Adapted based upon information cited in UC ANR Publication 8571, Table 3)

Irrigation Method/System	Range in Potential Irrigation Efficiency (%)	Potential Irrigation Efficiency (%) (high level mgt)[1]	Potential Irrigation Efficiency (mid-level mgt)[2]	Potential Irrigation Efficiency (low level mgt)[3]
Mini/Microsprinkler				
Solid set, rotator, > 1 gpm nozzle	70 to 90	90	80	70
Minisprinkler, rotator, < 1 gpm nozzle	75 to 90	90	83	75
Microsprinkler – gph flow, fixed spray pattern	80 to 90	90	85	80
Drip irrigation	80 to 95	95	88	80
Subsurface drip irrigation	80 to 95	95	88	80
Sprinkler				
Solid set	70 to 85	85	78	70
Hand move	65 to 85	85	75	65
Side roll	65 to 85	85	75	65
Traveling gun (big gun)	65 to 75	75	70	65
Center pivot	75 to 90	90	83	75
Linear move	75 to 90	90	83	75
LEPA (Low Energy Precise Application)[4]	80 to 90	90	85	80
Surface				
Conventional furrow	45 to 65	65	55	45
Conventional furrow with tailwater return	60 to 80	80	70	60
Surge or alternate furrow	55 to 75	75	65	55
Basin flood	60 to 75	75	68	60
Precision level basin flood	60 to 80	80	70	60

[1] Irrigation systems often less than ten years old, frequent maintenance of irrigation systems, and use of ET_c, soil, or plant water status monitoring to guide irrigation scheduling.
[2] Irrigation systems often older than ten years, less frequent maintenance of irrigation systems, and minimal use of ET_c, soil, and plant water status to guide irrigation scheduling.
[3] Irrigation systems 20 years or older, very little or no maintenance of systems, and no use of ETc, soil moisture, or plant water status monitoring to guide irrigation scheduling.
[4] Linear move or center pivot systems that use drop tubes and low pressure bubblers to deliver water directly into furrows and minimize wind drip and canopy interference. Furrows are typically blocked with furrow dikes every two to four yards to control where water infiltrates.

How to Determine Level of Management

High Level

- Irrigation distribution evaluation completed every three to five years to identify maintenance needs.
- Assess water quality for changes in chemistry, biological materials (like bacteria, fungi, algae), and sediment load) at least every three to five years or when water supply is known to have changed.
- Select and inject acids, chloride, or polymers based upon known water quality.
- Clean filters, and flush hose lines at least every other month during irrigation season.
- Drive through check of irrigation system at each start up to scout for system breaks and needed plumbing repairs.
- Regular use of ET_c, soil, or plant water status monitoring to guide irrigation scheduling.

Mid-Level

- Irrigation distribution evaluation completed once when irrigation system nears ten years old.
- Assess water quality for changes at least every five years.
- Select and inject water treatment according to known water quality at least once each irrigation season.
- Clean filters and flush irrigation system at least once each season.
- Drive through check of irrigation system start up every two to four weeks to scout for system breaks and make plumbing repairs.
- Minimal use of ET_c, soil, and plant water status to guide irrigation scheduling.

Low Level

- Irrigation system uniformity not assessed over the life of the system.
- Unknown water quality.
- No filter maintenance or chemigation practiced other than fertilizer injection.
- Seldom check irrigation system at start up for breaks and necessary plumbing repairs.
- No use of ET_c, soil, and plant water status to guide irrigation scheduling.