Information Sources for

Irrigation and Nitrogen Management Plan worksheet *(FEB 2020)*

For Further Assistance Contact USDA NRCS (707) 448-0106

Item #2: Planned Crop Evapotranspiration (ET, inches per acre)

https://www.sacvalleydmt.org/static/documents/SacValley_Seasonal_Crop_ET_Estimates.pdf for estimated crop evaporation values by County. If you have more refined ET estimates or actuals for your fields or from local advisors, please use those.

Item #3: Anticipated Crop Irrigation (inches per acre)

Use prior year application amounts, if you have that data.

OR

$$\text{Inches applied} = \frac{\text{(Flow in cfs) x (Irrigation set time in hours)}}{\text{(Irrigated acres)}}$$

$$\text{Inches applied} = \frac{\text{(Flow in gpm} \div 449\text{) x (Irrigation set time in hours)}}{\text{(Irrigated acres)}}$$

OR

You can also estimate based on expected ET divided by the expected efficiency of your irrigation system

$$\text{Crop irrigation} = \frac{\text{Planned Crop Evapotranspiration in Inches}}{\text{Efficiency factor (range: 0.5-0.95)*}}$$

Estimates of field application efficiency by irrigation method* (efficiencies can vary widely by soil type, management and maintenance of systems). For more detailed ranges visit: https://www.sacvalleydmt.org/static/documents/UC_ANR_8571_Potential_Ranges_of_Irrigation_Efficiency.pdf

Irrigation methods	**Field application efficiency**
Surface irrigation (border, furrow, basin)	60%
Sprinkler irrigation	75%
Drip irrigation	90%

*excerpt from "Irrigation Water Management: Irrigation Scheduling" - International Institute for Land Reclamation and Improvement & FAO Land and Water Development Division

Items #12-14: N Recommended/Planned

Fertility management guidance via Fertilizer Research and Education Program (FREP)

http://apps.cdfa.ca.gov/frep/docs/Guidelines.html

These guidelines are based on research results from studies carried out in California and elsewhere. Detailed information is summarized in a user-friendly, easily searched interactive database. Information for most major crops is available now. Crops will continue to be added.

University of California Resources

UC Nutrient Management for Fruit, Nut, and Vegetable Crops

http://ucanr.edu/sites/nm/

Can search by crop or by topic for information. Links to UC publications with nutrient management guidance prepared by UC Farm Advisors and Researchers.

Specific Crops:

UC Fruit and Nut Research and Information Center: http://fruitsandnuts.ucdavis.edu/

UC Vegetable Research and Information Center: http://vric.ucdavis.edu/

Items #12-14: Nitrogen Fertilizers Applied (Actual)

Amount of Available N in Dry/Liquid Fertilizers (Q5)

The available nitrogen (N) in commercial fertilizer products (dry, liquid or foliar) is printed on fertilizer labels by the manufacturer/supplier as part of the Guaranteed Analysis or Grade, as required by State Law.

The amount of N in a product is expressed as a percentage by weight of the product for all dry and liquid fertilizer products. For liquid fertilizers, the product density must be known and is listed as pounds per gallon (lbs/gal) of the fertilizer product. The first three numbers of the Guaranteed Analysis describe the nitrogen, phosphorus and potash content of the product. Examples:

The granular fertilizer product 21-7-14 has 21% nitrogen by weight or 21 lbs of N per 100 pounds of product. It also contains 7% P_2O_5, and 14% K_2O.

The liquid product CAN 17 has 17% nitrogen by weight and a product density of 12.64 lbs/gal. Thus, each gallon of this product contains 2.15 lbs of nitrogen. A fertilizer supplier or Certified Crop Advisor (CCA) can provide assistance in determining the amount of N in commercial fertilizer.

IPNI Nutrient Source Specifics are fact sheets on common synthetic fertilizer materials.

http://www.ipni.net/specifics-en

Western Fertilizer Handbook (Dixon RCD has a copy available at the office)

A comprehensive reference and resource for nutrient management theory and practical information. Includes chapters on soils, water, plant growth as well as fertilizer materials, application methods, and management topics. Find it on Amazon for about $45.

Item #11: Organic Amendments (Manure/Compost/Other, lbs/ac estimate)

Oregon State online calculator

This free Excel spreadsheet allows you to calculate nutrient additions from various organic sources. You can also enter test results from your own compost/manure lab analysis. Cover crop contributions can be calculated as well.

http://smallfarms.oregonstate.edu/calculator

Western Fertilizer Handbook (see above)

UCANR Publication: "Organic Soil Amendments and Fertilizers"

Can be purchased at http://anrcatalog.ucdavis.edu/Items.aspx?search=organic%20soil or at your local UC Cooperative Extension office for $5.

Item #9: Soil - Available N in Root Zone (Annualized, lbs/acre)

Rule of thumb: 20-40 lb N per acre for each 1% Soil Organic Matter (SOM)

Soil test results for NO_3-N: lb N/ac = Soil NO_3-N (ppm) × 4

Item #10: N in Irrigation Water (Annualized, lbs/ac)

N in irrigation water (lbs/ac) = Inches of water applied x lbs NO_3-N per inch of irrigation water

$$\text{Inches applied} = \frac{(\text{Flow in cfs}) \times (\text{Irrigation set time in hours})}{(\text{Irrigated acres})}$$

$$\text{Inches applied} = \frac{(\text{Flow in gpm} \div 449) \times (\text{Irrigation set time in hours})}{(\text{Irrigated acres})}$$

lbs N/ac-in = ppm (NO_3-N) x 0.23

N in Water Unit conversions:

ppm (NO_3-N) = ppm (NO_3) x 0.226

FYI: No longer required on worksheets: N Removed in Crop

UCCE Nitrogen concentrations in harvested plant parts - A literature overview by Daniel Geissler includes nitrogen removed coefficients for most CA Central Crops.

FOR A COPY OF THE REPORT, VISIT:

https://www.dixonrcd.org/copy-of-nitrogen-management-plan

USDA Tool to Calculate Nutrient (N, P, K) Removal by Harvested Crop

Crop Nutrient Tool at following website has information about N, P, and sometimes K of crop residues. Need to input yield and know what the harvested portion is.

http://plants.usda.gov/npk/main

International Plant Nutrition Institute Crop Nutrient Removal Calculator app for i-Phone or i-Pad

Download the free app from App Store or i-Tunes to your i-Phone or i-Pad. About 80 crops are available, but be aware that some are listed in components (such as sugar beet tops and sugar beet roots) that you would need to add together if all components are removed from field.

https://itunes.apple.com/us/app/crop-nutrient-removal-calculator/id914110406?mt=8

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.

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**	**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

Seasonal Crop ET Estimates (inches/year) These estimates should be adjusted as necessary for age, crop vigor, atypical density, etc. ND=No data																			
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Misc Row Crop	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
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

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**	**Tehama**	**Yolo**
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
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