

Application Efficiency: Vineyard 2010

Table 1 - Application Efficiencies for different Irrigation Systems

| Irrigation System | Application Efficiencies (%) | | |
|-------------------------------|------------------------------|------|------|
| | Low | Mean | High |
| Surface Irrigation | | | |
| Wild Flood | 50 | 68 | 86 |
| Border | 62 | 73 | 83 |
| Basin | 72 | 83 | 93 |
| Furrow | 60 | 73 | 85 |
| Surface - Sprinkler Side-Roll | 60 | 68 | 75 |
| Surface - Sprinkler Hand-Move | 60 | 68 | 75 |
| Sprinkler | | | |
| Permanent | 70 | 78 | 85 |
| Hand-Move | 60 | 70 | 80 |
| Linear-Move | 73 | 82 | 90 |
| Side-Roll | 60 | 70 | 80 |
| Micro-Mini | 73 | 81 | 88 |
| Hose-Pull | 70 | 73 | 75 |
| Center - Pivot | 70 | 80 | 90 |
| Drip | | | |
| Above ground | 77 | 86 | 95 |
| Buried drip | 77 | 86 | 95 |

Table 2 - Application Efficiency Estimates

| Code | Hydrologic Region | Application Efficiency (%) | | |
|------|-------------------|----------------------------|-------------|-------------|
| | | Low | Mean | High |
| 1 | North Coast | 76.2 | 85.1 | 93.8 |
| 2 | San Francisco Bay | 76.5 | 85.4 | 94.3 |
| 3 | Central Coast | 76.7 | 85.7 | 94.6 |
| 4 | South Coast | 76.8 | 85.8 | 94.7 |
| 5 | Sacramento River | 70 | 80.5 | 90.6 |
| 6 | San Joaquin River | 71.6 | 81.9 | 91.9 |
| 7 | Tulare Lake | 69 | 79.9 | 90.4 |
| 8 | North Lahontan | 75.5 | 84.3 | 92.9 |
| 9 | South Lahontan | 74.4 | 84 | 93.5 |
| 10 | Colorado River | 76.8 | 85.8 | 94.8 |
| | Statewide | 73.1 | 83.0 | 92.6 |

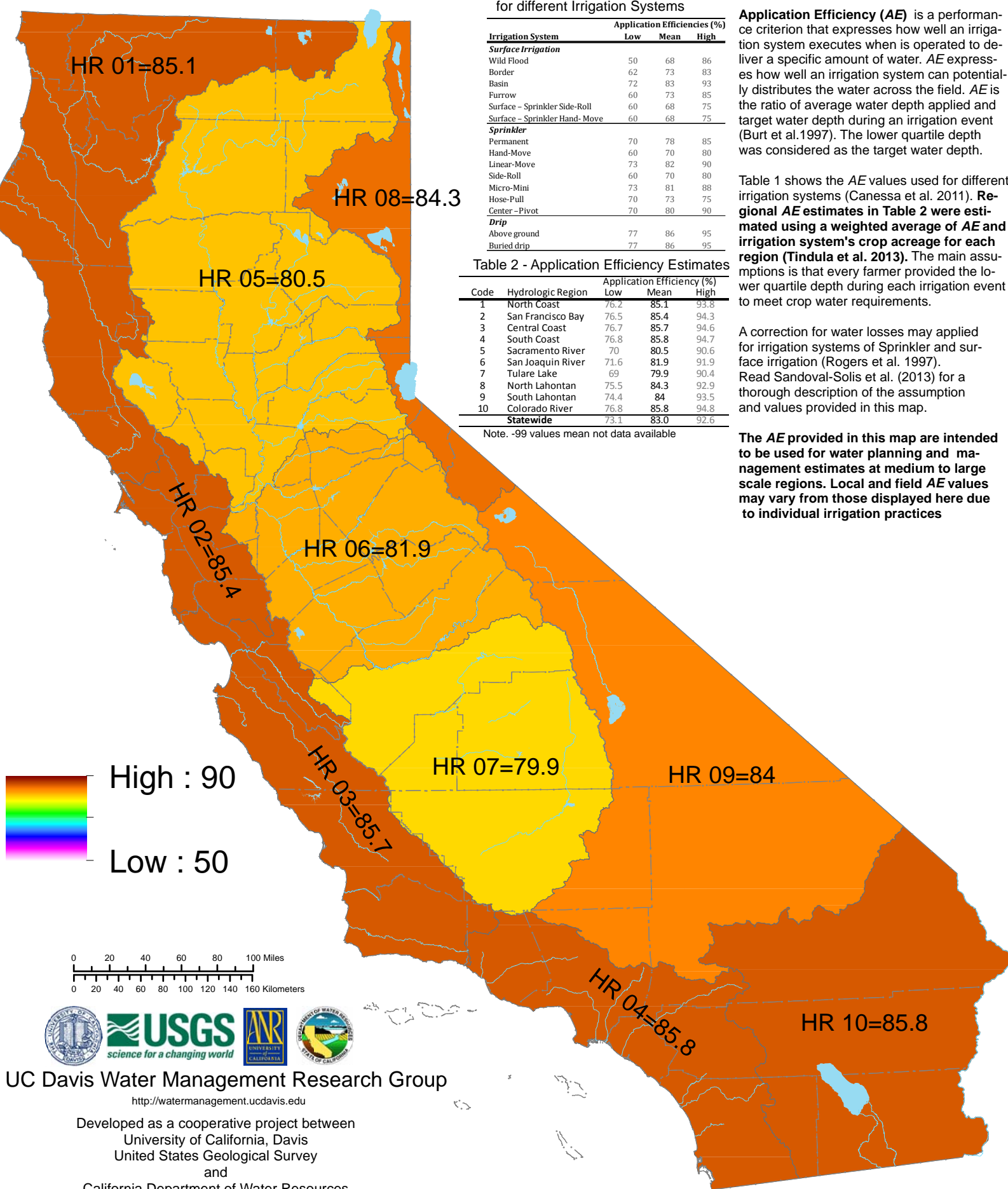
Note: .99 values mean not data available

Application Efficiency (AE) is a performance criterion that expresses how well an irrigation system executes when is operated to deliver a specific amount of water. AE expresses how well an irrigation system can potentially distributes the water across the field. AE is the ratio of average water depth applied and target water depth during an irrigation event (Burt et al.1997). The lower quartile depth was considered as the target water depth.

Table 1 shows the AE values used for different irrigation systems (Canessa et al. 2011). **Regional AE estimates in Table 2 were estimated using a weighted average of AE and irrigation system's crop acreage for each region (Tindula et al. 2013).** The main assumption is that every farmer provided the lower quartile depth during each irrigation event to meet crop water requirements.

A correction for water losses may applied for irrigation systems of Sprinkler and surface irrigation (Rogers et al. 1997). Read Sandoval-Solis et al. (2013) for a thorough description of the assumption and values provided in this map.

The AE provided in this map are intended to be used for water planning and management estimates at medium to large scale regions. Local and field AE values may vary from those displayed here due to individual irrigation practices



UC Davis Water Management Research Group

<http://watermanagement.ucdavis.edu>

Developed as a cooperative project between
University of California, Davis
United States Geological Survey
and
California Department of Water Resources

Map prepared by P.I.: Samuel Sandoval Solis, Ph.D. © 2013.

Burt, C.M., Clemmens, A.J., Stekoloff, T.S., Solomon, K.H., Bliesner, R.D., Hardy, L.A., Howell, T.A., Eisenhauer, D.E. (1997). "Irrigation Performance Measures: Efficiency and Uniformity." *Journal of Irrigation and Drainage Engineering*, (123)6, 423-442.
Canessa, P., Green, S., and Zolotarev, D. (2011). "Agricultural Water Use in California: A 2011 Update." *Nature*, K., ed. Center for Irrigation Technology, California State University, Fresno, Fresno, CA.
Rogers, D.H., Lamm, F.R., Allen, M., Troenkle, T.P., Clark, G.A., Barnes, P.L., and Martin, K. (1997). "Efficiencies and Water Losses of Irrigation Systems." *Irrigation Management Series*, Research and Extension Engineers, Kansas State University.
Tindula, G.N., Orang, M.A., and Snyder, R.L. (2013). "Survey of Irrigation Methods in California in 2010." *J. of Irrigation and Drainage Engineering*, ASCE, in press.
Sandoval-Solis, S., Orang, M., Snyder, R., Williams, K.E., and Rodriguez, J.M. (2013). "Spatial Analysis of Application Efficiencies in Irrigation Systems for the State of California." Final report, U.S. Geological Survey, California Institute for Water Resources.
<http://watermanagement.ucdavis.edu/library/>