

This presentation premiered at WaterSmart Innovations

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Non-Ideal Weather Stations Study

WaterSmart Innovations 2008

Las Vegas, Nevada

October 9th 2008

Cayle Little

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Urban Water
Conservation
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Department of Water Resources



What are Non-Ideal Weather Sites?

- Very similar to CIMIS
- Provide ETo information
- Located on surfaces other than grass



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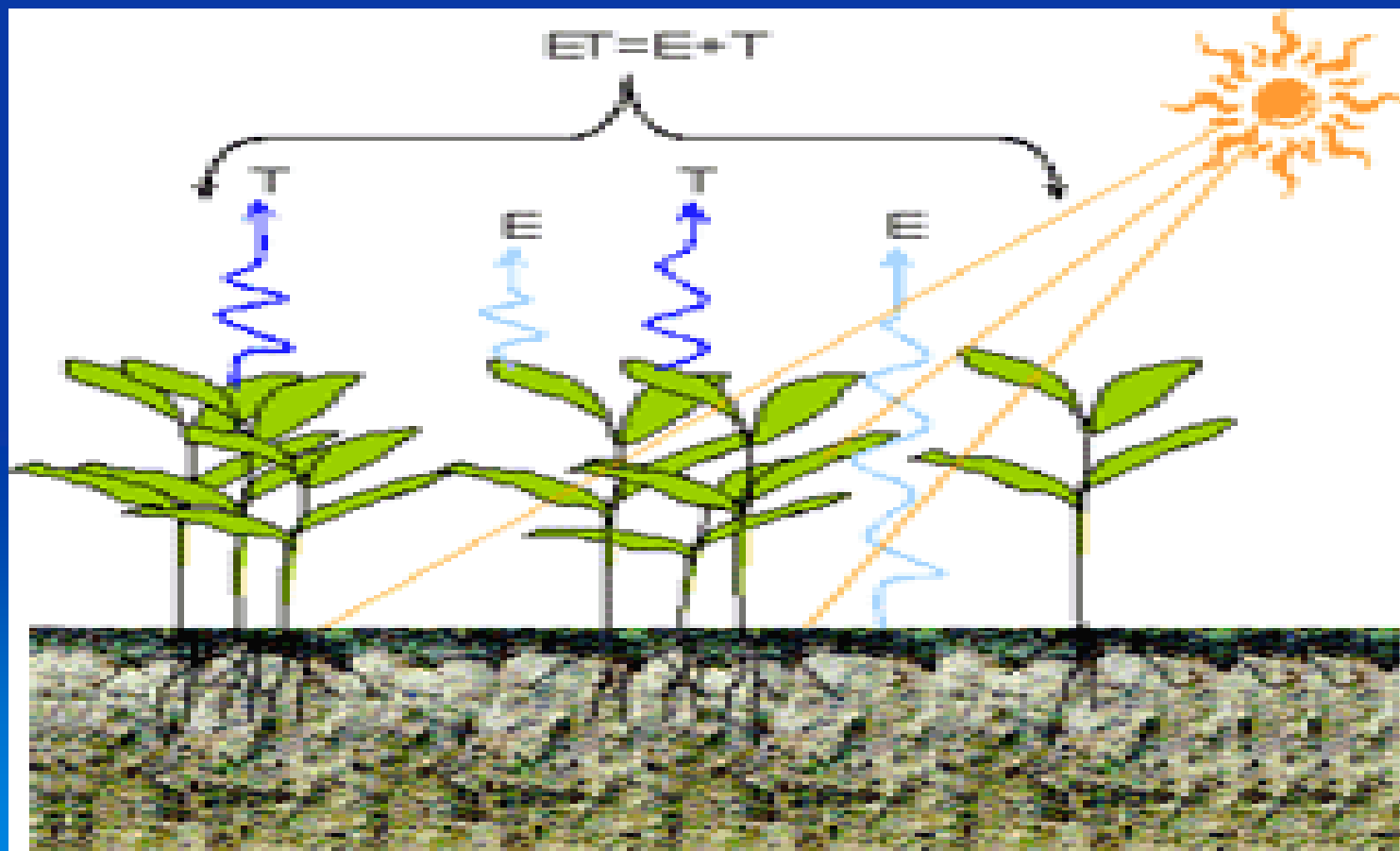
What is Evapotranspiration (ET)?



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Factors Affecting ET

- Weather parameters
- Soil factors
- Plant factors



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Reference Crops

- High number of variables
- Reference crops are well irrigated grass (ET_o) or alfalfa (ET_r).
- Crop Coefficient's (K_c's) are used to convert ET_o to actual ET (E_t) for specific crops.



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California Irrigation Management Information System (CIMIS)



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- Over 130 active stations
- Historical data on over 70 inactive stations
- Stations are both publicly and privately owned



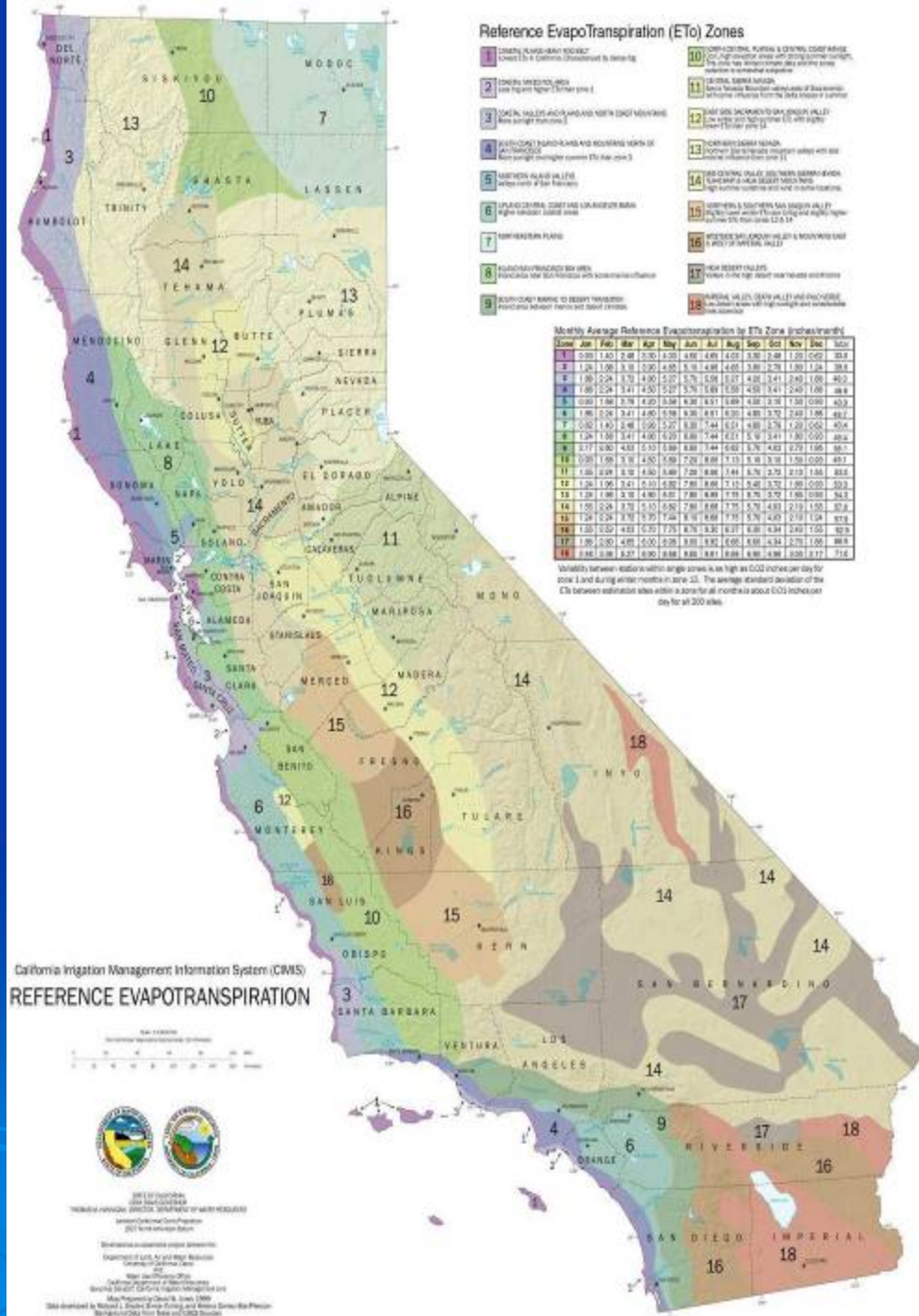
ETo Map

- California's ETo is complex
- Are the 130 stations representative?
- Microclimates?

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Limitations of CIMIS

- One station per 1,200 mi² assuming even distribution
- Stations are not evenly distributed
- Location availability is limited in some areas
- Microclimates may not be well represented.





ETo Data

- Who is using CIMIS ETo data?
- What are the uses for ETo data?
- How can this affect water conservation?



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How CIMIS Works

- Readings are taken every minute
- Hourly averages and totals
- Daily averages and totals
- The data is polled by a CIMIS polling computer



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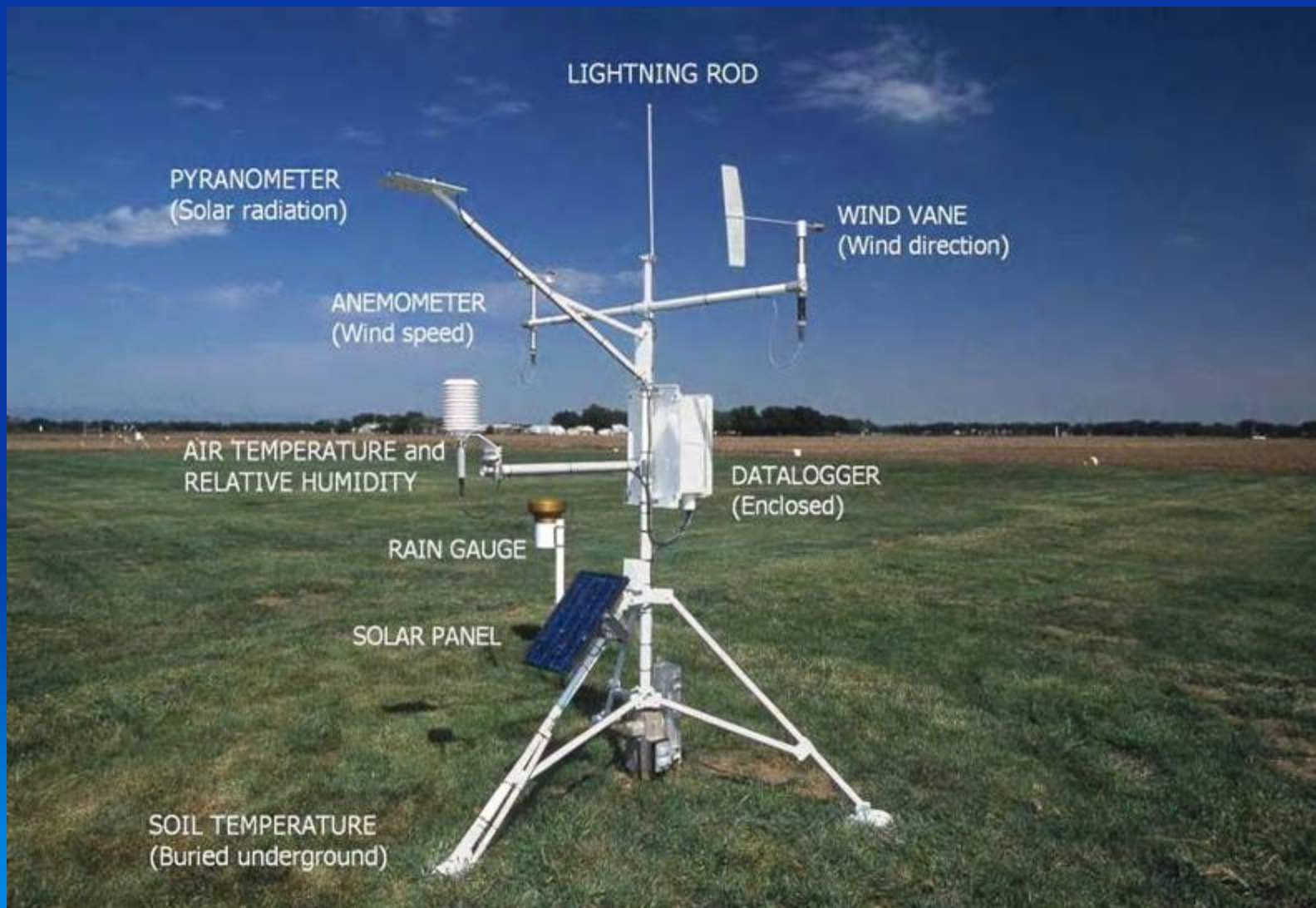
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Each station carries various sensors, a solar panel, a modem, and a datalogger.



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What Makes CIMIS Successful?

- Regular site maintenance
- Equipment calibration
- High quality equipment
- Data quality control program



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Site Selection

- Careful regional site selection
- Stringent quality assurance guidelines
 - Unobstructed solar radiation
 - Unobstructed wind fetch
 - Adequate irrigated grass fetch



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Site Selection (cont.)

- The fetch affects the boundary layer in which measurements are taken
- Finding irrigated fetch is a challenge under urban settings
- Fetch is key in weather based calculation of ET_o



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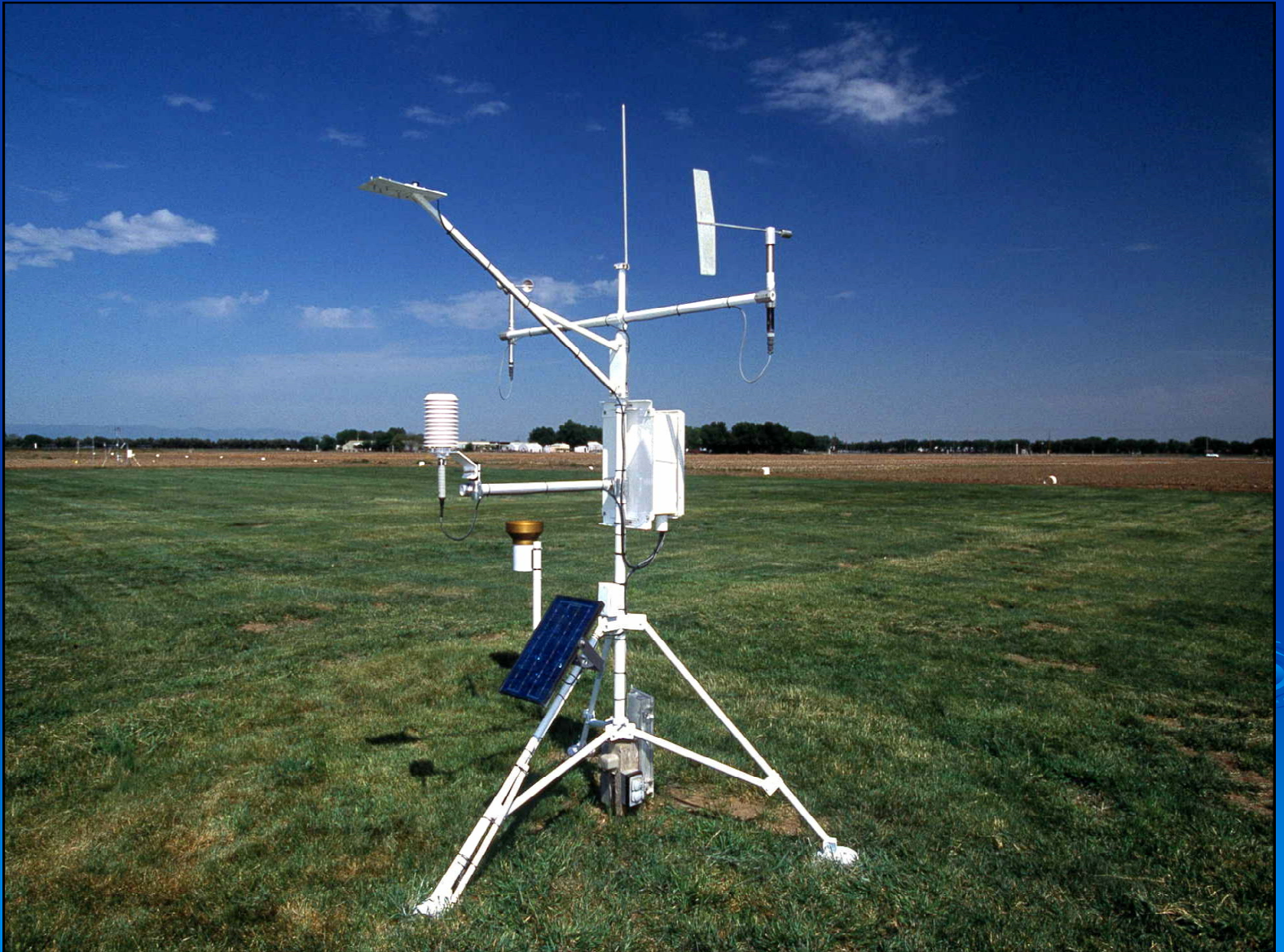
A typical CIMIS Site



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Why in Urban settings?

- CIMIS was originally designed for agriculture.
- Focus on water conservation in urban areas is growing
- Landscaping water use is significant
- ETo estimates in urban areas are needed



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Non-Ideal Sites

- Non-Ideal sites do not require the large grass fetch
- Other requirements for a site are similar to CIMIS
- Non- Ideal stations do not require all CIMIS station sensors



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**The only siting difference
is the grass fetch.**



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The Current Study Involves...

- A permanent Non-Ideal site
- A temporary reference site, in the same microclimate
- Collect data for at least a year and develop correlations
- Correlations would be used to adjust data from the Non-Ideal site
- Removal of the reference site





Are Non-Ideal Sites An Effective Option?

- A recent study by UC Davis:
 - Outlined possible scenarios
 - Small but clearly indicated potential.
 - Recommended testing on a larger scale.
 - That recommendation founded this current ongoing study.
- An effective alternative?
We hope.





What do Non-Ideal Sites cost?

- Hardware \$5,000 to \$6,000
- Misc. expenses, \$1,000 - \$3,000
- Low Maintenance costs
- Fetch installation & maintenance, if any, can significantly increase costs.





Non-Ideal Stations: Present

- Nine Non-Ideal stations are collecting data
- Stations are polled manually
- Detailed data analysis is starting.
- Several proposed Non-Ideal sites qualified as standard CIMIS stations.





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Challenges

- Difficult to find optimal Non-Ideal sites in most urban settings.
 - Nearby CIMIS stations have been used as reference stations
- The current grant expires in early 2009
- Locating additional cooperators



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Non-Ideal Stations: Future

- Currently working on nine additional stations
- A polling PC is scheduled to go on line shortly,
- A web site for public access is proposed



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Special Thanks



- California Urban Water Conservation Council
- Department of Water Resources

- Kent Frame
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Thank You, Questions? Cayle Little

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