



Sustainability

 Facilities Services

- Markus Hogue
- Program Coordinator: Irrigation & Water Conservation
- The University of Texas at Austin

President's Sustainability Steering Committee

- In May 2007, President William Powers established the University Task Force on Sustainability
- University adopted a policy regarding sustainability in April 2008
- By August 31, 2020, UT Austin will reduce domestic water use by 20% with at least 40% of total water use coming from reuse/reclaimed sources



U.S. Drought Monitor

Texas

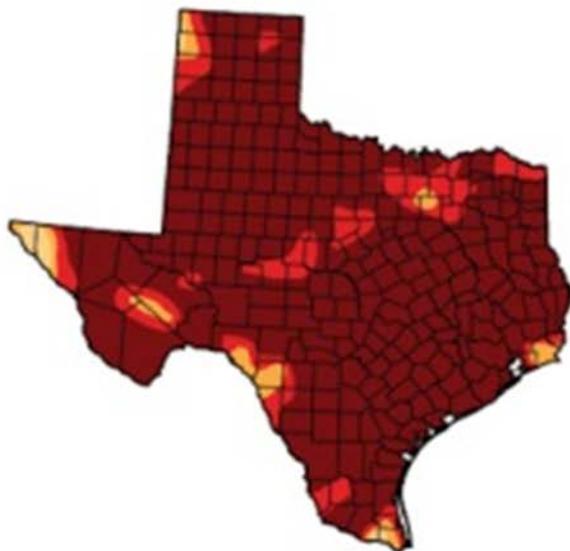
September 20, 2011

Valid 7 a.m. EST

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	0.00	100.00	100.00	99.03	96.10	85.43
Last Week (09/13/2011 map)	0.00	100.00	100.00	99.17	96.75	87.83
3 Months Ago (06/21/2011 map)	3.33	96.67	96.71	94.52	91.31	70.61
Start of Calendar Year (12/26/2010 map)	7.89	92.11	89.43	37.46	9.59	0.00
Start of Water Year (09/26/2010 map)	75.57	24.43	2.43	0.99	0.00	0.00
One Year Ago (09/14/2010 map)	77.93	22.07	3.37	0.97	0.00	0.00

Intensity:



The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

<http://drought.unl.edu/dm>

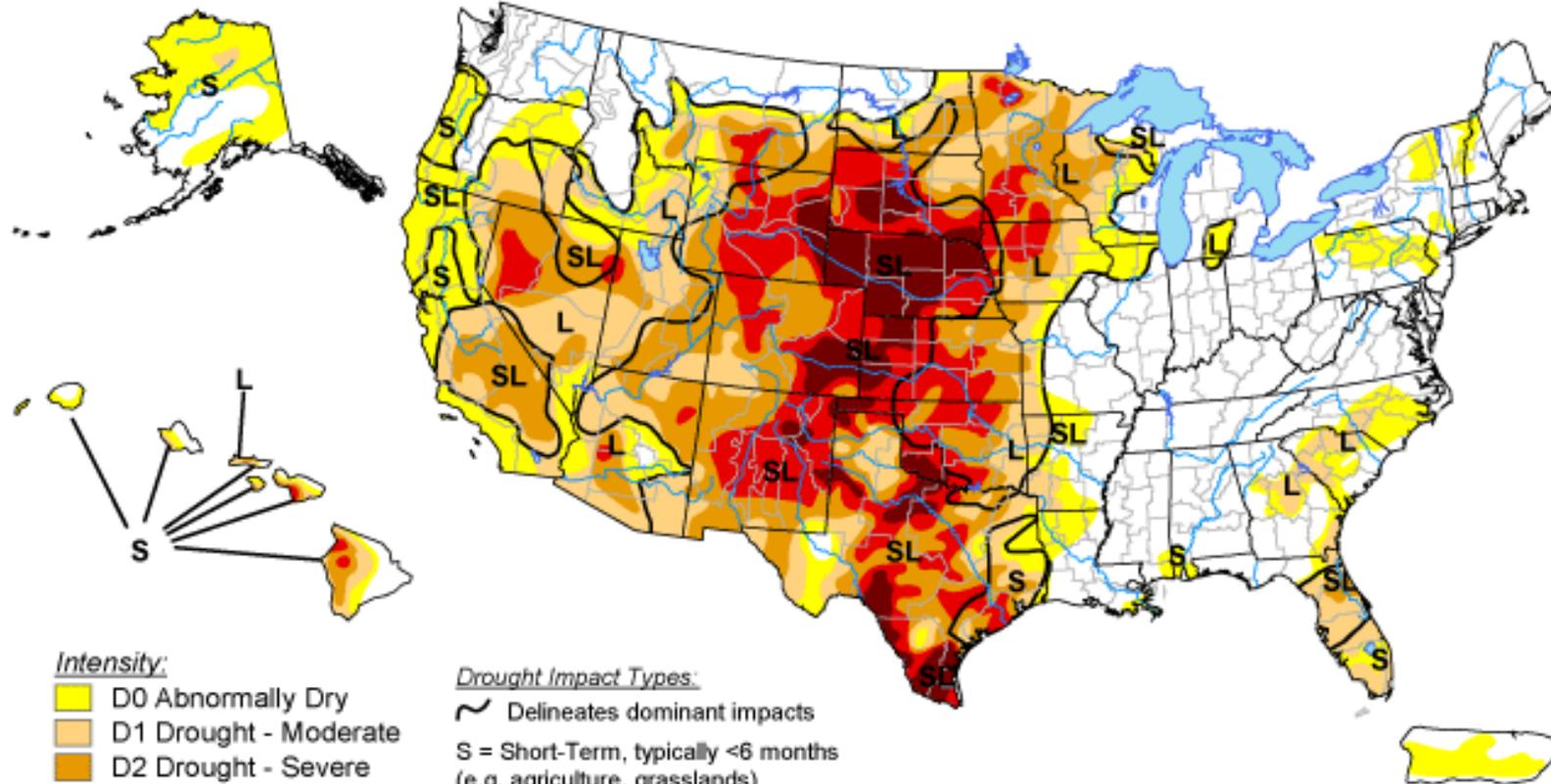


Released Thursday, September 22, 2011
Michael Brewer, National Climatic Data Center/NOAA

U.S. Drought Monitor

April 2, 2013

Valid 7 a.m. EDT



Intensity:

-  D0 Abnormally Dry
-  D1 Drought - Moderate
-  D2 Drought - Severe
-  D3 Drought - Extreme
-  D4 Drought - Exceptional

Drought Impact Types:

-  Delineates dominant impacts
- S = Short-Term, typically <6 months
(e.g. agriculture, grasslands)
- L = Long-Term, typically >6 months
(e.g. hydrology, ecology)

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

<http://droughtmonitor.unl.edu/>



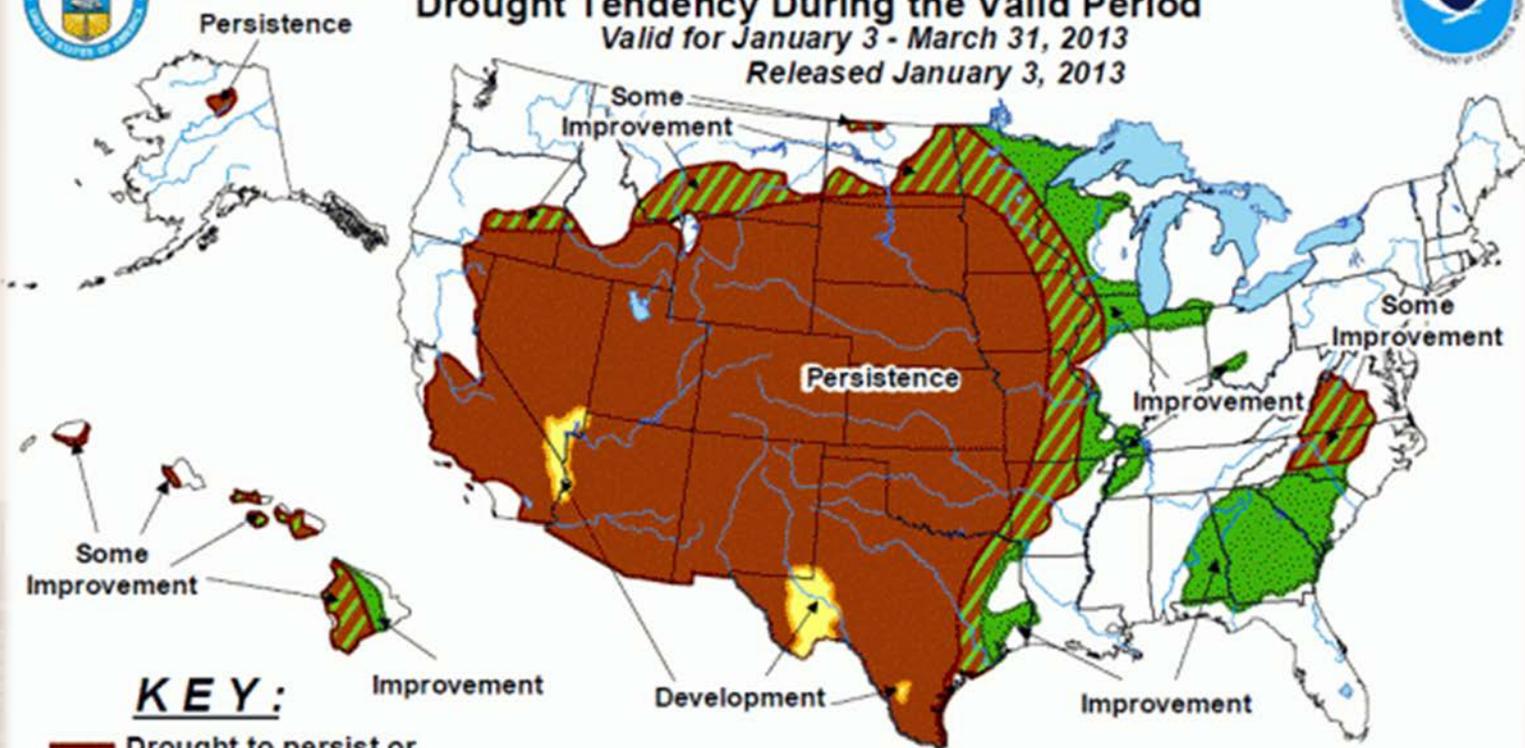
Released Thursday, April 4, 2013
Author: Rich Tinker, NOAA/NWS/NCEP/CPC



U.S. Seasonal Drought Outlook

Drought Tendency During the Valid Period

Valid for January 3 - March 31, 2013
Released January 3, 2013



KEY:

-  Drought to persist or intensify
-  Drought ongoing, some improvement
-  Drought likely to improve, impacts ease
-  Drought development likely

No Drought
Posted/Predicted 

Depicts large-scale trends based on subjectively derived probabilities guided by short- and long-range statistical and dynamical forecasts. Short-term events -- such as individual storms -- cannot be accurately forecast more than a few days in advance. Use caution for applications -- such as crops -- that can be affected by such events. "Ongoing" drought areas are approximated from the Drought Monitor (D1 to D4 intensity). For weekly drought updates, see the latest U.S. Drought Monitor. NOTE: the green improvement areas imply at least a 1-category improvement in the Drought Monitor intensity levels, but do not necessarily imply drought elimination.

UT Main Campus

107 Automatic Irrigation Controllers

2,288 irrigation zones

29,744 irrigation heads

53 manual zones

Past yearly irrigation consumption

175 million gallons of water

2012 consumption was 66% lower
on automated systems



Past Irrigation Information

Water Meter Data from Irrigation Meters

- 285 million gallons average for past 3 years

Calculation based on nozzle precipitation

- 182 million gallons per year

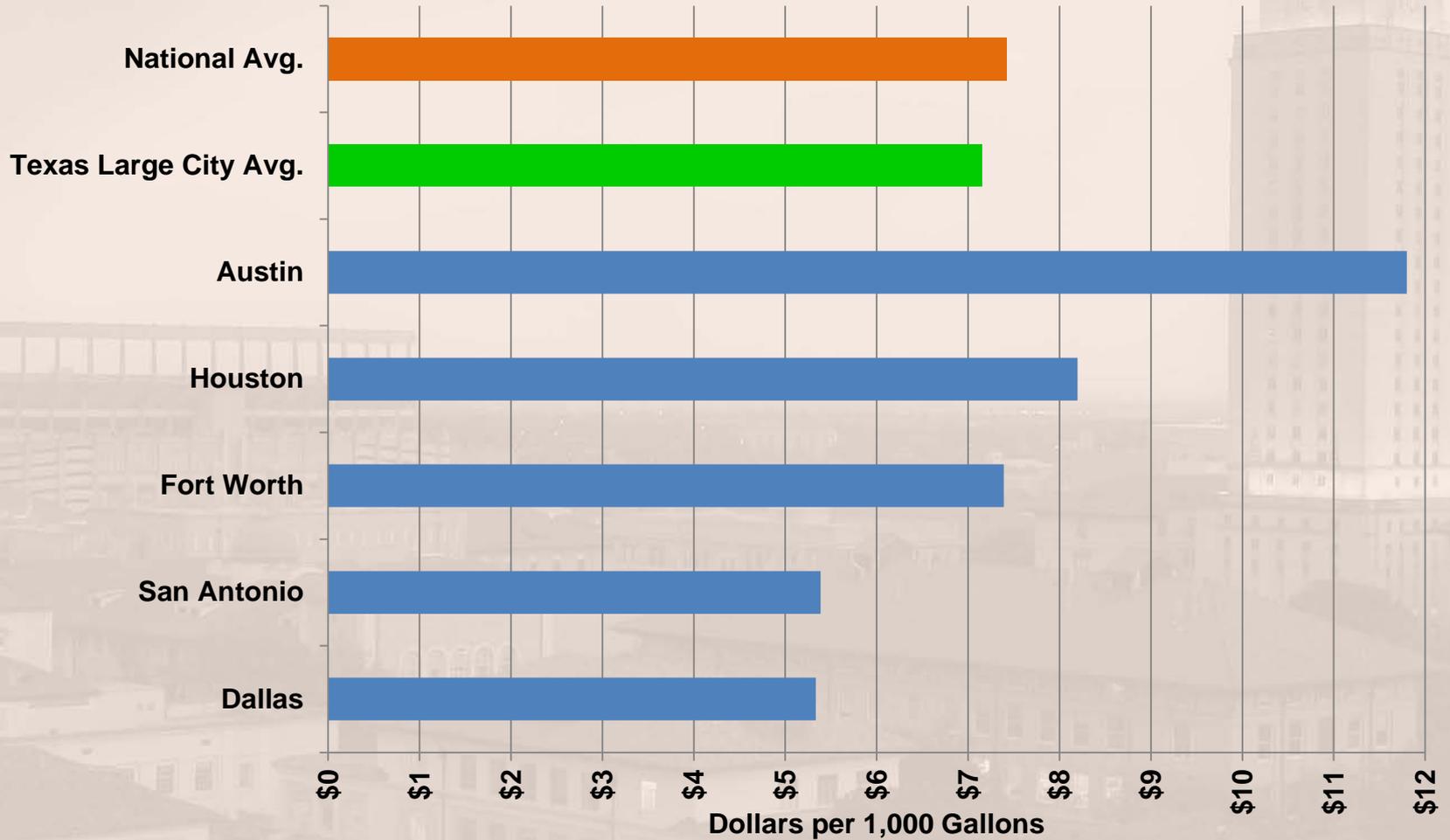
WMI Irrigation Audit in 2007-2008

- 176 million gallons per year

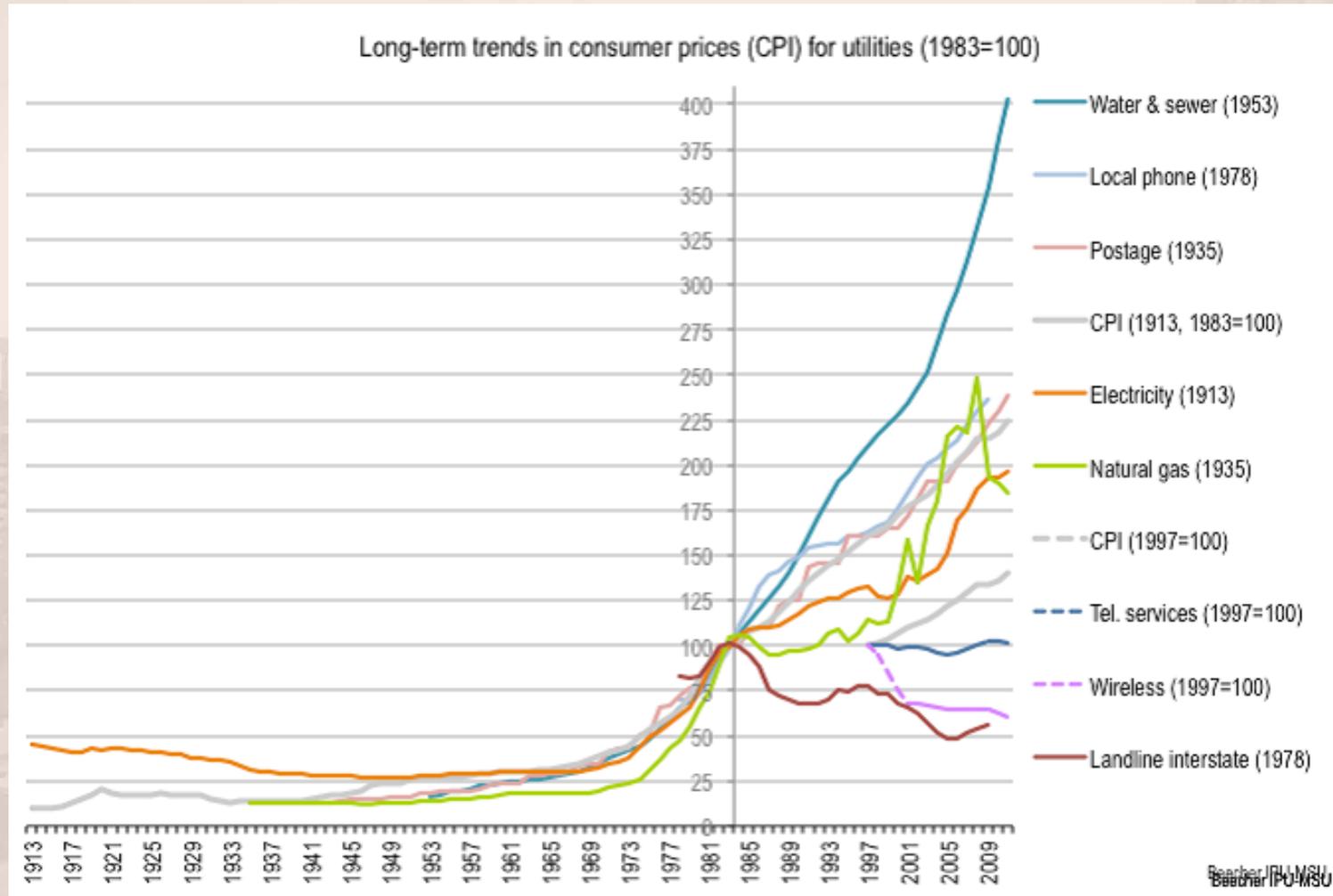
Present Data Collection

<u>Water Usage</u>	July 27, 2012 10:04:09 AM	Jun/01/2012 - Jun/30/2012	
	Usage (Gallons)	ET Table (Inches)	Rain Table (Inches)
Zone 1			
LFH			
Jun-2012	61,043	7.93	0.00
Total	61,043	7.93	0.00
LLC			
Jun-2012	53,175	8.28	0.00
Total	53,175	8.28	0.00
LTD			
Jun-2012	352	8.28	0.00
Total	352	8.28	0.00
LTD Courtyard			
Jun-2012	4,716	7.93	0.00
Total	4,716	7.93	0.00
SAG			
Jun-2012	3,788	8.28	0.00
Total	3,788	8.28	0.00
SEA			
Jun-2012	138,540	8.28	0.00
Total	138,540	8.28	0.00
SSB			
Jun-2012	51,392	8.28	0.00
Total	51,392	8.28	0.00
SMC			

2010 Combined Commercial Water & Sewer Rates



Pricing trend comparison



Irrigation and Water Management

- Distribution methods
- Central Irrigation System
- Flow Sensors
- Mapping
- Internships



Replaced over
18,000 nozzles

AFTER:

No Misting

+ No Drifting

= Minimal Water
Waste



Nozzles



Nozzles



Drip Irrigation

- Water applied where it is needed
- Reduced water waste



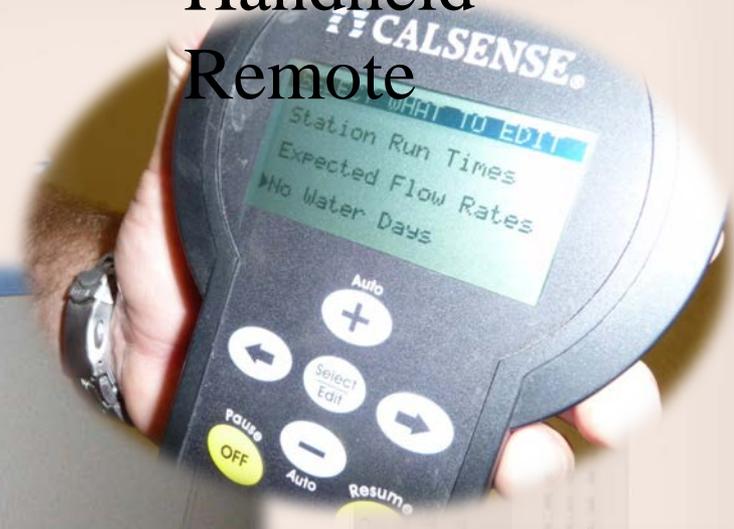
Irrigation and Water Management

- Installed a 2.1 million dollar centralized Irrigation system
- Adhere to City Watering Regulations
- Maintenance/Repair
- High Water usage Systems

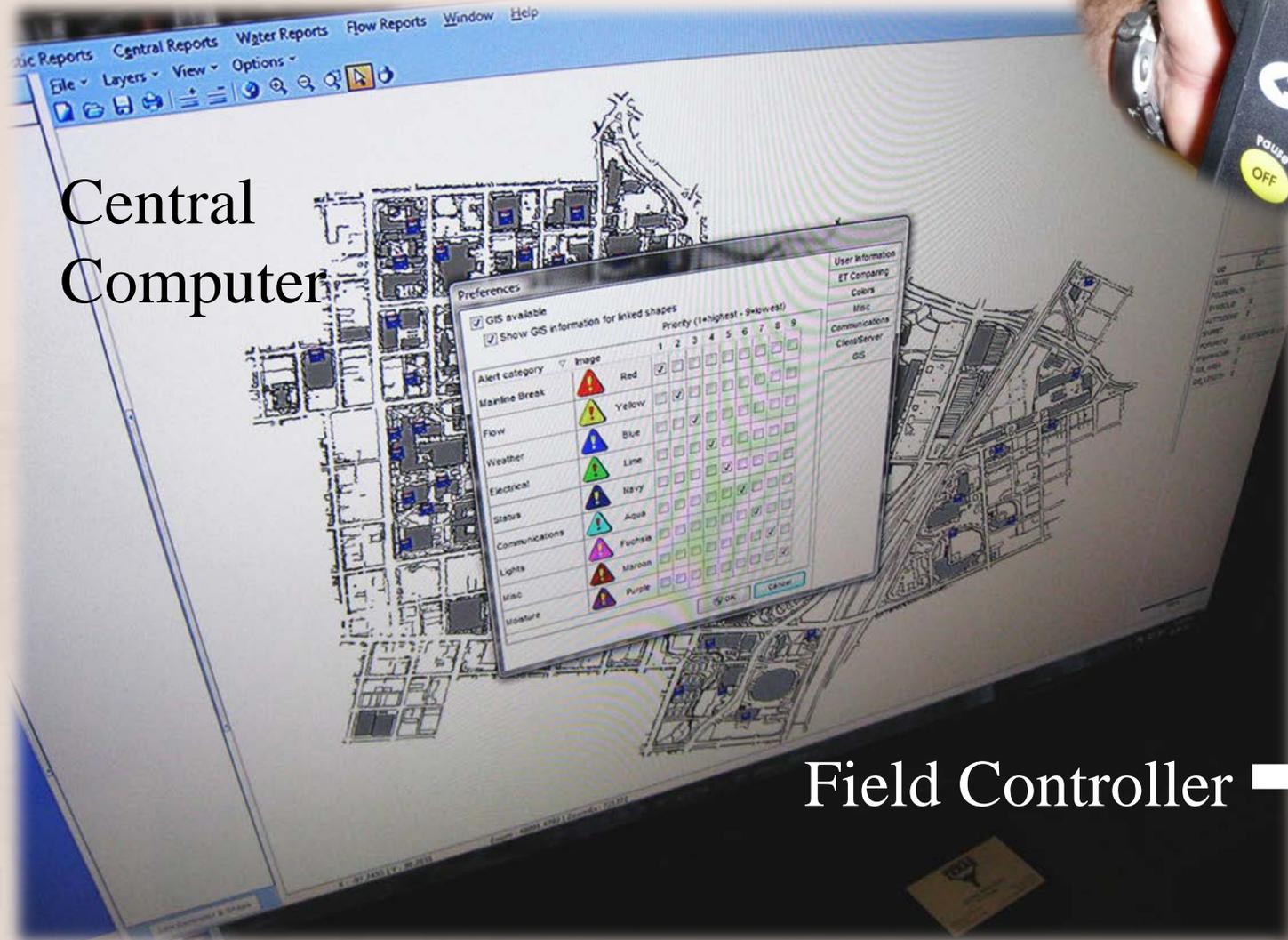


Centralized Irrigation Management

Handheld Remote



Central Computer



Field Controller →



Universal Control and Data Access

The screenshot displays the Calsense Command Center software interface. The title bar reads "Calsense Command Center {Administrator} - [Speed Communications]". The menu bar includes "File", "RR", "Setup", "Communications", "Program Data", "Diagnostic Reports", "Central Reports", "Water Reports", "Flow Reports", "Window", and "Help".

The interface is divided into several sections:

- Left Sidebar (Navigation):**
 - Setup:** Site/Controller, Tasks, Alert Filters & Repo..., Access Control, Controller Assignment, User Log, Rain Polling.
 - Communications:** Speed Communicati..., Task Scheduler, Communications Log, Winter Shutdown, Terminate Winter S...
 - Program data:** Program Data.
 - Diagnostic repo...:** Alerts, Station History.
 - Central reports:** Controller List, Task List, Disabled Communic..., No Report Gathering.
 - Water reports:** Water Management, Water Usage, Controller Summary, Station Summary, POC Summary, Station Costing.
 - Flow reports:** (Dropdown arrow).
 - Latest Alerts:** (Section at the bottom).
- Tree View (Sites/Controllers):**
 - <All Controllers>
 - HUB
 - Training
 - Zone 1
 - ADH
 - ARC
 - Belo
 - CMB
 - CPE
 - ETC
 - KIN
 - LFH
 - LLC
 - LTD
 - LTD Courtyard
 - SAG
 - SEA
 - SSB
 - SWG
 - TSG
 - Zone 2
 - Zone 3
 - Zone 4
 - Zone 5
 - Zone 6
 - Zone 7
 - Zone 8

- Main Panel (Action Grid):**

Select controller then select option to perform:

Get Alerts	Get Program Data	Get Station History	Get All Diagnostics
Send No Water Days	Controller ON	Controller OFF	
Direct Access	Get Manual Programs	Send Access Control Codes	Get Lights
Clear Mainline Break	Master Valve Override	Clear Hold Over	Set Time And Date
Send Program Tag Operations	Lights Override	Get Flow Recording	

Calsense Controllers



Hand Held Remote



Communication Method

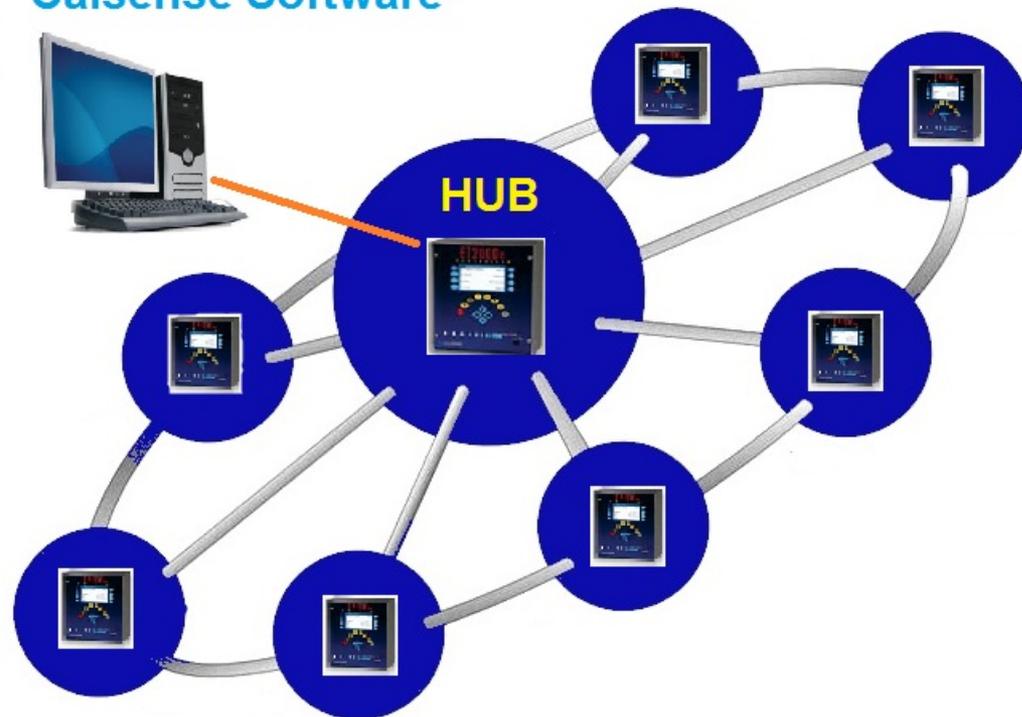
Laptop



Calsense Software



iPad or Phone



Offsite Management



GIS Map with Alert Notification

The screenshot displays the Calsense Command Center GIS Viewer interface. The main window shows a detailed GIS map of a city area with numerous blue alert icons overlaid on various buildings and streets. The interface includes a menu bar (File, BRe, Setup, Communications, Program Data, Diagnostic Reports, Central Reports, Water Reports, Flow Reports, Window, Help) and a toolbar with standard GIS navigation tools. On the left, a 'Sites/Controllers' tree view shows a hierarchy starting with '<All Controllers>', followed by 'HUB', and then 'Zone 1' through 'Zone 8'. A 'Preferences' dialog box is open in the foreground, allowing users to configure alert notifications. The dialog has sections for 'Alert category', 'Image', and 'Priority (1=highest - 9=lowest)'. The 'Alert category' list includes Mainline Break, Flow, VWeather, Electrical, Communications, Status, Lights, Misc, and Moisture. The 'Image' column shows corresponding icons (e.g., red triangle for Mainline Break, blue triangle for VWeather). The 'Priority' grid allows users to select a priority level for each category. The 'User Information' section on the right of the dialog includes 'ET Comparing', 'Colors', 'Misc', 'Communications', 'Client/Server', and 'GIS'. At the bottom of the dialog are 'OK' and 'Cancel' buttons. A 'Latest Alerts' button is visible in the bottom left corner of the application window. The status bar at the very bottom shows coordinates (X: -97.7470 | Y: 30.2901) and zoom information (Zoom: 49011.8378 | ZoomEx: 735177.5).

Alert category | Image | Priority (1=highest - 9=lowest)

Alert category	Image	1	2	3	4	5	6	7	8	9
Mainline Break	Red	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Flow	Yellow	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
VWeather	Blue	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Electrical	Lime	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Communications	Aqua	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Status	Navy	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lights	Fuchsia	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				
Misc	Maroon	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>					
Moisture	Purple	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>						

Alerts

Alerts By Site

February 05, 2013 7:37 AM

Zone 1

TSG

609.c

Time Stamp	Alert Message
02/04/2013 10:02 PM	LOW FLOW: Programmed irrigation, station 1, Measured 6 gpm, Expected 13 gpm
10:05 PM	LOW FLOW: Programmed irrigation, station 2, Measured 8 gpm, Expected 14 gpm
10:07 PM	LOW FLOW: Programmed irrigation, station 3, Measured 7 gpm, Expected 18 gpm
10:09 PM	HIGH FLOW: Programmed irrigation, station 4, Measured 33 gpm, Expected 22 gpm
10:11 PM	LOW FLOW: Programmed irrigation, station 5, Measured 16 gpm, Expected 22 gpm
10:13 PM	LOW FLOW: Programmed irrigation, station 6, Measured 6 gpm, Expected 15 gpm

*Broken head west side
by entrance
2-6-13
EV*

- Location
- Time
- Savings

Above water loss

4,620 gallons

\$33 a month

Right water loss

17,820 gallons

\$128 a season

Alerts By Site

February 05, 2013 7:37 AM

Zone 1

LLC

609.c

Time Stamp	Alert Message
02/04/2013 10:02 PM	NO FLOW: Programmed irrigation, station 9, Measured 0 gpm, Expected 5 gpm
11:51 PM	LOW FLOW: Programmed irrigation, station 3, Measured 5 gpm, Expected 8 gpm
11:53 PM	LOW FLOW: Programmed irrigation, station 10, Measured 8 gpm, Expected 11 gpm
11:59 PM	LOW FLOW: Programmed irrigation, station 11, Measured 13 gpm, Expected 16 gpm
02/05/2013 12:01 AM	HIGH FLOW: Programmed irrigation, station 2, Measured 17 gpm, Expected 7 gpm
12:03 AM	HIGH FLOW: Programmed irrigation, station 6, Measured 21 gpm, Expected 10 gpm
12:05 AM	HIGH FLOW: Programmed irrigation, station 12, Measured 21 gpm, Expected 10 gpm
12:07 AM	HIGH FLOW: Programmed irrigation, station 1, Measured 25 gpm, Expected 14 gpm
12:09 AM	HIGH FLOW: Programmed irrigation, station 4, Measured 19 gpm, Expected 11 gpm
12:12 AM	HIGH FLOW: Programmed irrigation, station 5, Measured 19 gpm, Expected 9 gpm
12:14 AM	HIGH FLOW: Programmed irrigation, station 7, Measured 19 gpm, Expected 10 gpm
12:16 AM	HIGH FLOW: Programmed irrigation, station 8, Measured 22 gpm, Expected 11 gpm

*Valve # 11 stuck on
2-6-13
EV
Repaired
2-11-13
EV*

Water Usage Data



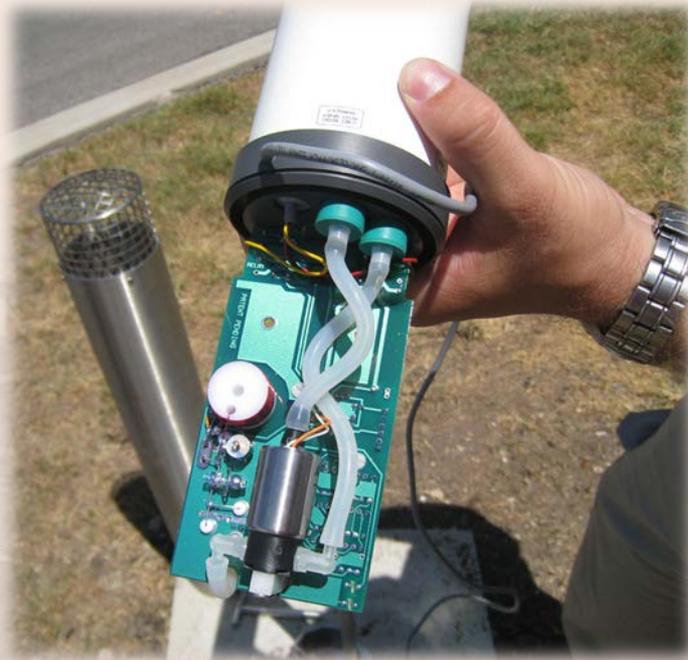
Calsense
 2075 Corte del Nogal
 Carlsbad, CA 92011
 (800) 572-8608
 July 17, 2012 6:43 AM

Controller Summary
 Zone 7
 MMS

Jun/01/2012 - Jun/30/2012

Date	Hist.	ET	Total	Rain	Budget	Irrigation	Irrigation	Manual	Manual	Test	Test	Remote	Remote	Non-Controller	Non-Controller
06/01/2012	0.28	0.28h	0.00	0.00o	317,529	0	0.0	0	0.0	0	0.0	0	0.0	2	0.1
06/02/2012	0.28	0.28h	0.00	0.00o	317,529	0	0.0	0	0.0	0	0.0	0	0.0	12,922	260.3
06/03/2012	0.28	0.28h	0.00	0.00o	317,529	13,235	248.5	0	0.0	0	0.0	0	0.0	396	85.3
06/04/2012	0.28	0.28h	0.00	0.00o	317,529	0	0.0	0	0.0	0	0.0	0	0.0	12,804	260.3
06/05/2012	0.28	0.28h	0.00	0.00o	317,529	9,555	180.3	0	0.0	0	0.0	0	0.0	12,723	259.1
06/06/2012	0.28	0.28h	0.00	0.00o	317,529	0	0.0	0	0.0	0	0.0	0	0.0	12,871	260.3
06/07/2012	0.28	0.28h	0.00	0.00o	317,529	14,094	265.8	0	0.0	0	0.0	0	0.0	2	0.1
06/08/2012	0.28	0.28h	0.00	0.00o	317,529	0	0.0	0	0.0	0	0.0	0	0.0	2	0.1
06/09/2012	0.28	0.28h	0.00	0.00o	317,529	0	0.0	0	0.0	0	0.0	0	0.0	19,015	385.3
06/10/2012	0.28	0.28h	0.00	0.00o	317,529	14,144	268.6	0	0.0	0	0.0	0	0.0	597	73.9
06/11/2012	0.28	0.28h	0.00	0.00o	317,529	0	0.0	0	0.0	0	0.0	0	0.0	19,499	401.3
06/12/2012	0.28	0.28h	0.00	0.00o	317,529	9,750	248.1	0	0.0	0	0.0	0	0.0	0	0.1
06/13/2012	0.28	0.28h	0.00	0.00o	317,529	0	0.0	0	0.0	0	0.0	0	0.0	11,096	401.1
06/14/2012	0.28	0.28h	0.00	0.00o	317,529	10,126	258.3	0	0.0	0	0.0	0	0.0	1	0.1
06/15/2012	0.28	0.28h	0.00	0.00o	317,529	0	0.0	0	0.0	0	0.0	0	0.0	1	0.1
06/16/2012	0.28	0.28h	0.00	0.00o	317,529	0	0.0	0	0.0	0	0.0	0	0.0	11,059	401.1
06/17/2012	0.28	0.28h	0.00	0.00o	317,529	9,922	259.8	0	0.0	0	0.0	317	8.6	342	77.4
06/18/2012	0.28	0.28h	0.00	0.00o	317,529	0	0.0	0	0.0	139	4.3	0	0.0	10,847	401.1
06/19/2012	0.28	0.28h	0.00	0.00o	317,529	10,130	252.4	980	45.0	0	0.0	0	0.0	7,243	348.2
06/20/2012	0.28	0.28h	0.00	0.00o	317,529	0	0.0	1,014	45.1	0	0.0	0	0.0	15,241	497.0
06/21/2012	0.28	0.28h	0.00	0.00o	317,529	13,935	268.1	1,576	45.0	0	0.0	0	0.0	2	0.1
06/22/2012	0.28	0.28h	0.00	0.00o	317,529	0	0.0	1,646	45.3	0	0.0	0	0.0	2	0.1
06/23/2012	0.28	0.28h	0.00	0.00o	317,529	0	0.0	0	0.0	0	0.0	0	0.0	19,779	401.3
06/24/2012	0.28	0.28h	0.00	0.00o	317,529	14,123	268.5	0	0.0	0	0.0	0	0.0	4,032	148.3
06/25/2012	0.28	0.28h	0.00	0.00o	317,529	9,815	180.7	0	0.0	0	0.0	0	0.0	19,503	398.3
06/26/2012	0.28	0.28h	0.00	0.00o	317,529	0	0.0	0	0.0	0	0.0	0	0.0	2,772	60.1
06/27/2012	0.28	0.28h	0.00	0.00o	317,529	9,973	180.7	0	0.0	0	0.0	0	0.0	18,542	368.3
06/28/2012	0.28	0.28h	0.00	0.00o	317,529	13,952	262.1	0	0.0	0	0.0	0	0.0	2	0.1
06/29/2012	0.28	0.28h	0.00	0.00o	317,529	0	0.0	0	0.0	0	0.0	0	0.0	3	0.1
06/30/2012	0.28	0.28h	0.00	0.00o	317,529	0	0.0	0	0.0	0	0.0	0	0.0	18,878	371.3
Jun-2012	8.28	8.28	0.00	0.00	317,529	152,754	3,141.9	5,216	180.4	139	4.3	317	8.6	230,178	5,860.0
Totals:	8.28	8.28	0.00	0.00	317,529	152,754	3,141.9	5,216	180.4	139	4.3	317	8.6	230,178	5,860.0
Site Totals:					317,529	152,754	3,141.9	5,216	180.4	139	4.3	317	8.6	230,178	5,860.0
Grand Totals:					317,529	152,754	3,141.9	5,216	180.4	139	4.3	317	8.6	230,178	5,860.0

Adjusting for Climate by Gauging Evapotranspiration



Evapotranspiration ET definition: is a term used to describe the sum of evaporation and plant transpiration from the Earth's land surface to atmosphere.

Rain Buckets

Locations : MAI

JON

Facilities Services

Turns off irrigation due to rain

Uses rain amount to modify
program operating times

Shares data with controllers that are
near the Rain Bucket's location

Rain Buckets at MAI and Facilities
Services have had different
amounts of up to half an inch



Measurement & Automatic Shut-Off

Installed flow sensors & master control valves

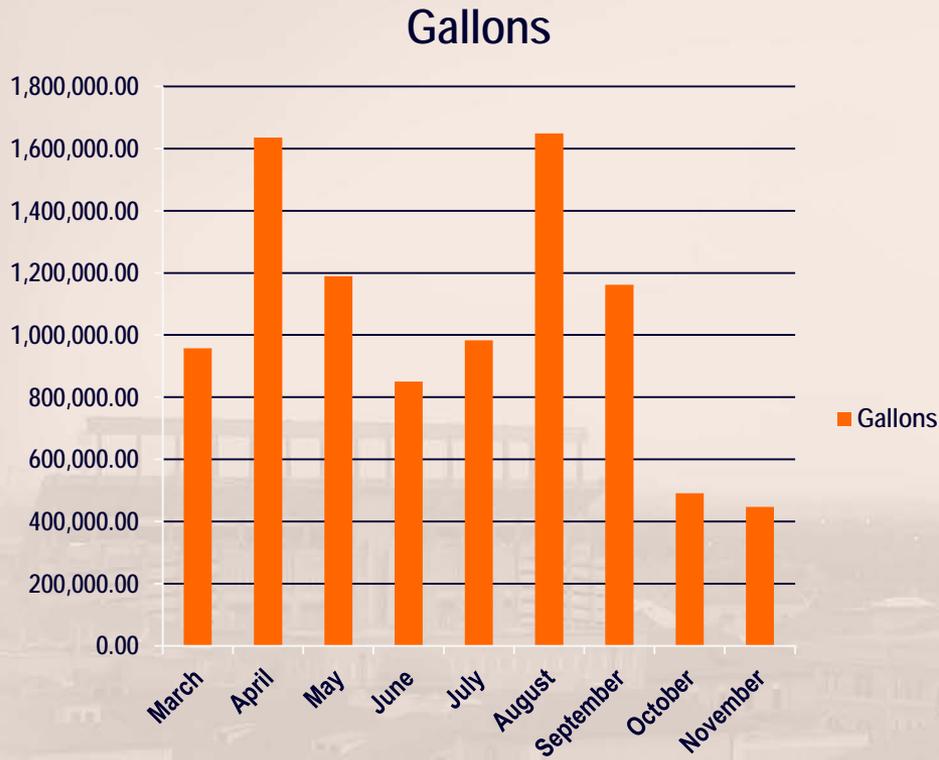


Old irrigation control box

New irrigation controls



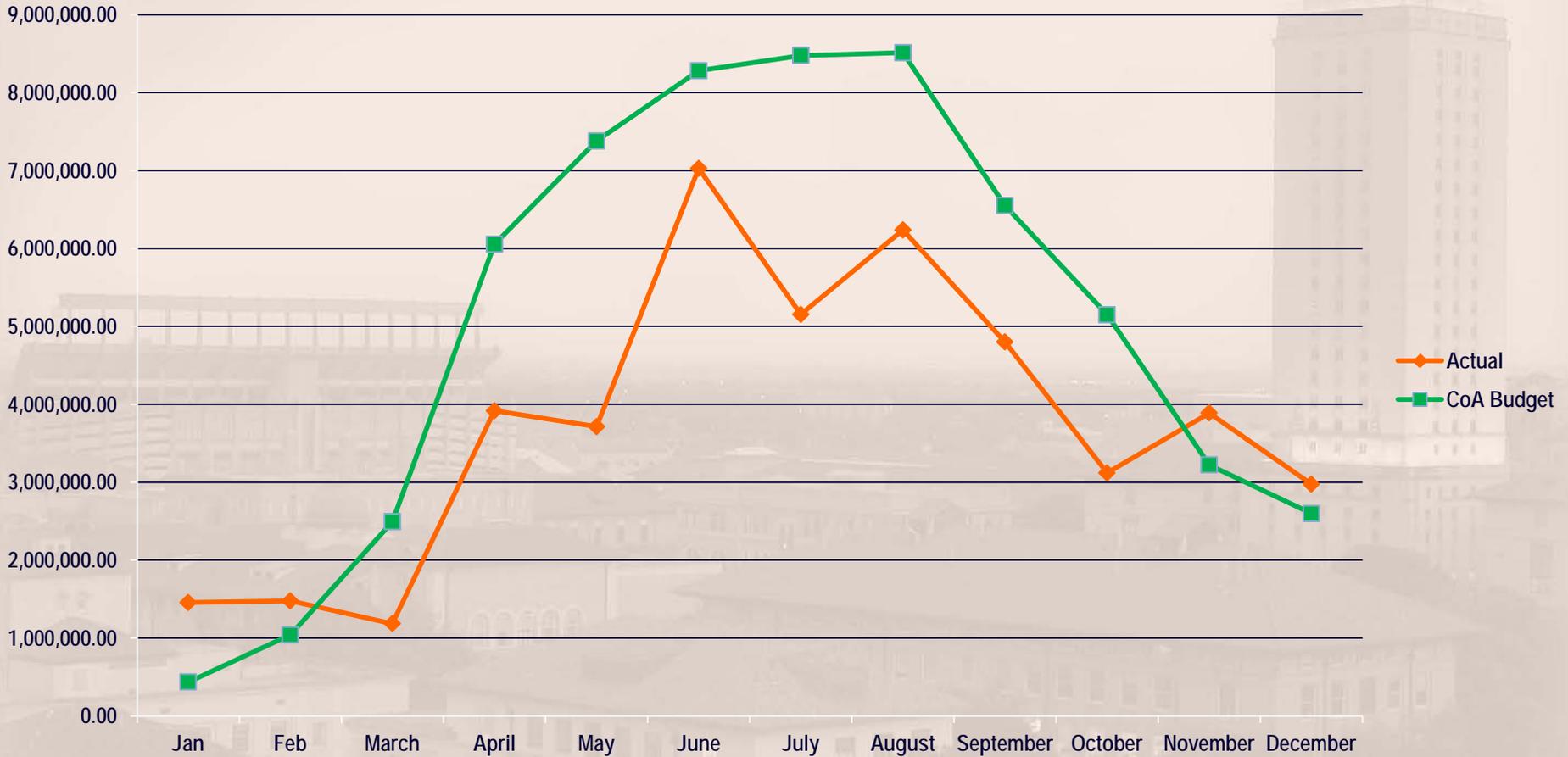
Water Savings from Flow Sensor



- Over 9.3 Million gallons saved so far!!!!

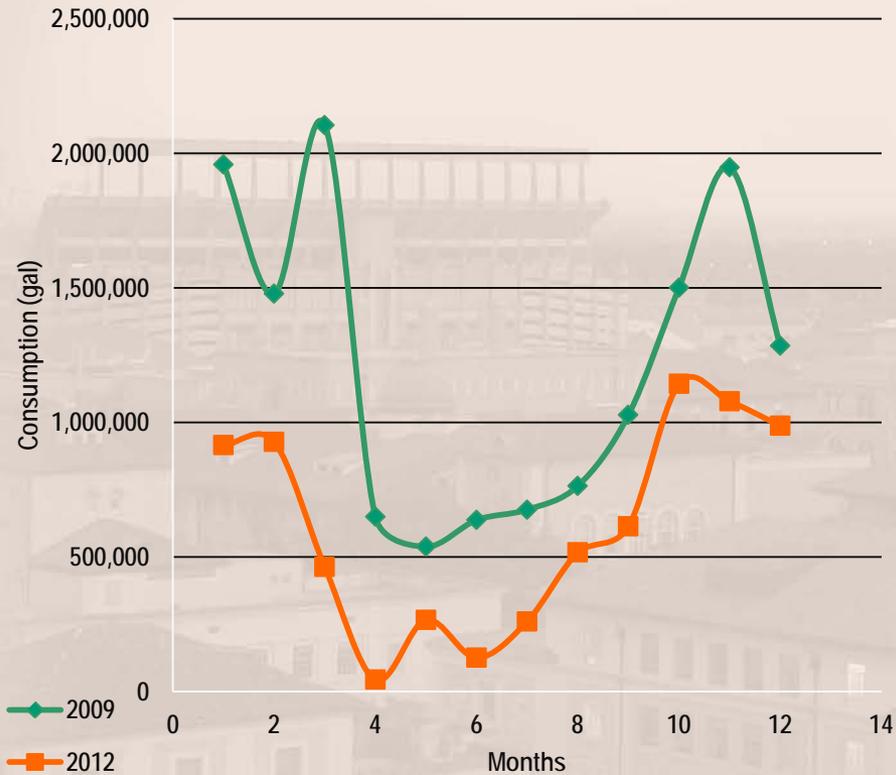


UT vs. City of Austin Budget

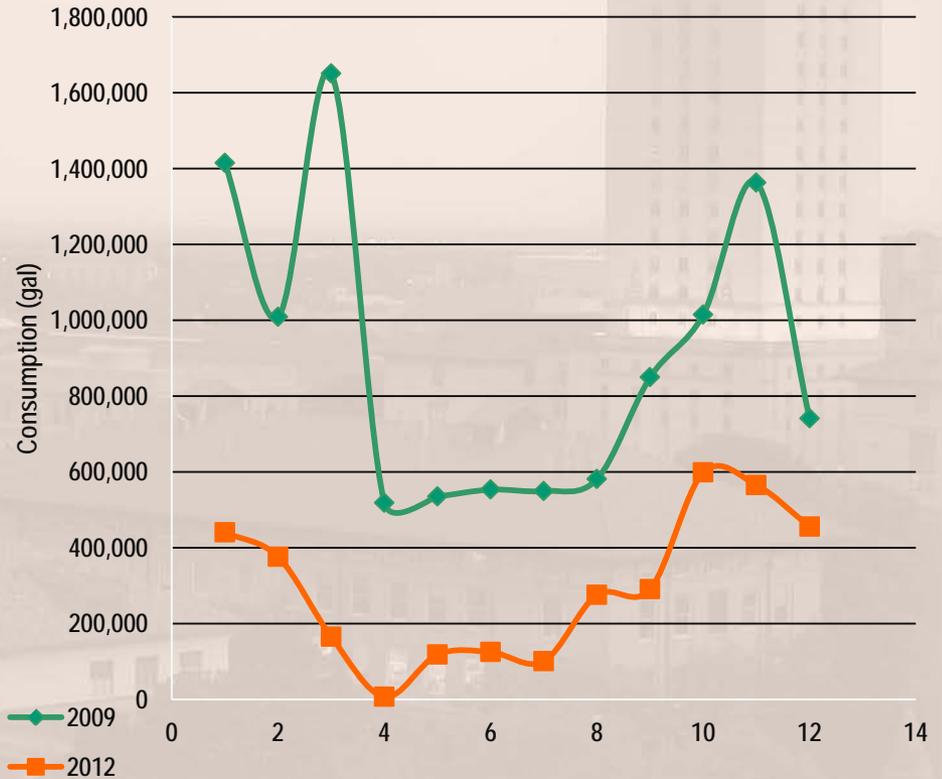


Water meter data

Overall irrigation



Automatic Systems



Xeriscaping



Sustainable Landscaping

Lower Maintenance

Requires less water

Can be very colorful

Local plant material



Mapping



Search

Search

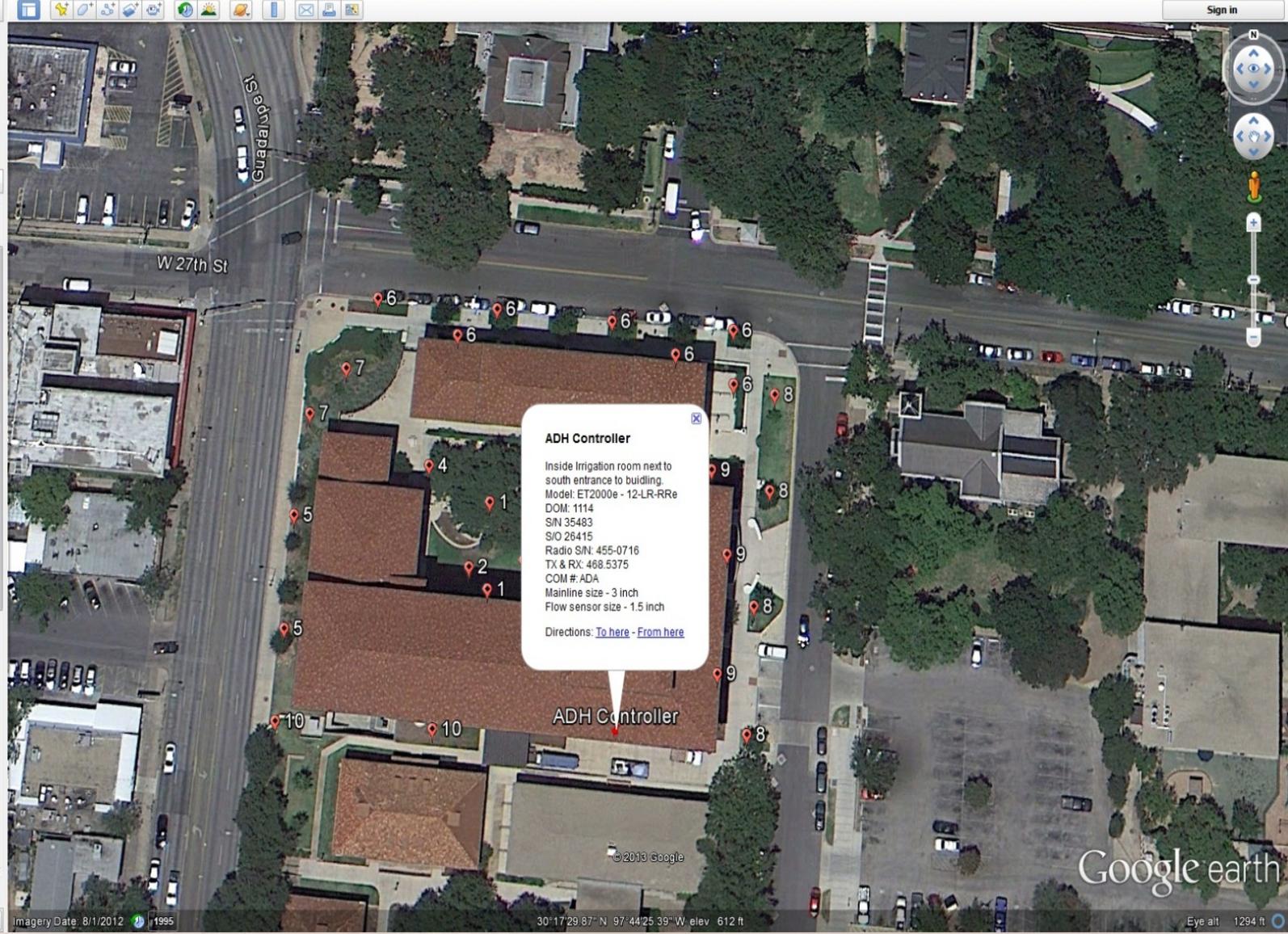
ex: pizza near NYC

Get Directions History

Places

My Places

- UT
- UT Irrigation
 - Zone 1
 - Zone 1 buildings
 - ADH
 - ADH Irrigation
 - ADH Controller**
Inside Irrigation room next to south entrance to building.
 - Zone 1
 - Zone 2
 - Zone 3
 - Zone 4
 - Zone 5
 - Zone 6
 - Zone 7
 - Zone 8
 - Zone 9
 - Zone 10
 - LLC
 - LLC Irrigation
 - KIN
 - KIN Irrigation
 - TSG
 - TSG - Parking garage
 - SSB
 - SSB Irrigation
 - SEA
 - SEA Irrigation
 - SWG
 - SWG Irrigation
 - CPE
 - CPE Irrigation



Utilizing Interns

Hands on experience!!!

Combining class lessons with
real life applications



What Starts Here Changes the World

Contact Information

Markus Hogue

Markus.hogue@austin.utexas.edu

512-475-7750 – Office

512-796-9549 – Cell

