

# City of Fontana

GIS: Making Life Easier

Presenters: Joe Field, Rogelio Matta

# Fontana

- Fontana 44.5 Square Miles
- Population 209,000
- 60 miles east of Los Angeles

# Fontana Public Works Department

- 94 Staff
- \$52 Million annual operating budget
  - Streets
  - Sewers
  - Parks
  - Streetscapes
  - Fleet
  - Buildings
  - Environmental

# Presentation

- Field Operations Section
- Technical Support Section

# Field Operations Section

It all starts with a work order

# City of Fontana Context

- Using GIS to monitor:
  - Plan
  - Productivity
  - Progress
  - Performance

# Operational Work Cycle



# PWD GIS Reporting Evolution

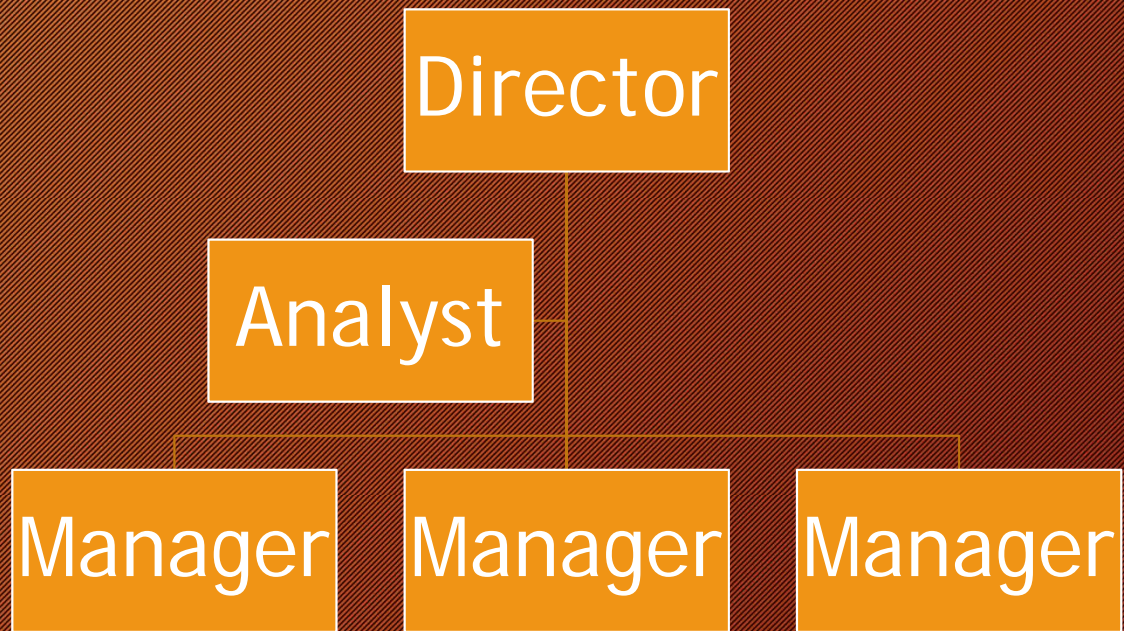
- End user experience
  - Paper map
  - Digital map
  - Task integrated, real-time map



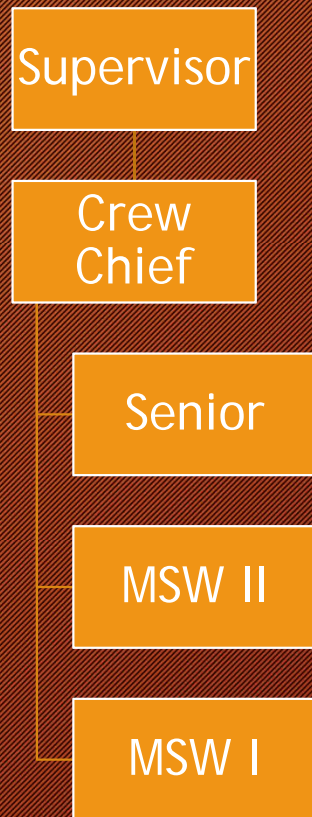
# The Gap

- Gap between the decision maker and the Field.

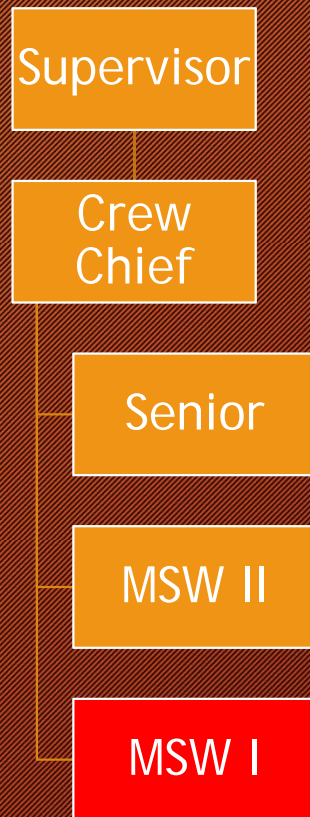
# Management



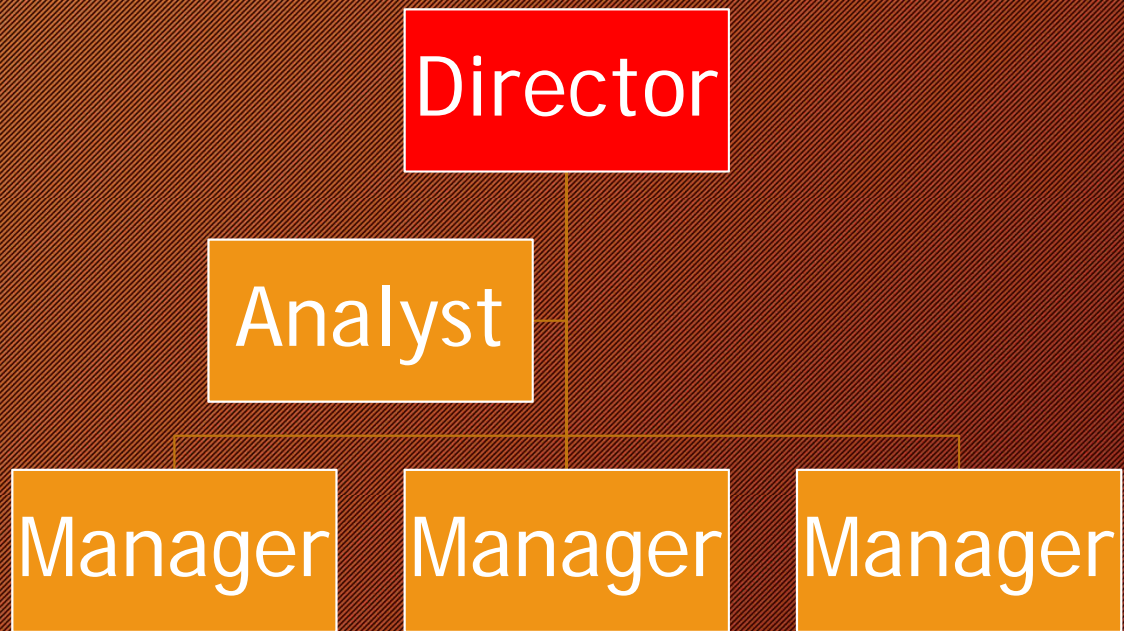
# Field



# Field

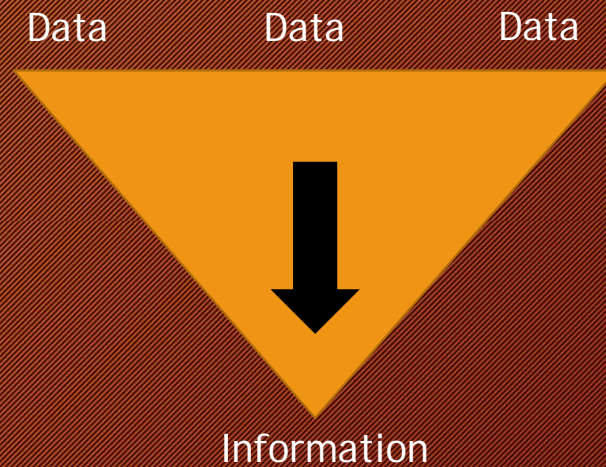


# Management



# Information Bottleneck

- 58,549 Completed work orders annually



# Simple Reporting

- Daily Report
- Monthly Report
- Quarterly Report
- Annual Report



## Public Works Monthly Report

To: Debbie Bradt, Deputy City Manager  
 From: Chuck Hays, Public Works Director  
 Subject: APRIL MONTHLY REPORT  
 Date: May 24, 2018

FRONT OFFICE CALLS	CALLS REQUIRING SERVICE		CALLS REQUIRING INFORMATION ONLY
	188	208	
REQUESTS	<u>Opened</u> 1260	<u>Completed</u> 1209	<u>Still Open</u> 51
WORK ORDERS	<u>Opened</u> 5,652	<u>Completed</u> 5,579	<u>Still Open</u> 103

### UTILITIES & STREET & DIVISION

		Completed in Month	Units of Measure
The Utilities & Streets Division is charged with maintaining the City's asphalt pavement infrastructure, which is a 500 million dollar asset and contains approximately 304 center line miles of streets, alleys and City owned parking lots.			
1131	Maintenance - Pavement		
1109	Pothole Repair	690	Each
1110	Debris Cleanup	1	Each
1121	Paving Project	649	Square Feet
1176	Slit Patch	150	Square Feet
1177	Asphalt Remove and Replace	200	Square Feet
1180	Curbs and Gutter Remove/Replace	454	Linear Feet
1140	Roadside Maintenance		
1103	Shooting Cart Retrieval	59	Each
1110	Debris Cleanup	254	Each
1114	Road Edge Grading	1	Linear Miles
1120	Weed Spraying	95	Linear Miles
1184	Hazardous Spill Cleanup	2	Each
The Public Works Department maintains and reconstructs approximately 140 miles of sidewalk. This includes temporary ramping, grinding or complete replacement/construction.			
1132	Sidewalk		
1112	Sidewalk Asphalt Ramms	17	Each
1116	Concrete Cutting	1	Linear Feet
1129	Sidewalk Replacement	4	Square Feet
1132	ADA Ramms	13	Square Feet
1180	Curbs and Gutter Remove/Replace	4	Linear Feet
The City's storm drain system is maintained in accordance with federal and state regulated requirements. These facilities are cleaned and maintained annually to ensure adequate performance.			
1134	Storm Structure		



# Complex Reporting: Sewer CCTV KPI

## CCTV Planning

Planning Tasks - Unnamed Filter Set

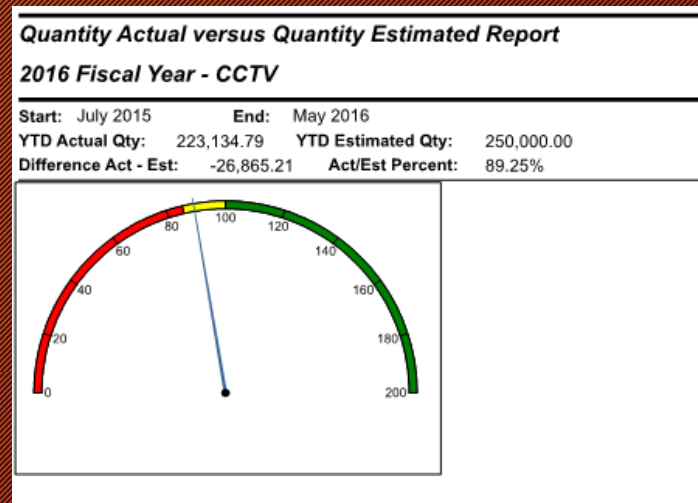
Work Task: 11324 CCTV Fiscal Year: 2016

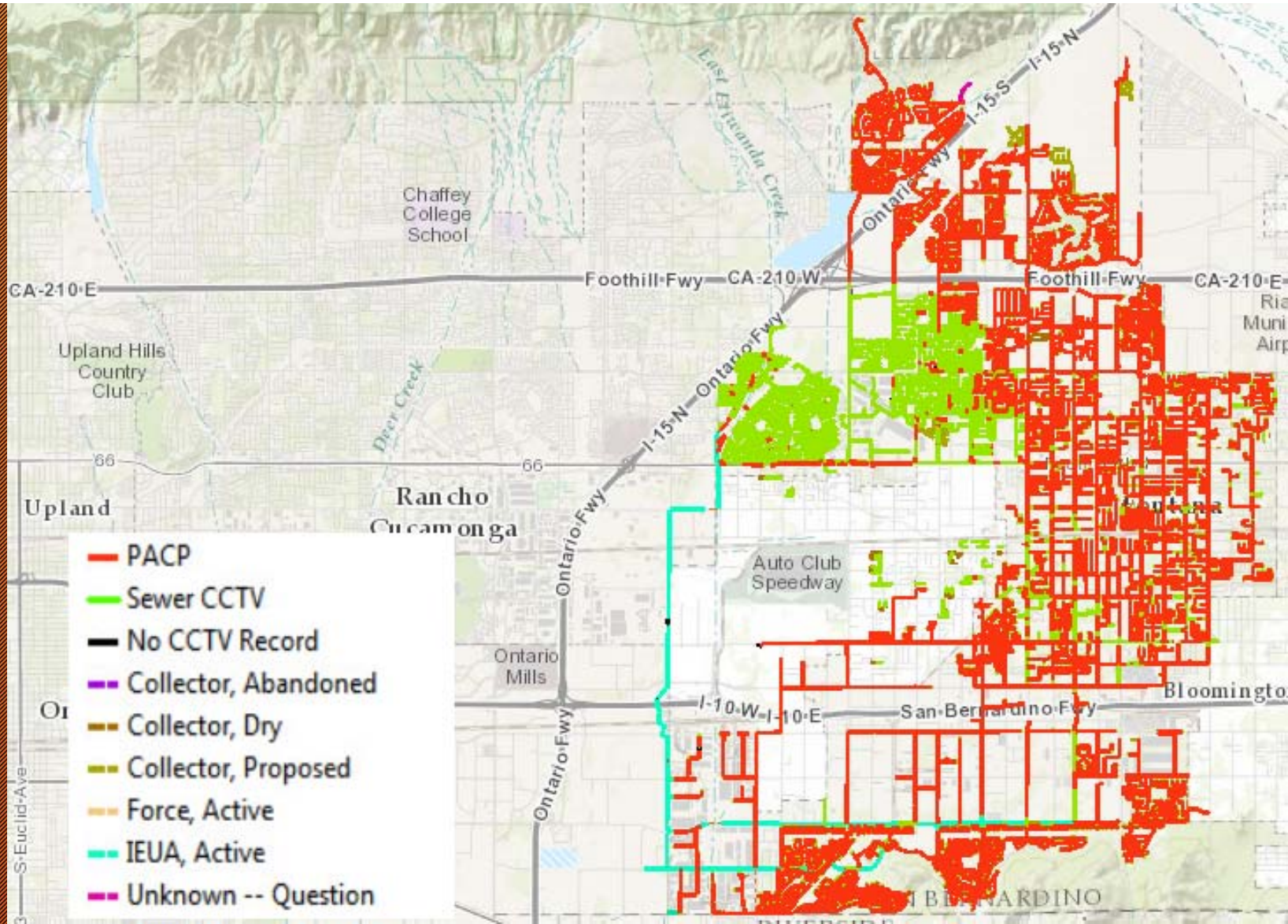
Setup | Resources | Quantity | Labor Days | Cost | WDs | Specific Guidelines | Custom | Comment

	Est %	Est Amount	Actual Amount		Est %	Est Amount	Actual Amount
January	8.33	25000.0	11158.7	July	8.33	25000.0	32720.1
February	8.33	25000.0	25608.0	August	8.33	25000.0	23430.7
March	8.33	25000.0	32081.7	September	8.33	25000.0	29337.0
April	8.33	25000.0	36429.4	October	8.33	25000.0	25588.8
May	8.33	25000.0	16010.0	November	8.33	25000.0	6780.4
June	8.33	25000.0	0.0	December	8.33	25000.0	0.0
Distribute Total Amount Evenly <input checked="" type="checkbox"/>				TOTAL 100.00 300000.0 239144.8			
				% Quantity YTD vs Planned 79.71			
Units/Labor Hour Planned and Actual				113.64 86.49			
Unit Cost Planned and Actual				0.34 0.45			

Record 1 of 18 View Mode Ready...

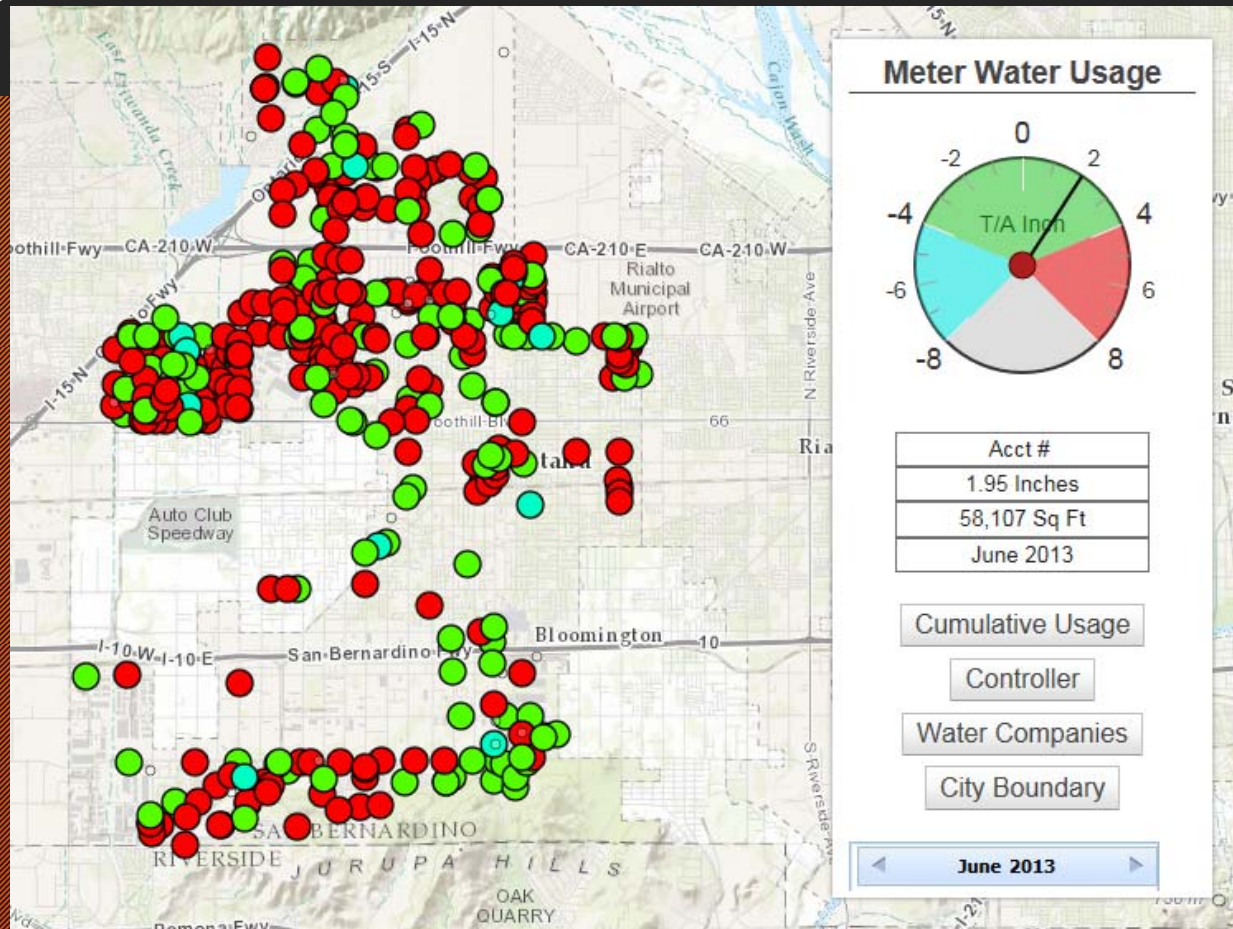
## Progress



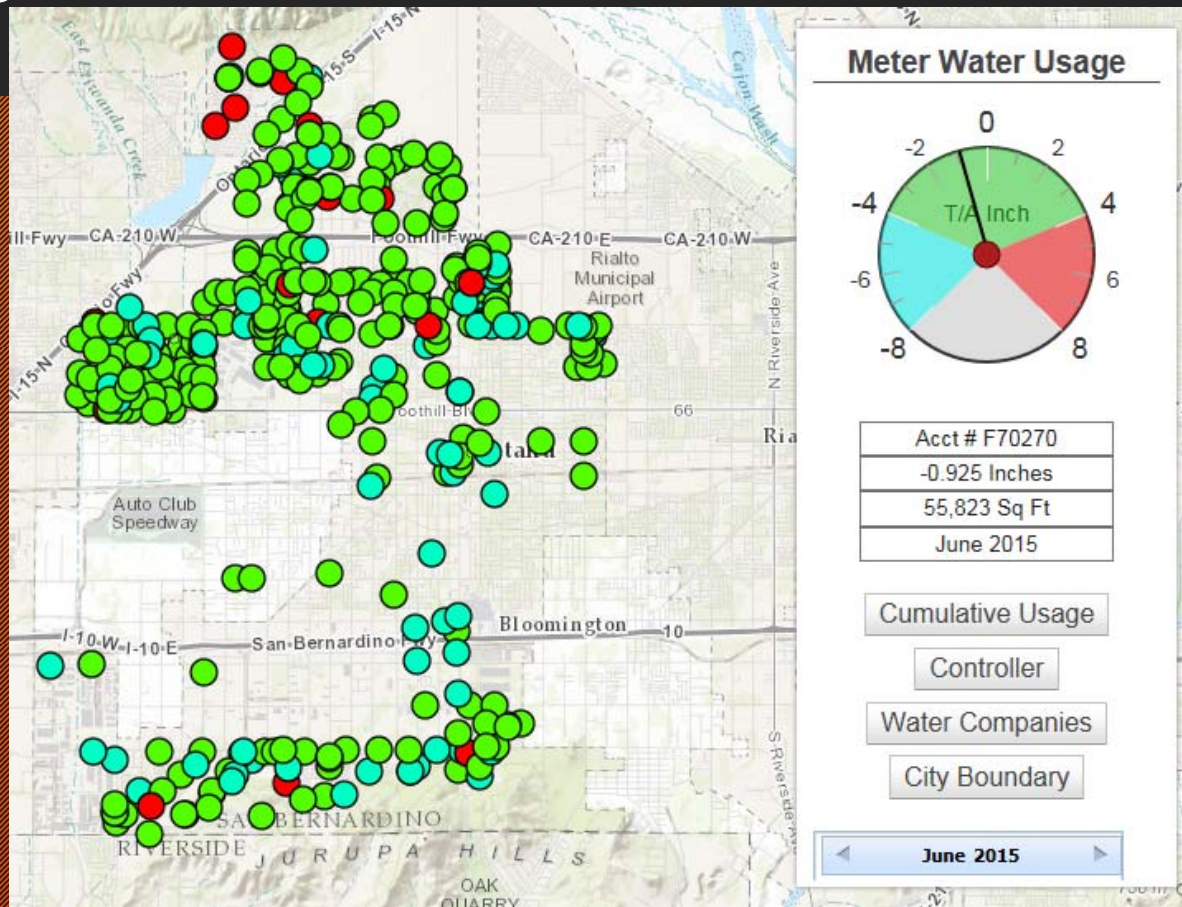


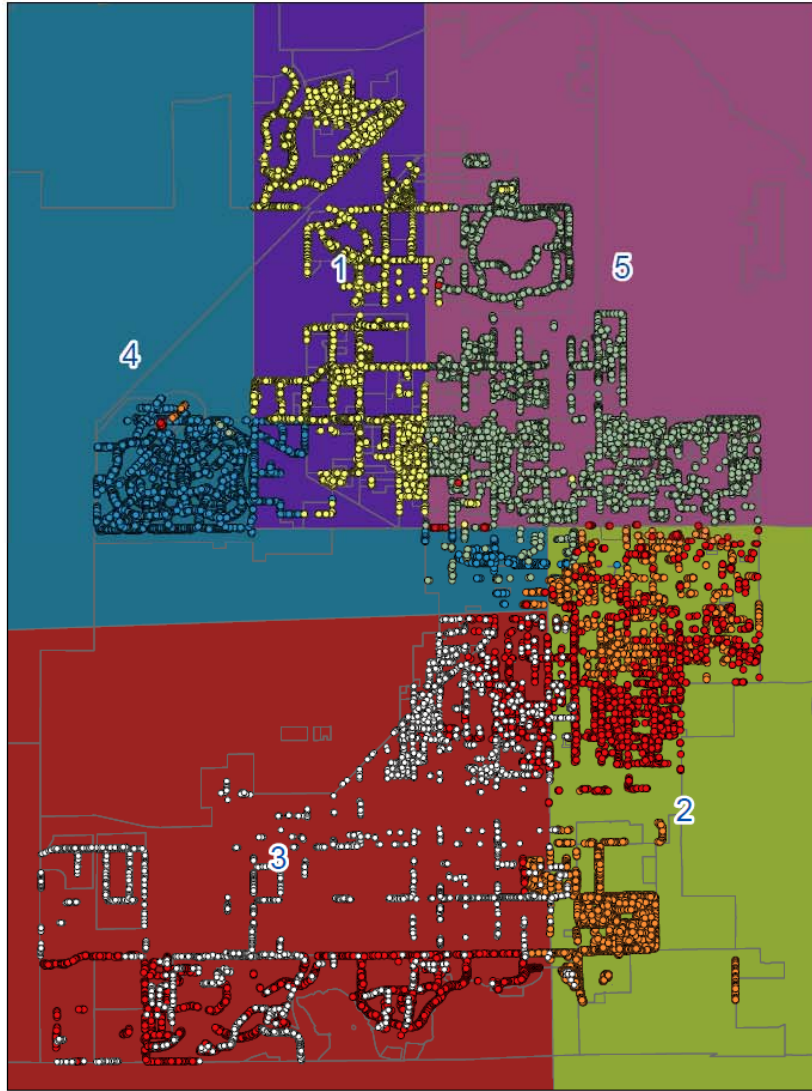


June 2013



June 2015





## Task - Grid Pruning Type - 5 Year Trim Cycle Trees Annual Totals - Years 1-5 (Jul 1, 2011 to May 13, 2016)

### Tree Counts All

NetWork, TreeWiseSchad, TreeTot (Gesamt)Schad  
13483, 3118, 35603 (4117) 30720

### Trimmed by Year All

NetWork, TreeWiseSchad, TreeTot (Gesamt)Schad  
● Year 1, 2004, 1544, 6300 (4283) 8639  
● Year 2, 2760, 384, 5433 (2148) 7197  
● Year 3, 2528, 176, 7066 (204) 7905  
● Year 4, 1528, 445, 7599 (206) 7360  
○ Untrimmed, 0, 0, 0 (4117) 0

### Trimmed by Zone All

NetWork, TreeWiseSchad, TreeTot (Gesamt)Schad  
■ 1, 2528, 304, 8529 (0) 8529  
■ 2, 2760, 2015, 7064 (133) 7197  
■ 3, 2004, 299, 4655 (3984) 8639  
■ 4, 1528, 206, 7360 (0) 7360  
■ 5, 3763, 204, 7995 (0) 7995

### Zone 1 All

FundPark, NetW, TreeWiseSch, TreeTot(Gesamt)Schad  
101 GENFUND, 378, 1, 413 (0) 413  
101 GENFUND6, 18, 1, 48 (0) 48  
101 RPP, 15, 0, 625 (0) 625  
401 LMD1-10, 10, 0, 88 (0) 88  
401 LMD1-22, 205, 0, 174 (0) 174  
402 LMD2, 80, 380, 380 (0) 380  
404 HR, 3, 0, 99 (0) 99  
404 LMD3, 57, 0, 1274 (0) 1274  
404 RRP, 4, 0, 101 (0) 101  
404 WR, 3, 0, 4 (0) 4  
408 CPD6, 70, 0, 354 (0) 354  
408 KP, 25, 0, 217 (0) 217  
409 CPD6-1, 13, 0, 78 (0) 78  
409 CPD6-1A1, 23, 0, 170 (0) 170  
409 CPD6-1A2, 7, 0, 62 (0) 62  
409 CPD6-1A4, 6, 0, 26 (0) 26  
409 CPD6-1A5, 5, 0, 32 (0) 32  
410 CPD6-2, 33, 0, 71 (0) 71  
411 CPD6-3A, 56, 0, 138 (0) 138  
411 CPD6-3A-1, 7, 0, 49 (0) 49

411 CPD6-3A-2, 25, 0, <Null>  
413 ALM, 184, 0, 22 (0) 22  
413 CPD4, 34, 0, 35 (0) 35  
414 CPD5M, 25, 11, 259 (0) 259  
417 CPD13M, 186, 0, 1025 (0) 1025  
417 CPD13M-A1, 0, 0, 12 (0) 12  
417 ROSENAE, 8, 0, 154 (0) 154  
417 ROSENAW, 0, 0, 66 (0) 66  
419 CPD15M, 52, 0, 26 (0) 26  
419 CPD15M-A1, 0, 0, 59 (0) 59  
419 CPD15M-A2, 7, 0, 32 (0) 32  
419 CPD15M-A3, 9, 0, 47 (0) 47  
420 CPD16M, 11, 0, 78 (0) 78  
422 CPD20M, 10, 0, 75 (0) 75  
422 CPD24, 8, 0, 16 (0) 16  
427 CPD27A, 43, 0, 153 (0) 153  
428 CPD28M, 57, 0, 230 (0) 230  
428 CPD28M-A1, 11, 0, 49 (0) 49  
428 CPD28M-A2, 6, 0, 49 (0) 49  
429 CPD29M, 103, 0, <Null>  
430 CPD30M, 30, 0, 301 (0) 301  
433 CPD31, 47, 0, 193 (0) 193  
434 CPD32, 3, 0, 15 (0) 15  
435 COVCAN, 40, 0, 219 (0) 219

436 CPD36, 0, 1, 1 (0) 1  
441 CPD41, 18, 0, 15 (0) 15  
445 CPD48, 78, 0, 9 (0) 9  
447 CPD48M-A1, 6, 0, 43 (0) 43  
450 CPD51M-A1, 12, 0, 18 (0) 18  
455 CPD55, 5, 0, 14 (0) 14  
463 CPD63M, 4, 0, 13 (0) 13  
469 CPD69, 5, 0, <Null>  
470 CPD70M, 250, 0, <Null>  
<Null>, 13, 0, 88 (0) 88

### Zone 2 All

FundPark, NetW, TreeWiseSch, TreeTot(Gesamt)Schad  
101 GENFUND, 1598, 1986, 3509 (109) 3618  
101 GENFUND6, 207, 0, 141 (0) 141  
101 MP, 0, 6, 65 (0) 65  
101 MTRP, 0, 15, 15 (0) 15  
101 WETP, 10, 0, 123 (0) 123

101 VFW, 3, 0, 143 (0) 143  
401 LMD1-2, 30, 0, 133 (15) 118  
401 LMD1-3, 12, 7, 59 (0) 59  
401 LMD1-43, 5, 0, 4 (0) 4  
401 LMD1-5, 29, 0, 11 (0) 11  
403 LMD3-1, 286, 0, 44 (0) 44  
407 CPD1, 0, 0, 40 (0) 40  
412 CPD7, 288, 0, 215 (0) 215  
412 FP, 7, 0, 94 (0) 94  
418 CPD14M, 192, 1, 1447 (0) 1447  
418 CPD14M-A2, 20, 0, 330 (0) 330  
418 BYCHILLS, 6, 0, 90 (0) 90  
426 CPD25M-A2, 0, 0, 15 (0) 15  
431 CPD34, 0, 0, 22 (0) 22  
432 CPD33, 87, 0, 311 (0) 311

### Zone 3 All

FundPark, NetW, TreeWiseSch, TreeTot(Gesamt)Schad  
101 GENFUND, 1090, 133, 1300 (2640) 3940  
101 GENFUND6, 240, 0, 0 (37) 37  
101 JBR, 2, 1, 398 (21) 419  
101 MTRP, 32, 0, 43 (0) 43  
401 LMD1-26, 0, 0, 0 (301) 301  
401 LMD1-28A, 0, 0, 0 (82) 82  
401 LMD1-30, 4, 0, 0 (2) 2  
401 LMD1-37, 2, 0, 53 (23) 78  
401 LMD1-40, 12, 0, 0 (7) 7  
407 CATP, 28, 0, 47 (18) 65  
407 CPD1, 845, 47, 1897 (574) 2471  
407 CPP, 12, 0, 58 (15) 71  
407 CP, 0, 0, 66 (5) 71  
407 RP, 2, 0, 0 (38) 38  
407 RRP, 0, 0, 144 (31) 175  
407 WMNC, 313, 0, 37 (2) 39  
407 WP, 9, 0, 162 (4) 166  
415 CPD10M, 0, 0, 91 (5) 96  
423 CPD21M, 0, 0, 0 (53) 53  
424 CPD23M-A2, 0, 0, <Null>  
436 CPD36M-A1, 0, 0, 4 (0) 4  
438 CPD37, 219, 118, 144 (22) 166  
439 CPD39, 0, 0, 0 (33) 33  
439 CPD39M-A1, 0, 0, 0 (71) 71  
441 CPD41, 7, 0, <Null>  
442 CPD42, 63, 0, 219 (0) 213

449 CPD50M-A1, 0, 0, 0 (0) 0  
459 CPD59, 12, 0, 0 (11) 11  
465 CPD65, 3, 0, <Null>  
401 CC, 10, 0, 55 (0) 55  
101 GENFUND, 520, 137, 486 (0) 436  
101 EPA, 1, 0, 40 (0) 40  
401 LMD1-4, 22, 0, <Null>  
402 GRANDAV, 5, 0, 298 (0) 298  
402 HCP, 0, 0, 139 (0) 139  
402 LMD2, 902, 56, 6087 (0) 6087  
402 M3C, 3, 0, 66 (0) 66  
402 M3C-P, 8, 12, 28 (0) 28  
402 M3C-B, 1, 0, 26 (0) 26  
402 NHP, 8, 0, 39 (0) 39  
402 PMURRAY, 0, 0, 54 (0) 54  
402 TLA, 0, 0, 3 (0) 3  
414 CPD5M, 0, 1, 1 (0) 1  
424 CPD23M-A3, 3, 0, <Null>  
<Null>, 44, 0, <Null>

### Zone 4 All

FundPark, NetW, TreeWiseSch, TreeTot(Gesamt)Schad  
101 CC, 10, 0, 55 (0) 55  
101 GENFUND, 520, 137, 486 (0) 436  
101 EPA, 1, 0, 40 (0) 40  
401 LMD1-4, 22, 0, <Null>  
402 GRANDAV, 5, 0, 298 (0) 298  
402 HCP, 0, 0, 139 (0) 139  
402 LMD2, 902, 56, 6087 (0) 6087  
402 M3C, 3, 0, 66 (0) 66  
402 M3C-P, 8, 12, 28 (0) 28  
402 M3C-B, 1, 0, 26 (0) 26  
402 NHP, 8, 0, 39 (0) 39  
402 PMURRAY, 0, 0, 54 (0) 54  
402 TLA, 0, 0, 3 (0) 3  
414 CPD5M, 0, 1, 1 (0) 1  
424 CPD23M-A3, 3, 0, <Null>  
<Null>, 44, 0, <Null>

### Zone 5 All

FundPark, NetW, TreeWiseSch, TreeTot(Gesamt)Schad  
101 BMP, 270, 0, 14 (0) 14  
101 FRR, 131, 0, <Null>  
101 GENFUND, 888, 67, 3257 (0) 3257  
101 GENFUND2, 174, 0, <Null>  
101 GENFUND6, 11, 0, 11 (0) 11  
101 NTR, 1, 0, 107 (0) 107  
401 CAMP, 9, 0, 13 (0) 13  
401 LMD1-1, 0, 0, 4 (0) 4  
401 LMD1-10, 0, 0, 18 (0) 18  
401 LMD1-14, 10, 0, 50 (0) 50  
401 LMD1-15, 16, 0, 49 (0) 49  
401 LMD1-16, 22, 0, 33 (0) 37  
401 LMD1-25, 402, 0, 457 (0) 457  
401 LMD1-29, 3, 0, 59 (0) 58  
401 LMD1-31, 0, 0, 63 (0) 63  
401 LMD1-33, 0, 0, 18 (0) 18  
401 LMD1-36, 2, 0, 1 (0) 1  
401 LMD1-38, 0, 0, 3 (0) 3  
401 LMD1-42, 2, 2, 2 (0) 2

401 LMD1-7, 6, 0, 27 (0) 27  
401 LMD1-8, 10, 0, 44 (0) 44  
401 NG, 61, 0, 9 (0) 9  
409 CPD6-1A3, 13, 0, 38 (0) 38  
413 CPD8, 69, 0, <Null>  
414 CPD9M-A1, 3, 0, 20 (0) 20  
416 CPD12, 27, 0, 6 (0) 6  
416 PMARRILJO, 28, 0, 151 (0) 151  
417 CPD18M, 0, 0, 2 (0) 2  
424 CPD23M-A4, 0, 0, 4 (0) 4  
426 CPD25M, 57, 0, 138 (0) 138  
426 CPD25M-A1, 22, 0, 115 (0) 115  
430 CPD35M, 1, 51, 51 (0) 51  
433 CPD31, 53, 70, 98 (0) 98  
436 CPD36, 1, 0, 28 (0) 28  
437 CPD38M, 54, 0, 274 (0) 274  
437 CPD38M-A1, 60, 0, 152 (0) 152  
437 CPD38M-A2, 6, 0, 30 (0) 30  
437 CPD38M-A3, 15, 0, 32 (0) 32  
437 CPD38M-A4, 90, 0, <Null>  
443 CPD45, 5, 0, 15 (0) 15  
444 CPD46, 12, 255 (0) 255  
444 CPD45M-A1, 76, 0, 64 (0) 64  
446 CPD47, 7, 0, 52 (0) 52  
447 CPD48, 26, 0, 59 (0) 59  
448 CPD49, 17, 0, 48 (0) 48  
449 CPD50, 16, 0, 94 (0) 94  
450 CPD51, 9, 0, 92 (0) 92  
454 CPD54, 16, 0, 84 (0) 84  
457 CPD57, 3, 0, 39 (0) 39  
458 CPD58, 4, 0, 17 (0) 17  
461 CPD61, 23, 0, 94 (0) 94  
465 CPD64, 72, 0, <Null>  
467 CPD67M, 125, 0, 69 (0) 69  
471 CPD71M, 2, 0, <Null>  
471 CONP, 45, 0, <Null>  
471 BCP, 36, 0, <Null>  
472 CPD72M, 21, 0, <Null>  
477 CPD77M, 0, 0, 2 (0) 2  
<Null>, 328, 2, 1487 (0) 1487

# Technical Support Section

It all starts with a map

# Problem

- You have
  - Repeated process (Show in Map)
  - That is slow
- **Want to Show progress**
  - But you only want to do it Once!
- Tabular data
- Showing processed data



# Tabular data

Meter Water Consumption History - No Filter

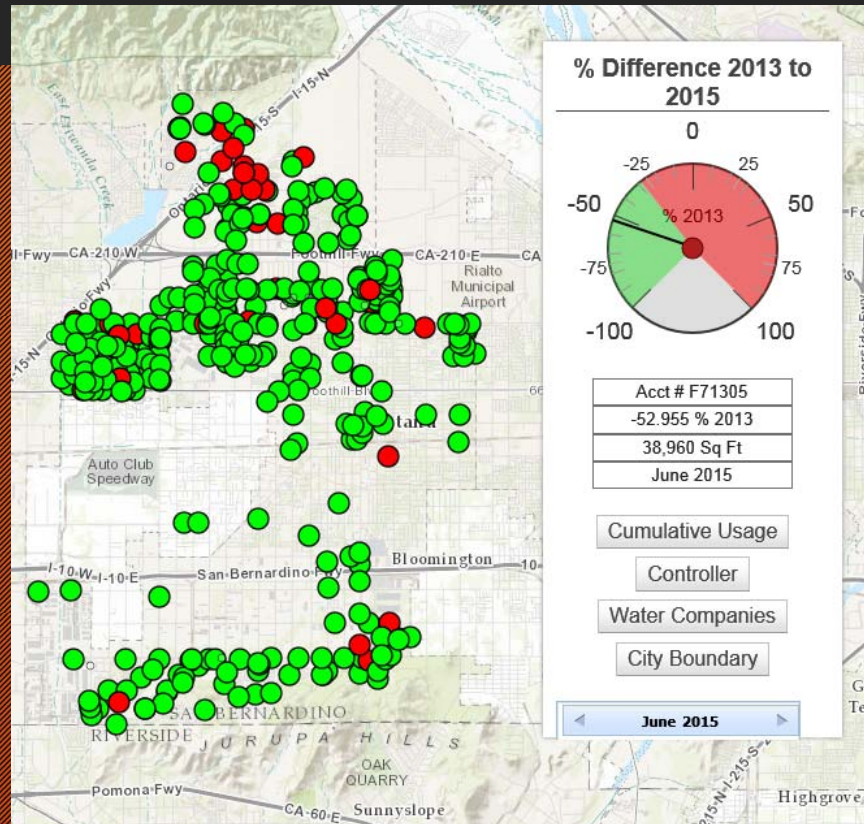
Meter Rec # 884 Unique ID PKPM\_1322 Year 2014

Inches Ccf Units Dollars

	Local Weather Station	Target Consumption	Actual Consumption	Target/Actual Difference
January		2.48	5.53	3.05
February		2.80	5.75	2.95
March		4.03	7.60	3.57
April		5.10	10.73	5.63
May		6.82	17.01	10.19
June		6.60	20.04	13.44
July		7.13	20.40	13.27
August		6.82	19.11	12.29
September		5.40	14.90	9.50
October		4.03	14.55	10.52
November		4.20	15.68	11.48
December		2.48	8.96	6.48
YEAR END		0.00	57.89	102.37

Record 1 of 1499

# Tabular Data



# What is geo-processing

## ESRI description

- What esri normally advertises
  - Spatial analysis
  - Projection
  - Clip
  - Travel Time
- Allows you to automate your GIS tasks.
- Can be run from ArcMAP

## My description

- Connects your data to your features
- It's a Script
- Relates and Joins
- But with ArcServer
  - You have tool
  - A MapService

# Relationships

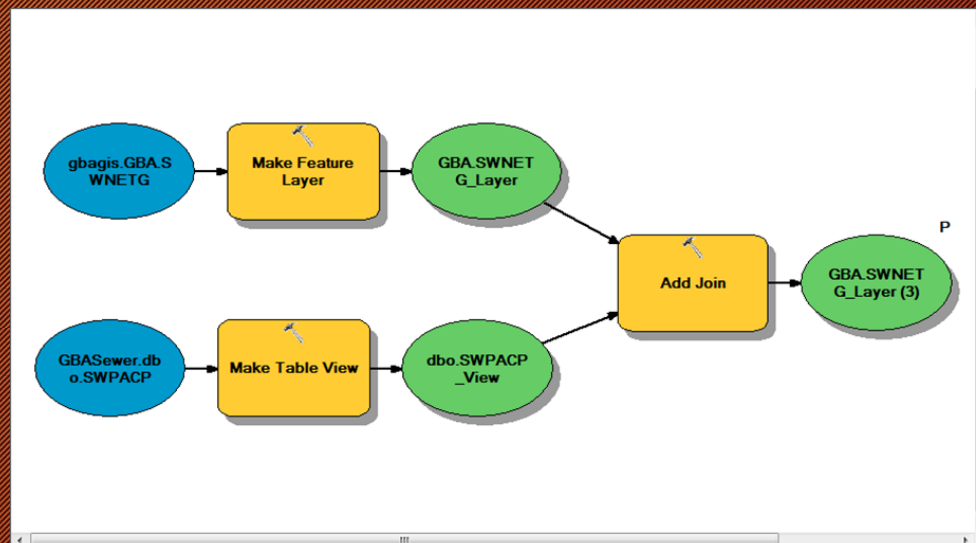
- One of the biggest tools esri has developed
- Is allowing you to relate to any database that you have access to.
- If you know how to join or relate tables you have the ability to see inside Lucity or any of your databases.

# Types of Relationships

- Why is this important
  - How Geoprocessing and Map Services work.
- One to One ( Live )
  - Asset
- One to Many ( Requires Execution )
  - Inspection records
  - Work orders
- Views ( Live )

# How to build

- Model Builder or Python
- Easiest Path is Model Builder



## Once you have a Model

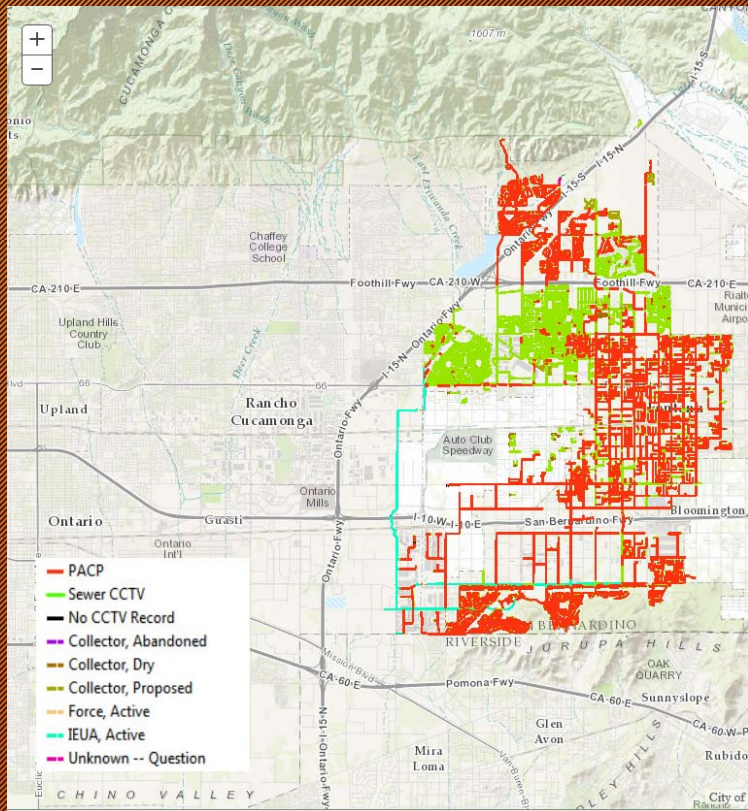
- Run the Model in the toolbox
- Publish the results to the server
- Create Map Service

# What to do now!

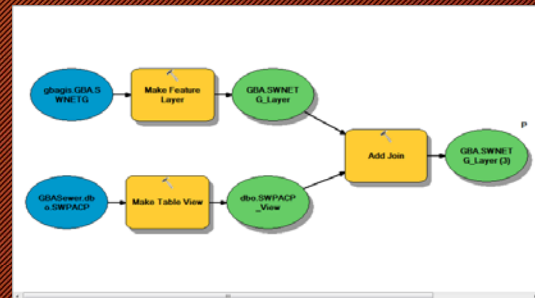
- You have many options
  - Publish to ArcGIS Online or Portal
    - Add the layer to base map
    - Make a map with a template or Web AppBuilder
  - Or write your own Javascript Map



# PACP Map



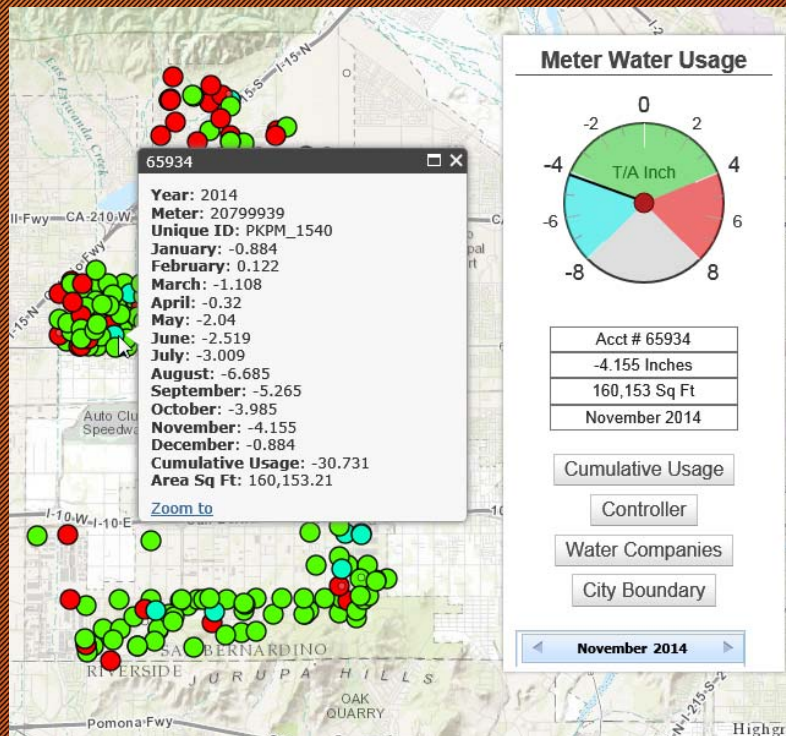
- What is being drawn
- Geoprocessing Mapservices



# Data Mash up

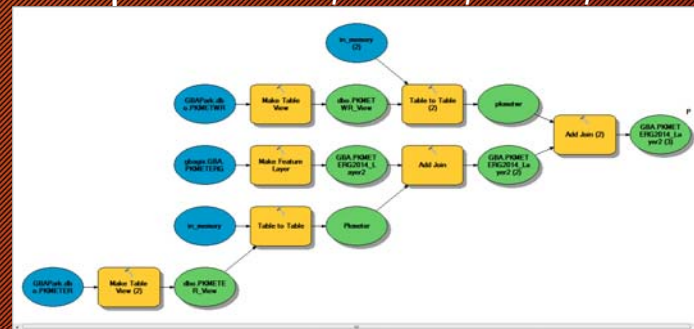
- Two static Maps
  - All Pipes were colored Black
  - Pipes That Have CCTV records were colored green
- PACP pipes are drawn in red using a MapService
- Map was created in July of 2014 have not touched it since.

# Water Consumption



## What is happening

- Map Services, 2013, 2014, 2015



- JavaScript displaying the map data by rendering, popup and with a mouse-over

# Advantage of JavaScript

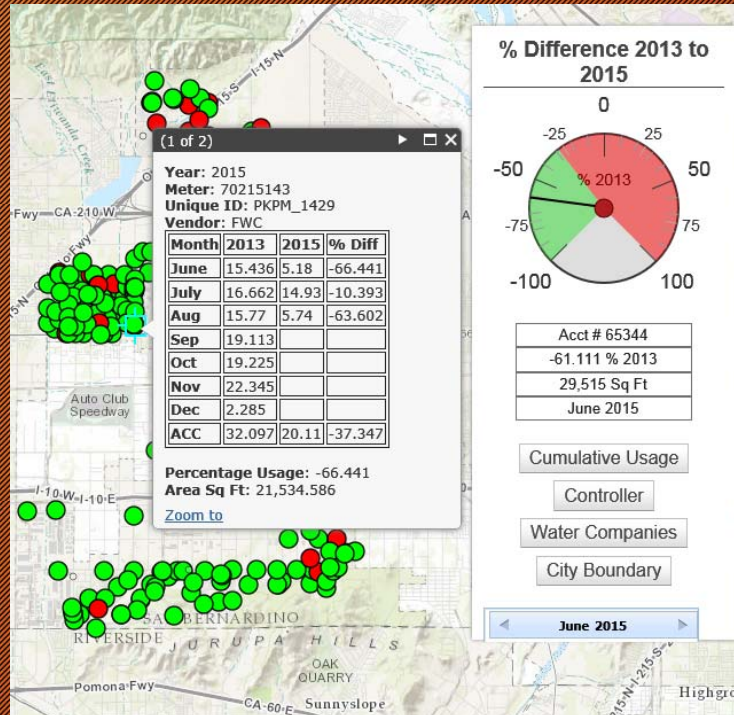
## Languages, Libraries and Frameworks

- Customization
  - DHTML
  - Sonic-Gauge
    - Negative Gauge
- Esri examples
  - Dojo
- HTML5

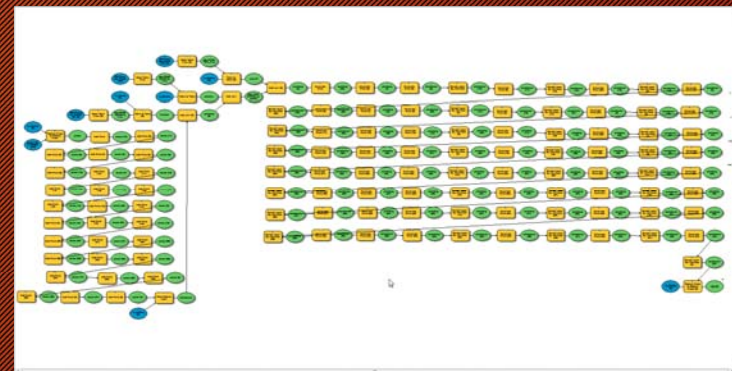
## What it does

- Renders the points using the addBreak object
  - To color the point
    - Red -300 to -4
    - Blue -4 to 4
    - Green 4 to 300
- Mouse-over to populate the display fields and move the needle.

# Water Conservation



- What is happening
- Map service



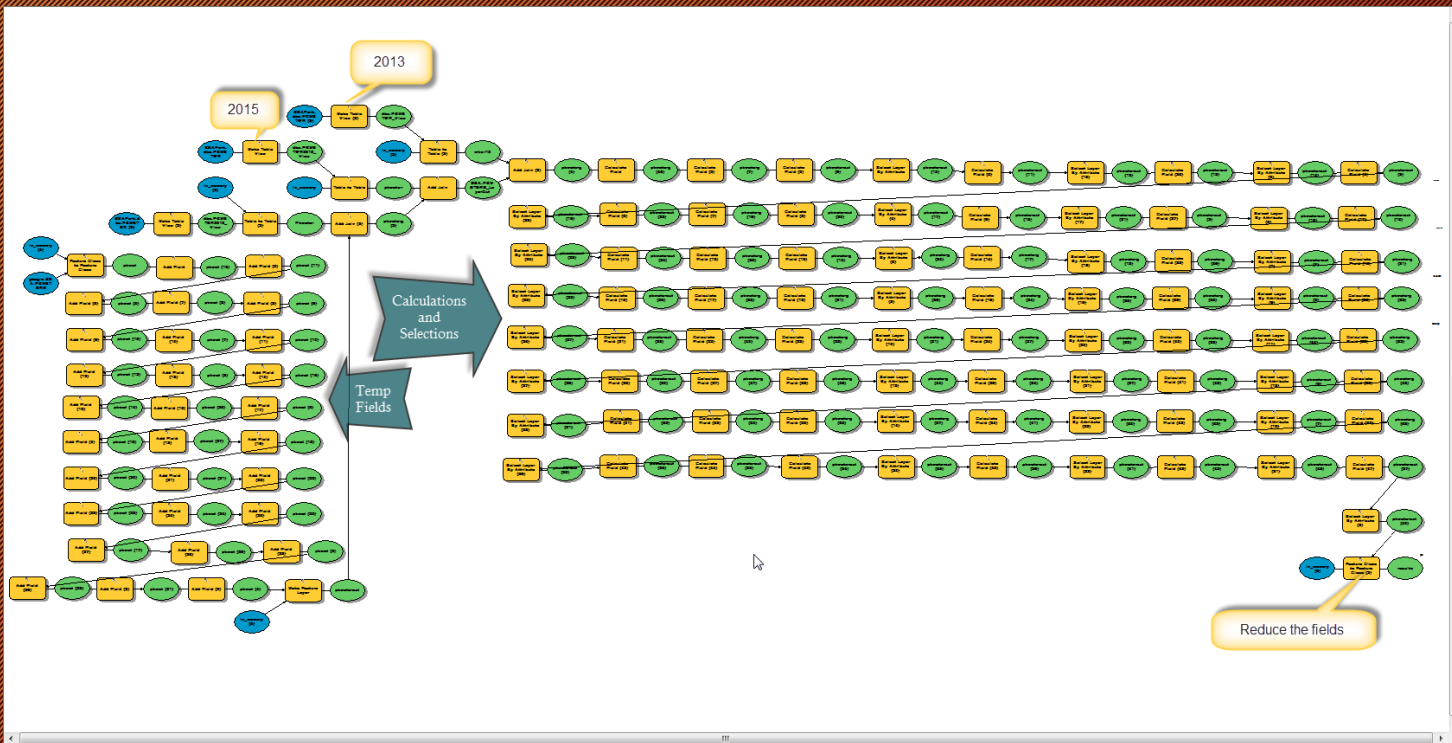
# Model Builder and JavaScript

## Model Builder

- Needed fields
- Have to calculate the values into the fields
- Have to select and clear select
- All temporary
- Leave only the fields you need

## What it does

- State Mandate % used
- Renders the points using the addValue object
  - To color the point by attribute
    - Red
    - Green
  - Why different water district have different base reduction requirements



# Lessons Learned

## PACP

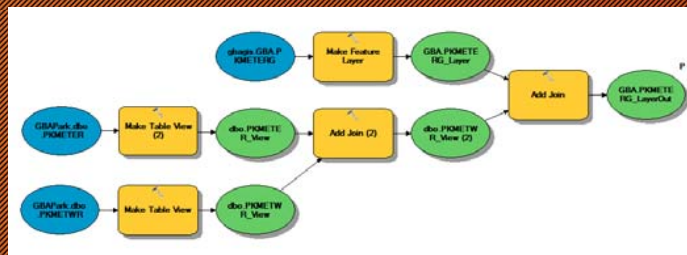
- No Major Problems just working through the process of publishing
- Having to run a model from a tool
- Using the results window
- Sharing the Results
- Not Publishing with Map services checked
  - Open Services Properties and check Map services after Publishing.



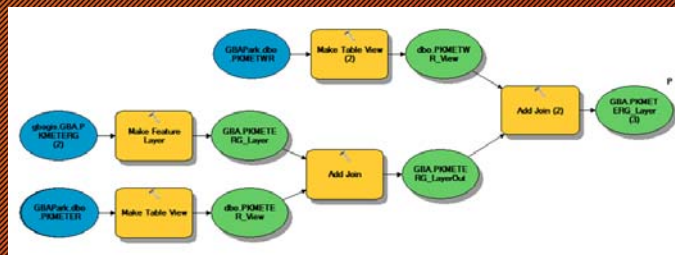
# Trouble shooting

## Water Consumption

- Works in ArcMAP



- After



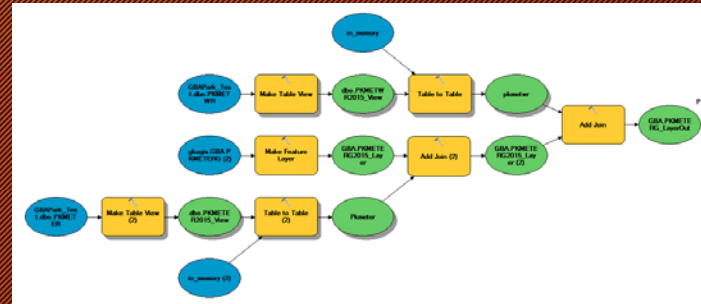
## Trouble shooting

- Can be trouble some
- Bad messages 09999
- Had to take it to a staging services. Then publishing the staging services got a 001270 error message
- Joined data to Feature services

# Trouble shooting

## One to Many

- Entered in 2015
- Found a bug
- Have to write data out to memory



# Documents

Contact Me:

- [jfield@fontana.org](mailto:jfield@fontana.org)
- [rmatta@fontana.org](mailto:rmatta@fontana.org)

# Questions