

GPCD Calculations

Process Steps for SAWS Calculation



Introduction

- GPCD refers to the number of gallons produced for sale or use, per person (capita), per day for a utility.
- GPCD can also be calculated for billed (sold) or otherwise allocated in the system. Other allocations could be things like:
 - Storage for later use
 - Mainline flushing
 - Fire hydrant testing
 - Other internal utility uses that aren't billed
- Gallons should be an accurate (as possible) count of water as determined by
 - Meters
 - Channel flow estimations
 - Run-time constant calculations for pumps

Introduction (con't)

- Capita or “persons” should be an accurate (as possible) representation of the total population served by the utility

- Population can be determined several ways:
 - Census data maps in comparison with utility boundary maps
 - Utility surveys of customers
 - Other locally developed demographic data such as
 - Transportation data
 - Workforce data
 - Housing reports

Introduction (con't)

- Issues in obtaining “gallons” data
 - Meters are not always in place or in the wrong place
 - Meter accuracy can vary due to many factors, including
 - Manufacturer
 - Type
 - Water Quality
 - Pump run-time data (which is a surrogate for metering) can be misleading if the equations are not calibrated frequently with recent pump performance data
 - Human error on meter reads can alter outcome

Introduction (con't)

- Issues in obtaining population data
 - Census occurs once every 10 years (with some larger areas having intra-decadal updates)
 - Census boundaries probably won't have an exact match to service area boundaries
 - Day workers within the service boundaries are hard to account for
 - Local utilities may not have GIS systems to help them map boundaries

Introduction (con't)

- Issues in obtaining population data
 - Utility assets (customer meters in particular) may not be mapped out for GIS analysis

Introduction (con't)

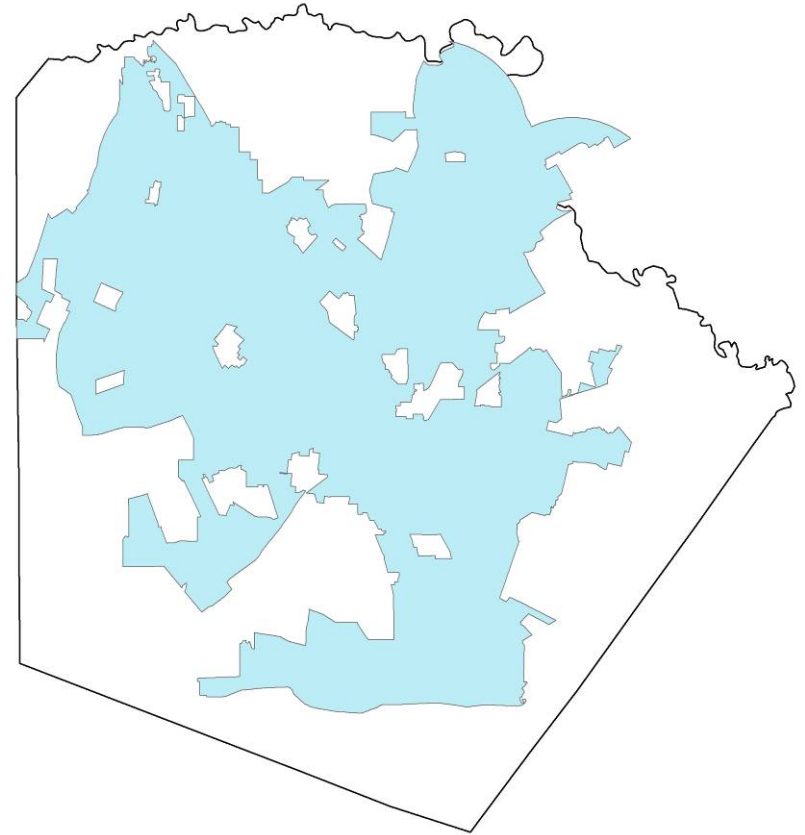
- Tools for Determining GPCD
 - Mapping software
 - ESRI (expensive, but relatively easy to use and full featured)
 - GRASS (freeware, but requires experienced system administrator support)
 - Database and spreadsheet software
 - Microsoft Office, MSSQL Open Office, MySQL

Steps to Determine GPCD

- 1. Determine geographic boundaries of service area.**
2. Determine location and type of customers in service area.
3. Obtain geographic boundaries and population counts by census boundary (tract or sub unit of census tract such as census block).
4. Overlay service boundary line on Census boundary data.
5. Determine water production gallons for service area
6. Determine water delivery gallons for service area
7. Divide production and delivery amounts by service population

Determine geographic boundaries of service area

- Use GIS to determine exact service area based on CCN

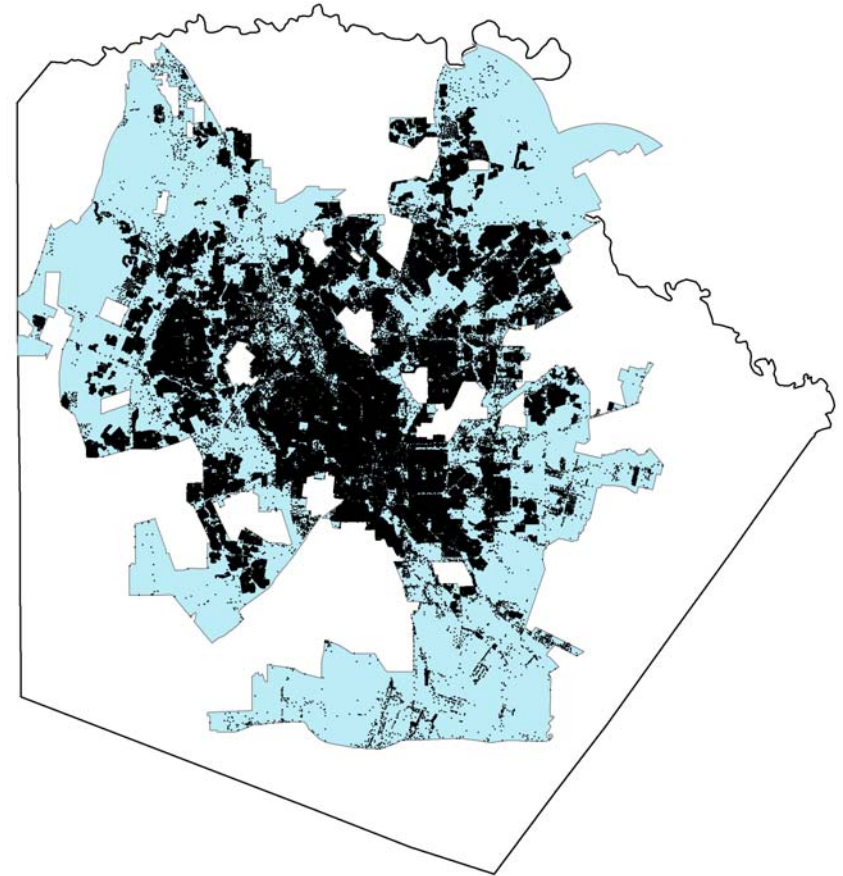


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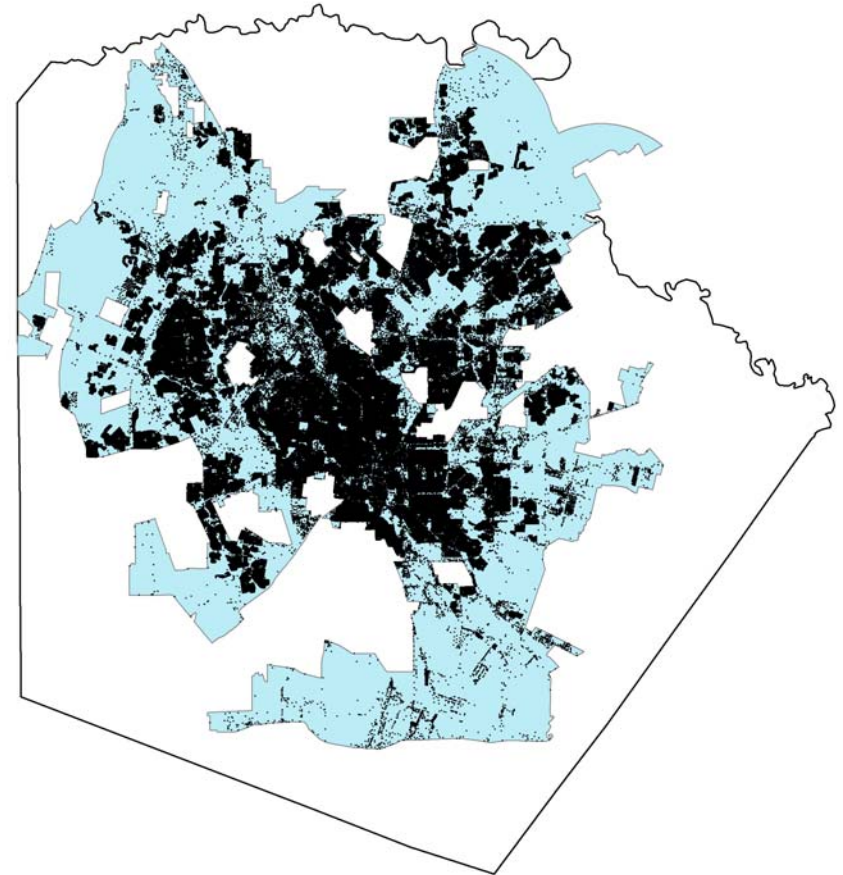
Determine location and type of customers in service area

- Determine location of each customer by:
 - GPS each meter
 - Address matching with local appraisal district files
 - Obtain precise latitude and longitude for each customer from third party software and data such as Google Earth



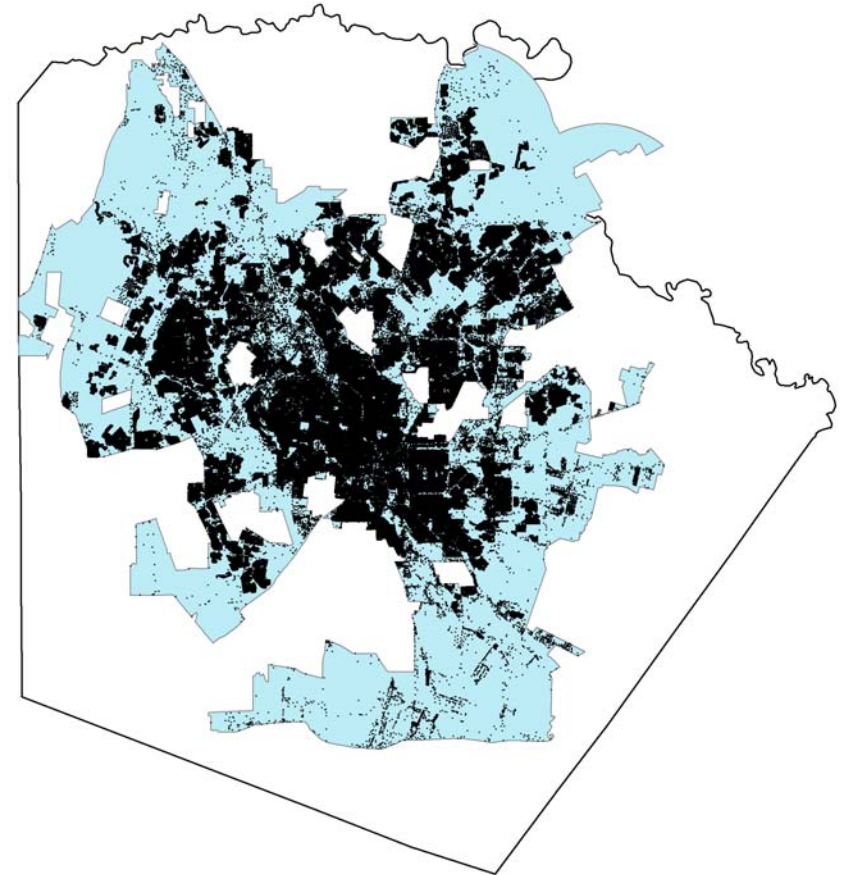
Determine location and type of customers in service area

- Residential – Single Family Home
- Apartment – 3 or more units
- Commercial Account
 - Grocery store, furniture store, auto repair garage, hotel/motel, restaurant, amusement park, etc
 - Most of water at site used for/by humans/landscape.
- Industrial Account
 - Refinery, auto assembly plant, food processing plant, semiconductor manufacturing plant.
 - Most of water at site used for economic process.
- Wholesale water customer
- Recycled water customer



Determine location and type of customers in service area

- Include all active customers that are indicative of population change, such as:
 - Homes, apartments, restaurants
- Exclude larger industrial customers, such as:
 - Large manufacturing plants that distribute nationally
- Exclude inactive (vacant), under construction and irrigation accounts

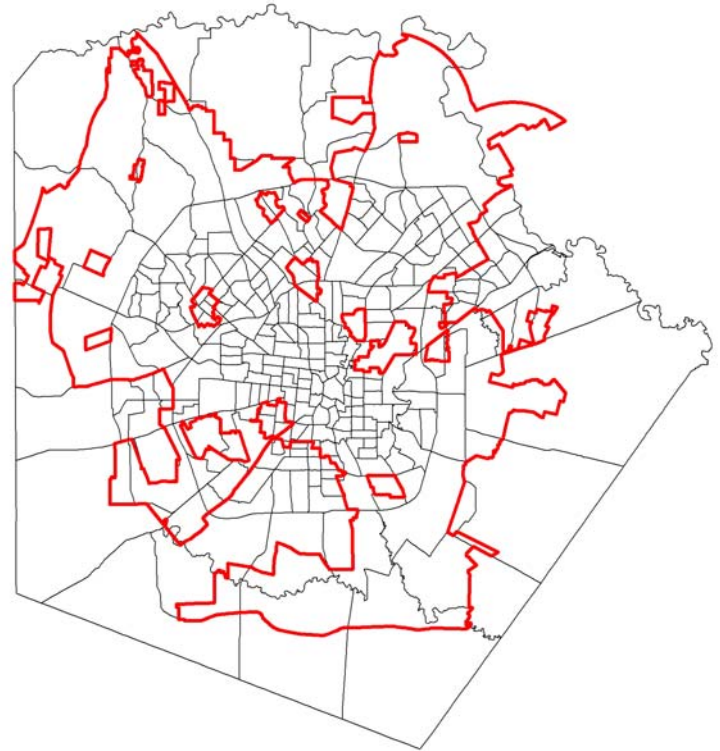


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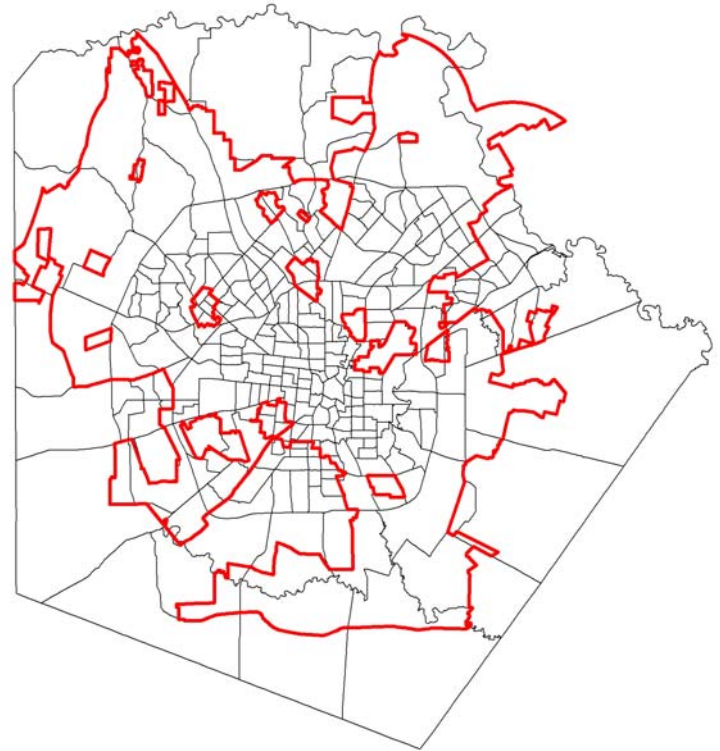
Overlay service boundary line on Census boundary data

- Census data and GIS files are freely available on the web
- Based on service area size and location, determine which census units are best for the analysis



Overlay service boundary line on Census boundary data

- Overlay census boundaries (in this case tracts) with service area

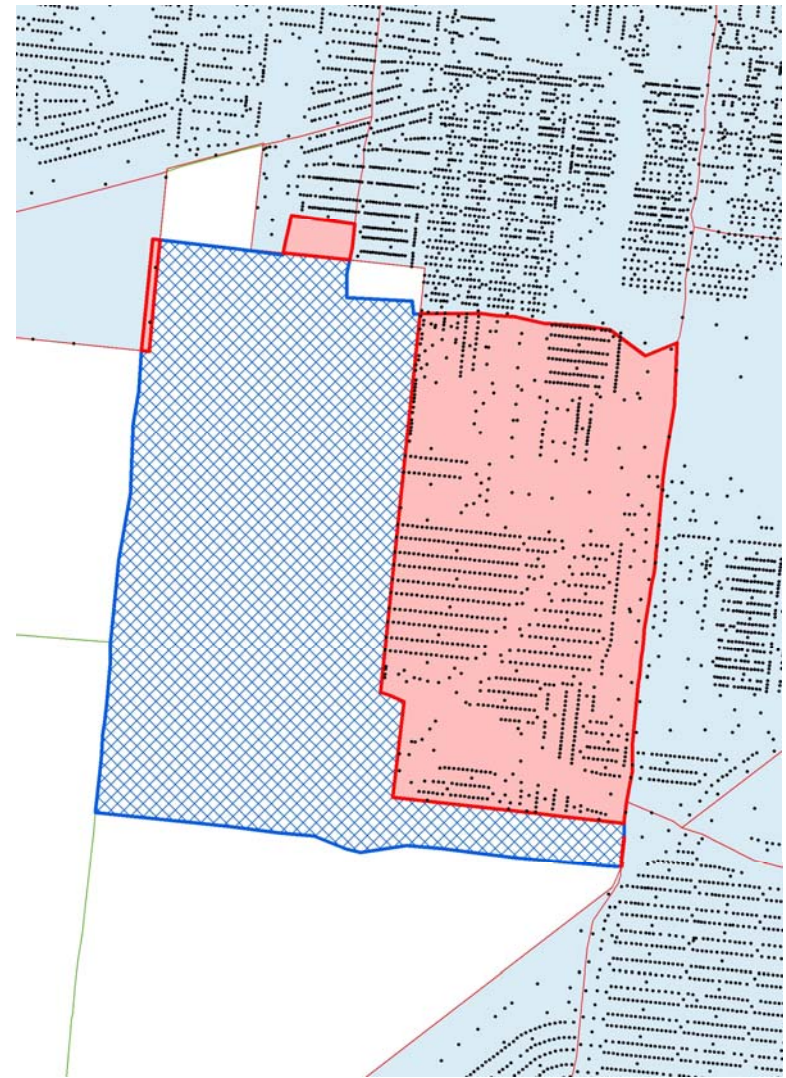


Overlay service boundary line on Census boundary data

- In most (if not all) cases, boundaries between service area and census boundary will not match at all
- Partial population counts must be estimated either by
 - Using GIS software to approximate
 - Visually looking at the map and approximating

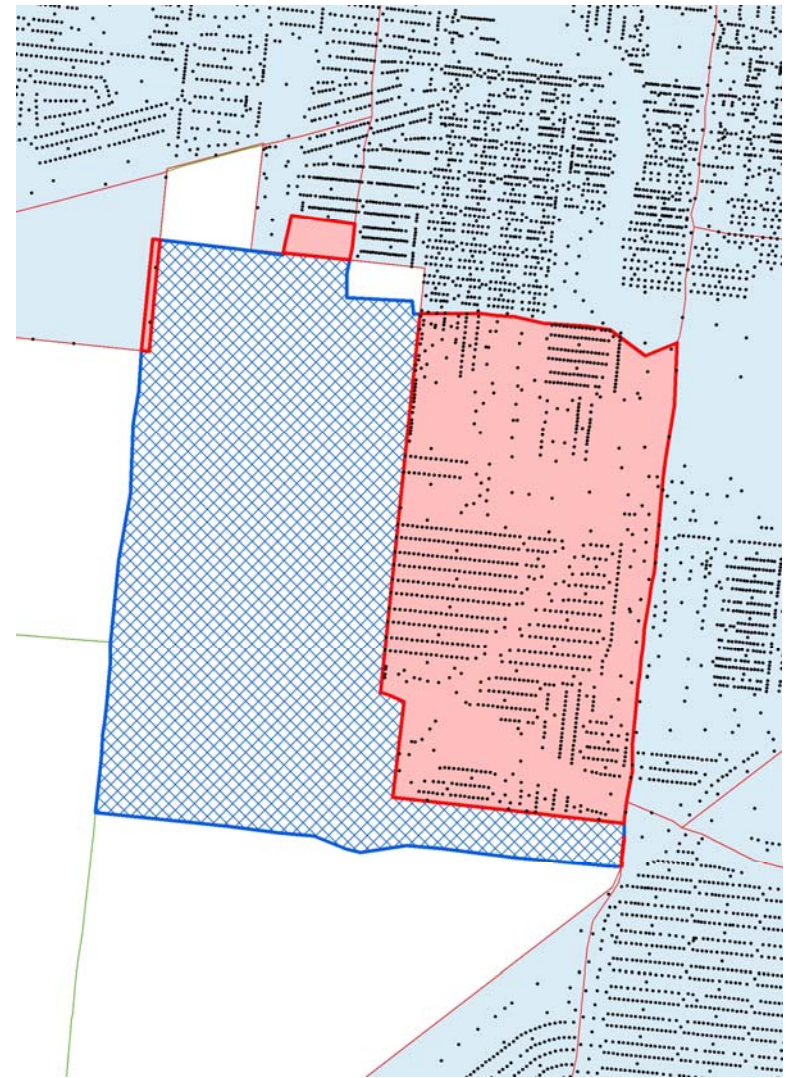
Overlay service boundary line on Census boundary data

- SAWS example of partial match of census tract to service boundary
 - Blue is Census
 - Red is SAWS Service



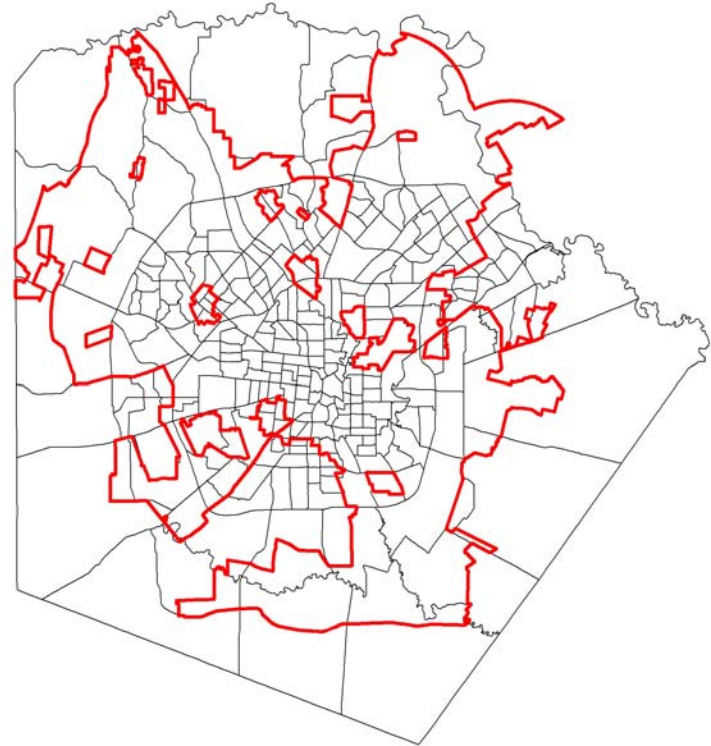
Overlay service boundary line on Census boundary data

- SAWS example of partial match of census tract to service boundary
 - Tract 1605
 - Census 2000 Population: 7,831 people
 - Only 40% of the SAWS CCN extends into the census tract
 - SAWS population for the tract may only be:
 - $7,831 \times 0.40 = 3,132$



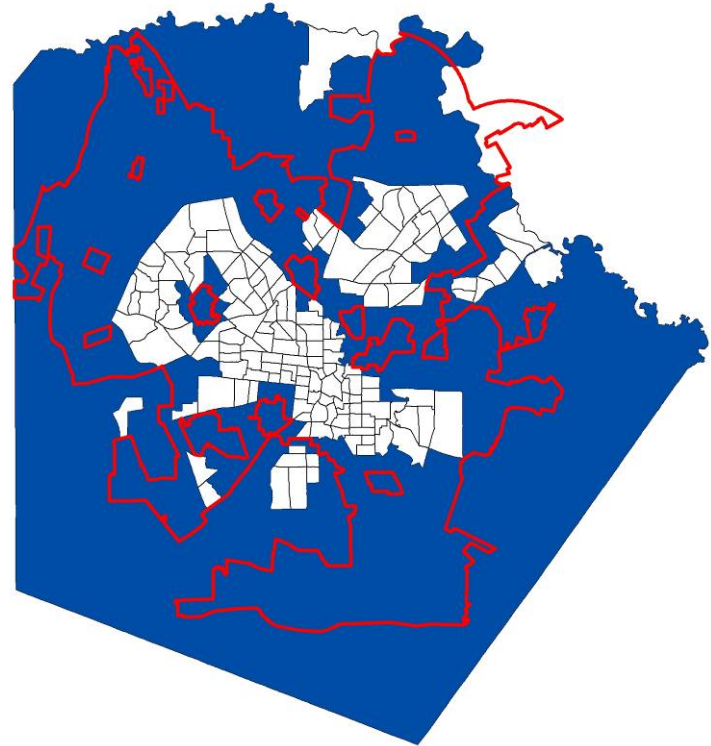
Overlay service boundary line on Census boundary data

- SAWS data on partial overlays
 - 262 census tracts represented in the SAWS CCN



Overlay service boundary line on Census boundary data

- SAWS data on partial overlays
 - 262 census tracts represented in the SAWS CCN
 - 119 (or 45%) are partially split by the SAWS CCN boundary



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Summing it all up

Depending on audience, there may several ways of presenting the data

2006 Production Data

| Line | Production Stats | | | Line | Production Source Accounting Audience | | | Line | Summary Stats | | |
|---|---------------------------------|---------------|--|------|---------------------------------------|---|------------|------|---------------------------------|---------------|------------|
| 1 | Service Population | 1,280,684 | | 1 | Service Population | 1,280,684 | | 1 | Service Population | 1,280,684 | |
| | | MG | AF | | | MG | AF | | | MG | AF |
| 2 | Edwards Production ¹ | 63,747.30 | 195,633.28 | 2 | Edwards Production | 58,690.82 | 180,115.51 | 2 | Edwards Production ⁴ | 59,056.60 | 181,238.05 |
| 3 | Oliver Ranch/BSR/Trinity | 943.95 | 2,896.88 | 3 | Oliver Ranch/BSR/Trinity | 943.95 | 2,896.88 | 3 | Trinity Production ⁵ | 963.38 | 2,956.50 |
| 4 | GBRA | 1,615.13 | 4,956.65 | 4 | GBRA | 1,615.13 | 4,956.65 | 4 | Canyon Lake | 1,615.13 | 4,956.65 |
| 5 | Kelly USA | 365.78 | 1,122.54 | 5 | Kelly USA | 365.78 | 1,122.54 | 5 | | | |
| 6 | CTI | 7.02 | 21.54 | 6 | CTI | 7.02 | 21.54 | 6 | | | |
| 7 | S&S Hills | 12.41 | 38.08 | 7 | S&S Hills | 12.41 | 38.08 | 7 | | | |
| 8 | ASR Recharge | 2,962.29 | 9,090.93 | 8 | ASR Recharge | 2,962.29 | 9,090.93 | 8 | ASR Recharge | 2,962.29 | 9,090.93 |
| 9 | ASR Production | 2,094.62 | 6,428.15 | 9 | ASR Production | 2,094.62 | 6,428.15 | 9 | ASR Production | 2,094.62 | 6,428.15 |
| 10 | Total Production | 66,691.59 | 204,668.97 | 10 | Total Production | 66,692.02 | 204,670.29 | 10 | | | |
| 11 | Net Production ² | 63,729.30 | 195,578.04 | 11 | Net Production ³ | 63,729.73 | 195,579.36 | 11 | Production for Use | 63,729.73 | 195,579.36 |
| 12 | GPCD³ | 136.33 | | 12 | GPCD³ | 136.33 | | 12 | GPCD³ | 136.33 | |
| 1 - Includes 2,094.62 MG from ASR 2 - Sum of lines 2,3,4,5,6,7 less line 8 3 - Line 11 / 1.280684 / 365 Population provided by Mapping and Planning Dept. Production Provided by Production Dept. | | | 3 - Sum of lines 2,3,4,5,6,7,9 less line 8 3 - Line 11 / 1.280684 / 365 Population provided by Mapping and Planning Dept. Production Provided by Production Dept. | | | 4 - Sum Edwards wells and Kelly USA 5 - Sum of Trinity wells, Oliver Ranch, BSR, CTI and 3 - Line 11 / 1.280684 / 365 Population provided by Mapping and Planning Dept. Production Provided by Production Dept. | | | | | |