

Planning Equitable Fire and Rescue Service Delivery Based on Informed Decision Making

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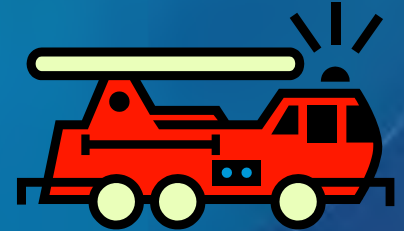
About Queensland

- Population 3,840,000
- Area 1.7 million square kilometers
- South East corner:
 - Rapid, sustained population growth
 - Increasing population density
- Regional centres:
 - Sustained population growth
- Remoter areas:
 - Decreasing population

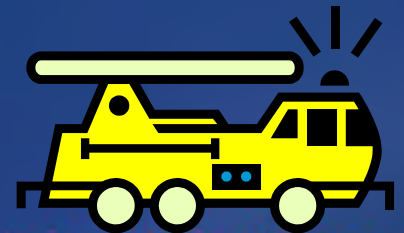


About QFRS

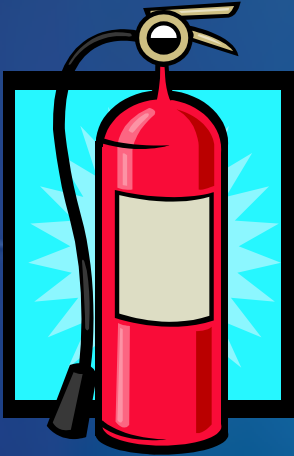
- 237 urban stations
 - Cover about 87% of QLD population
 - Permanent stations
 - Auxiliary stations
 - Composite stations
 - Career and auxiliary (part-time) personnel



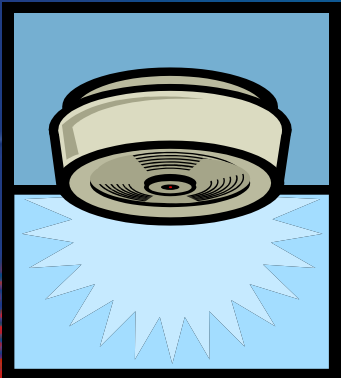
- 1565 rural brigades
 - Cover about 83% of QLD area
 - 4 classes of rural brigade
 - 44,000 volunteer personnel



Urban Stations



- **Building Fire Safety Inspections**
 - Hospital premises
 - Licensed premises
 - Accommodation premises

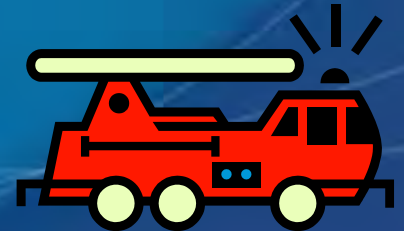


- **Community Education**
 - Operation Safehome
 - School-based programs
(Fire Ed, RAAP)



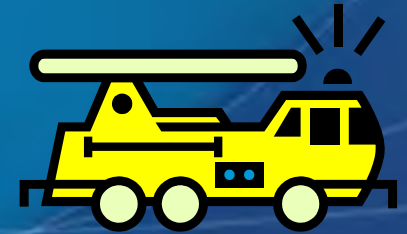
Urban Stations

- Attend 60,000 incidents per year
 - Fires
 - Vehicle accidents
 - Other rescues
 - HAZMAT
 - Unwanted alarm activations
- Incident details are recorded in a database
- Conforms to the Australasian Incident Reporting System - AIRS



Rural Brigades

- Attend unknown number of incidents per year
 - Voluntary reporting
 - Majority are landscape fires
 - Also structural fires, rescues, HAZMAT
- Separate database
- Similar structure but cut-down
 - Fewer fields
 - Fewer coding options



Some questions worth asking

- Are our resources spread to provide equity of service delivery right now?
- By 2026, the population of SEQ will be 50% higher than it is now. How many more incidents per year will we have to attend?
- What new resources will we need?
- Where will they need to be located?





Some inescapable facts



- Planning is required to
 - Find the most appropriate location
 - Design the appropriate facilities
 - Determine the most appropriate equipment



- Time and money are required for
 - Training new personnel
 - Building
 - Obtaining new fleet assets



Analysis Basics

- **Number of incidents occurring within a station or brigade's area of responsibility**
 - **Who filed the report? (First attending crew)**
 - **Compare incident location with station and brigade area boundaries (GIS - more data pre-processing required)**
- **Average over two financial years ('01-'03)**
 - **Take account of year-to-year fluctuations**
 - **Minimise impact of overall growth**



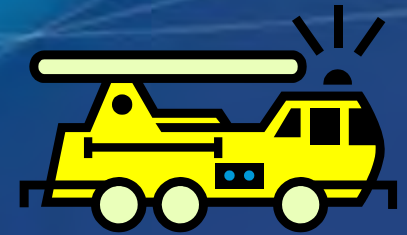
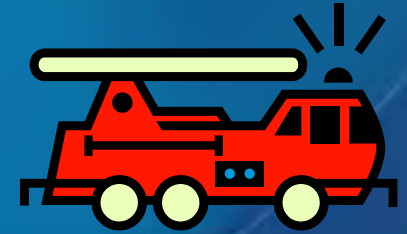
More Analysis Basics

- Area of responsibility calculated from map boundaries using GIS
- Population values obtained from 2001 Census of Population and Housing (ABS)
- Compare census Collection Districts with station areas to estimate population



Service Type and Number of Incidents

- 237 urban stations
- 3 types (permanent, composite, auxiliary)
- 1565 rural brigades
- 4 types
- Do the types of stations and brigades we have now match their workloads?



Station Type and Number of Incidents

- Station type correlates well with number of incidents ($r = 0.81$)
- Type of station can be predicted fairly accurately from breakdown of incident types (discriminant analysis)
 - 59/65 permanent stations
 - 10/10 composite stations
 - 144/162 auxiliary stations



Brigade Type and Number of Incidents

- Brigade type correlates only moderately with number of incidents ($r = 0.50$)
- Voluntary reporting policy may be skewing the results
- Maybe the type of brigade doesn't match current workloads too well
- Too few incidents to try to predict brigade type from incident type breakdown



Incident Numbers, Population and Area

- Can demographic variables be used to predict emergency services workload?
- Correlation between number of incidents and population = 0.79
- Correlation between number of incidents and area of responsibility = -0.36
- No other significant factors
 - Socioeconomic advantage/disadvantage
 - Passenger vehicle registrations
 - Remoteness

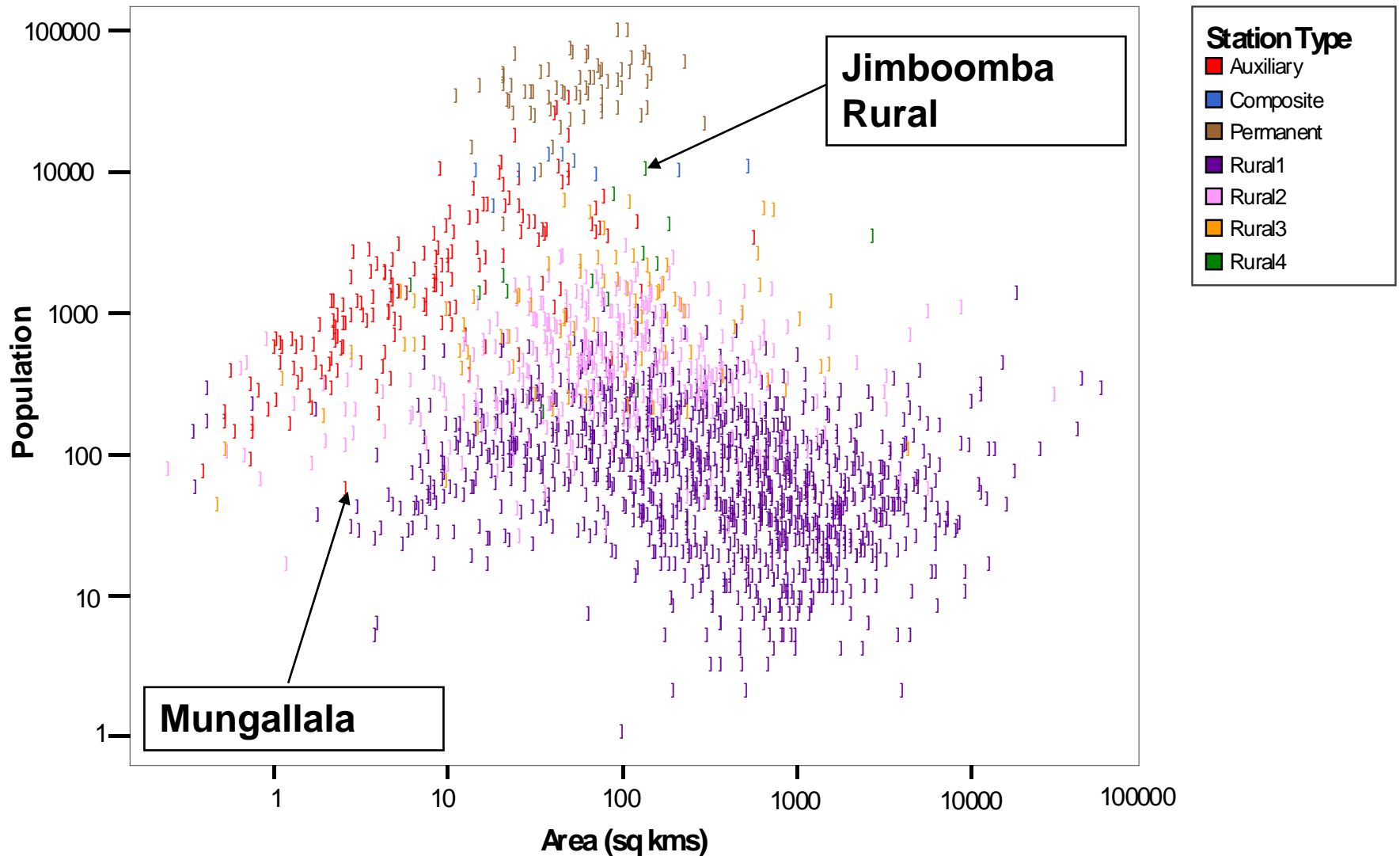


Incident Numbers, Population and Area

- **Constructed linear regression model**
- **Results correlated highly with actual numbers of incidents ($r = 0.85$)**
- **More predictive than current station and brigade classification systems**



Incident Numbers, Population and Area



Ways this can be used

1. **Proposals for redefining boundaries**
 - **Compare proposed area and population against similar combinations**
 - **Shows what type of station is most comparable to what currently exists elsewhere in the state**



Ways this can be used

2. Planning for the future

- Consider existing areas and their predicted future populations
- Where will the growth be?
- To keep the same level of service delivery, how many more resources do we need?

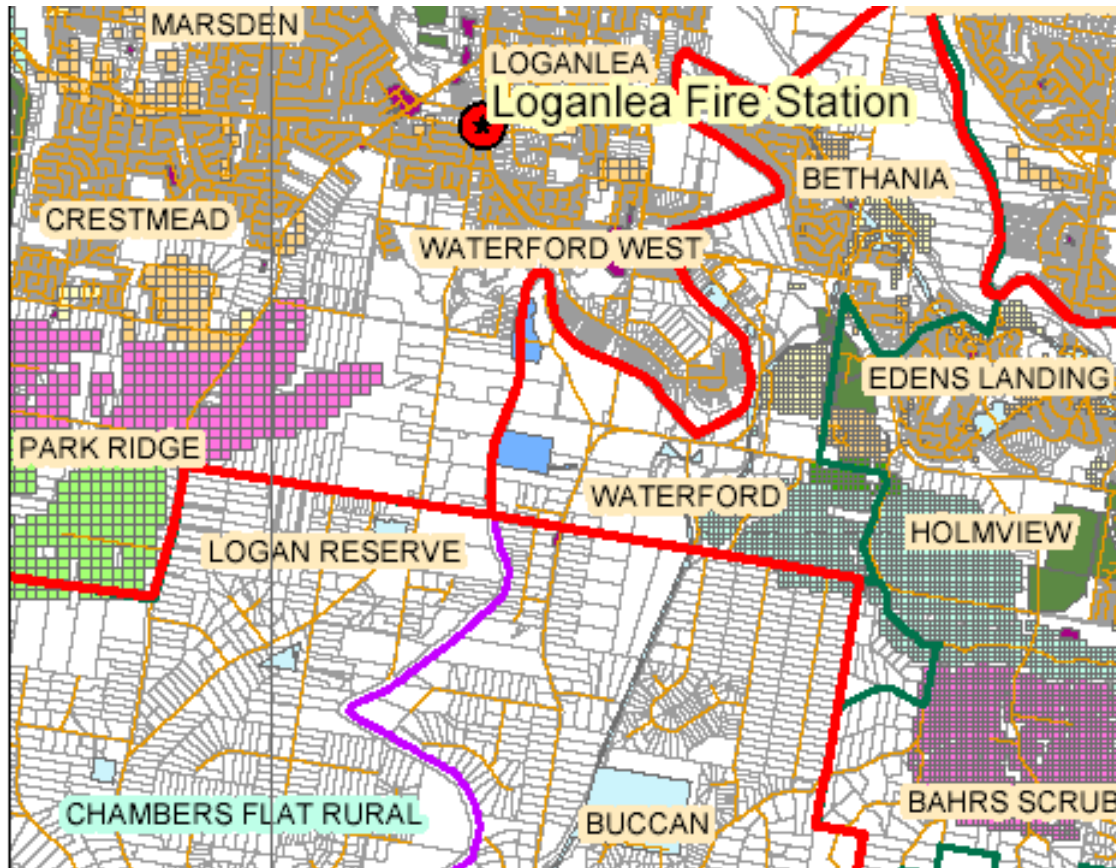


So where do we get information on the future?

- Population projections – ABS / OESR
 - Statistical Divisions to 2026
 - Queensland as a whole to 2051
 - Includes age-group data
- More localised – Department of Local Government
 - 2006, 2011, 2016, 2021



Broadhectare Data



Conclusions

- **Service delivery assessment and planning can be enhanced by use of statistics and demographic data**
- **Only considers base level resources**
- **Specialised resources held centrally need to be looked at separately**
- **GIS mapping of data can help show where risks are higher**



Acknowledgements

- **Operations, Risk and Planning Unit, QFRS**
 - Roger Bird (Concepts and output specifications)
- **GIS Unit, QFRS**
 - Mapping station and brigade boundaries
 - Broadhectare map
- **QFRS Urban and Rural personnel**

