Redefining South East Queensland's Water Supply Options

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OUTLINE

Operational system developed that increases water availability while meeting statutory requirements

- Challenges
- State Water Management Planning
- Brisbane & Goulburn-Murray Water Supply Schemes
- Climatic Variability
- Modelling Approach and Data
- Benefits Achieved
- Conclusions

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Challenges

- Brisbane's water system is large and complex.
- Water is controversial and economically important.
- Can we make better sense of this system?
  - ➢ Understanding from data analysis
  - ➢ Insights from results
  - ➢ Reduce reliance on narrow perspectives
- How could system management be improved?
- What is user willingness to pay?

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QLD Water Management Planning

- Water Resource Plans set performance indicators for water management in each river basin:
  - Water Allocation performance criteria
  - Environmental flow criteria
- Hydrologic modelling tools test how these criteria will be met

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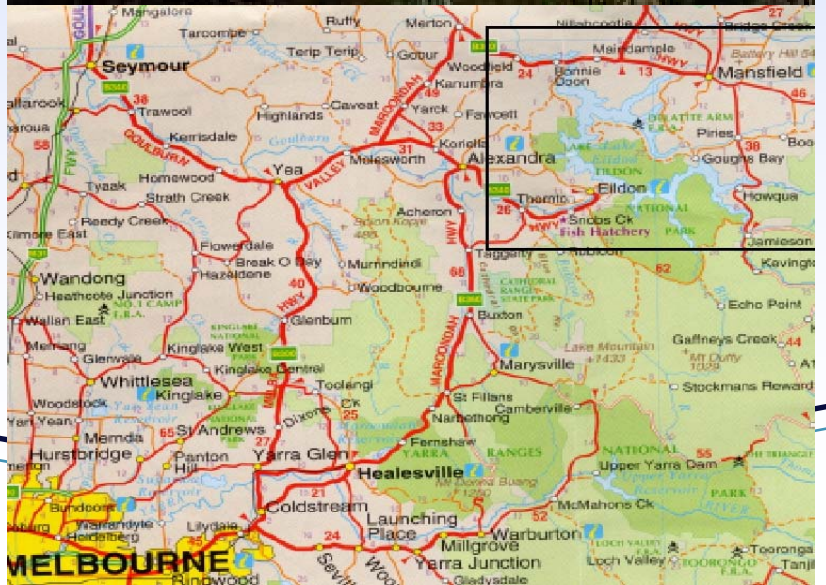
Catchment Characteristics

Feature	Wivenhoe	Eildon
Location	60km NW Brisbane	140km NE Melbourne
Completed	1986	1956
Purpose	Urban supply	Irrigation supply
Catchment size	~7,000 km^2	~23,915 km^2
Mean annual rainfall	911 mm/a	852 mm/a
Mean annual flow	1.17 ML/ha/a	1.8 ML/ha/yr



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Brisbane River
Water Supply Scheme

- Wivenhoe Dam has a full supply volume of 1,165 GL
- Somerset Dam with FSL 380 GL
- Water Allocations currently modelled in the scheme are:
  - High Priority 279,022 ML/a
  - Medium Priority 7,000 ML/a

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Goulburn River Water Supply Scheme

- Eildon Dam has a full supply volume of 3,390 GL (3 times capacity of Wivenhoe)
- Eildon Dam supplies 60% of Goulburn –Murray Irrigation District - largest area of irrigated farmland in Australia (800 000 ha)
- Average 91% of water released is diverted for irrigation purposes

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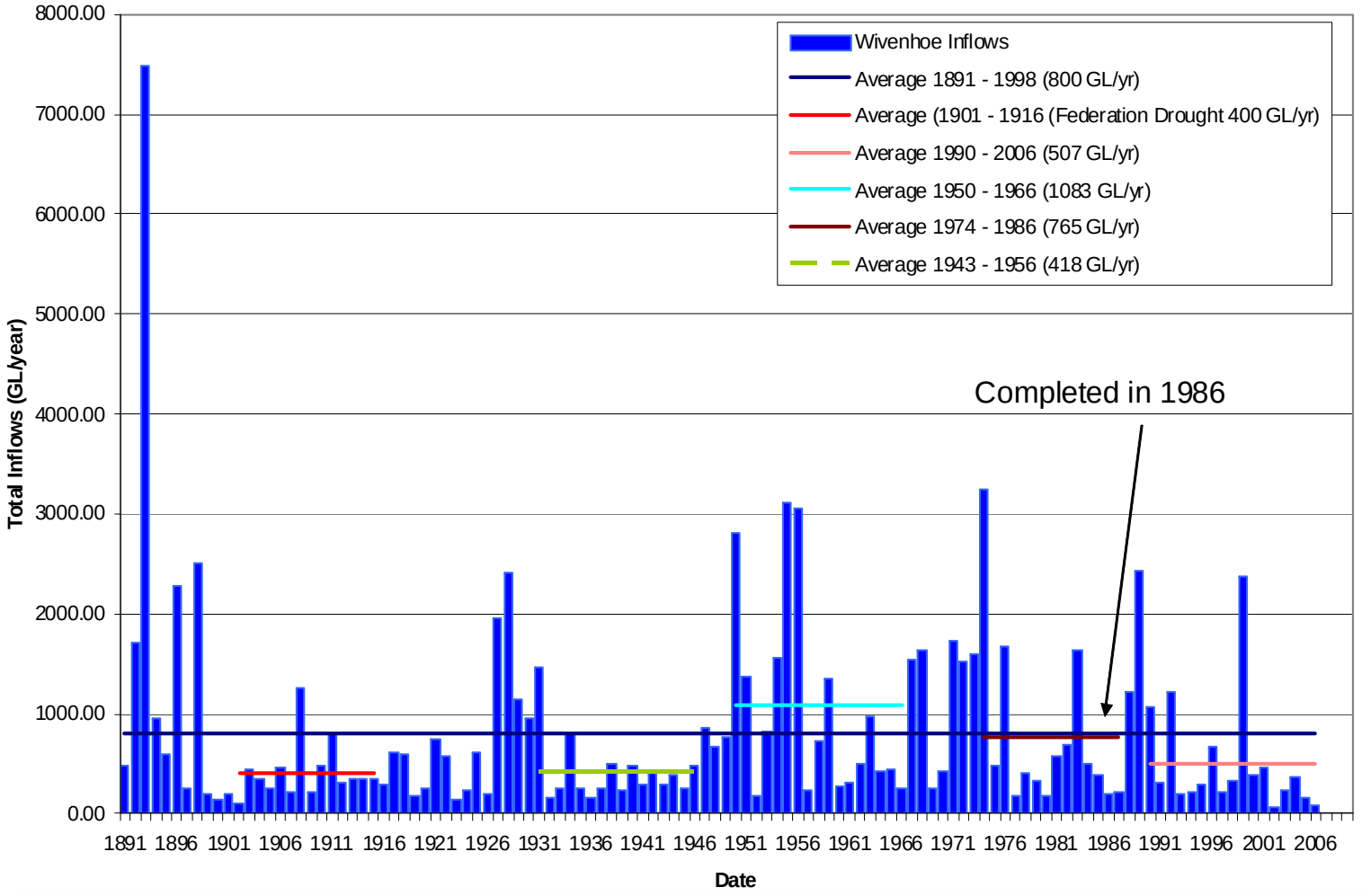
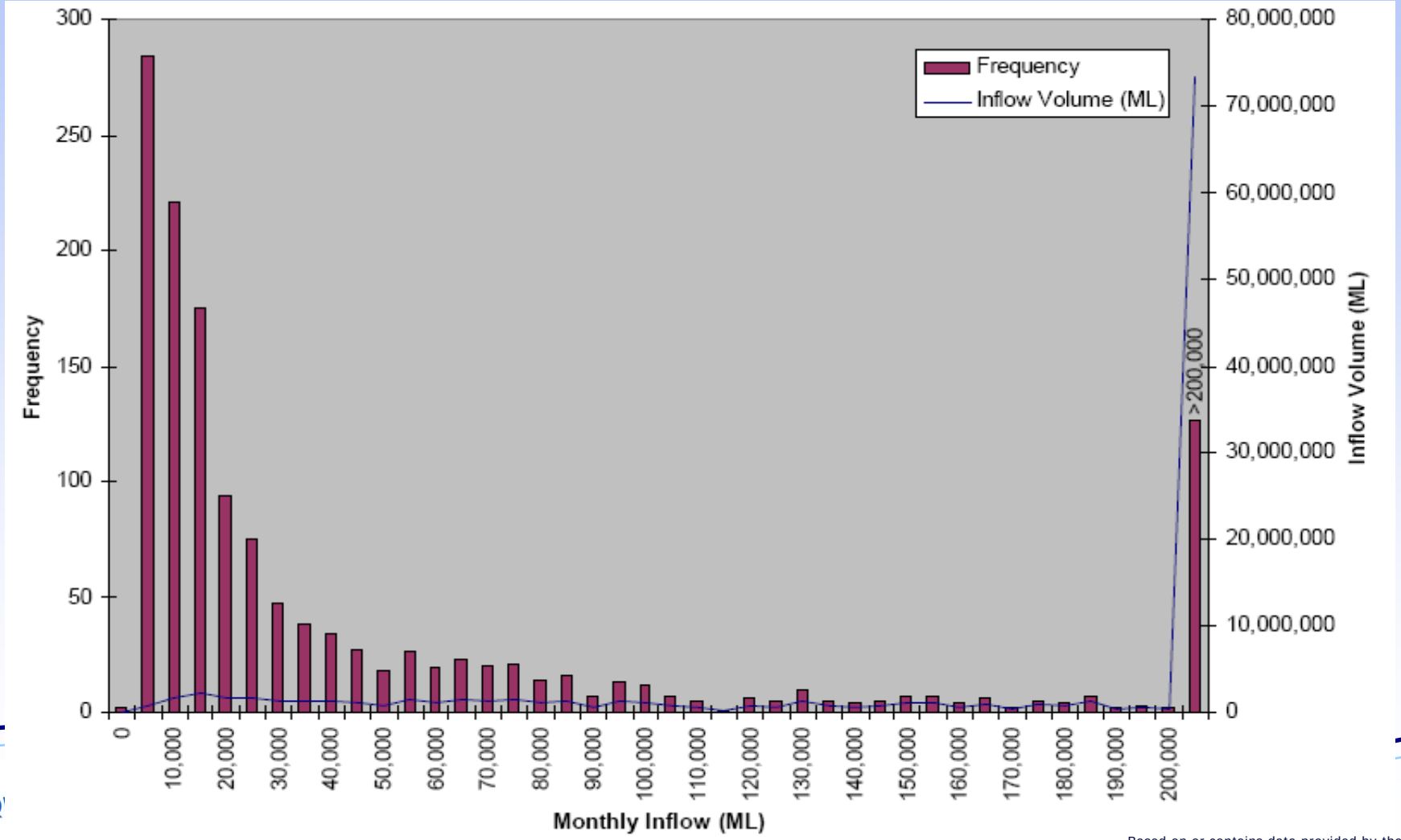
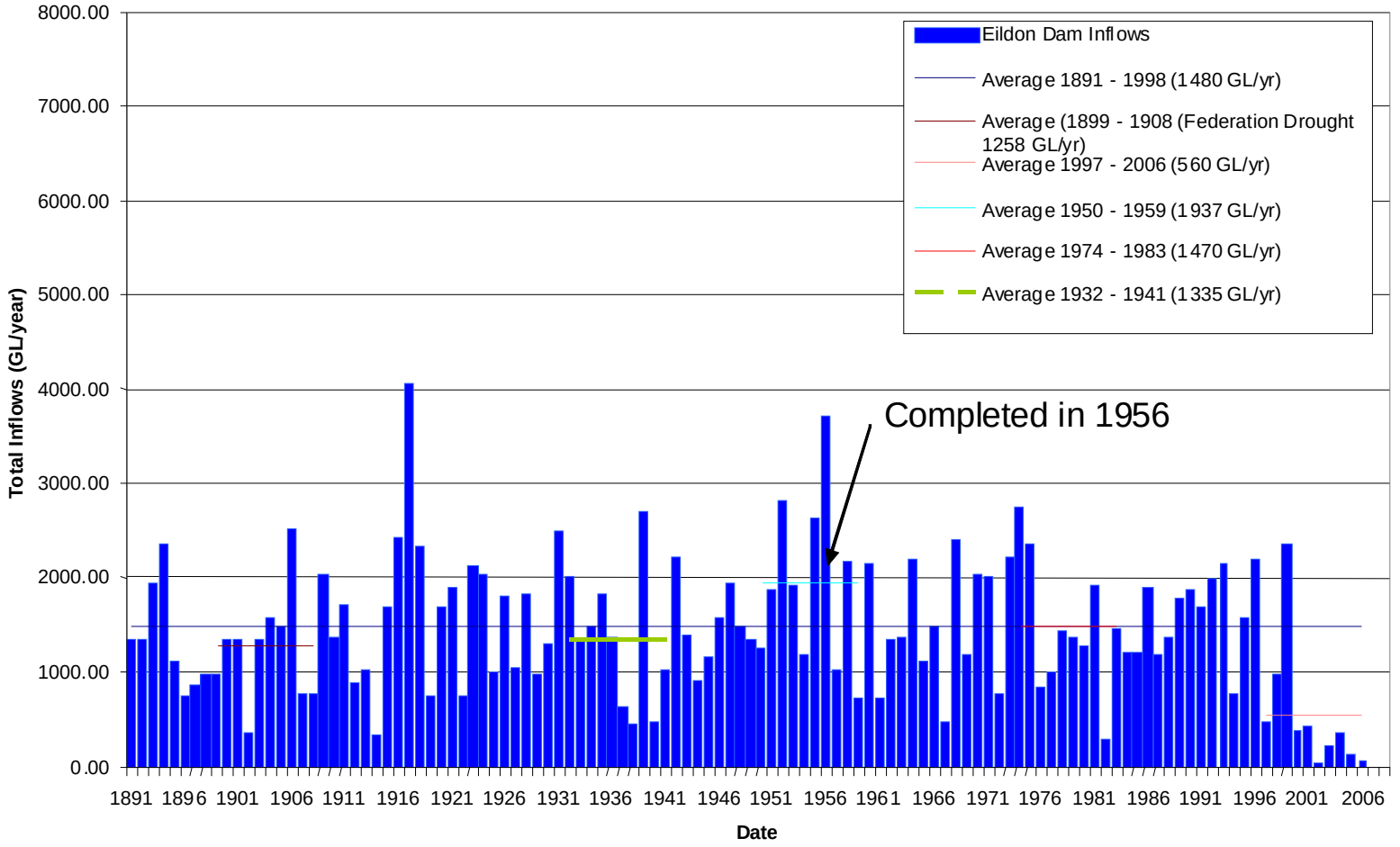
Wivenhoe Dam Inflows



Frequency and volume contribution of Wivenhoe monthly inflows



Eildon Dam Inflows



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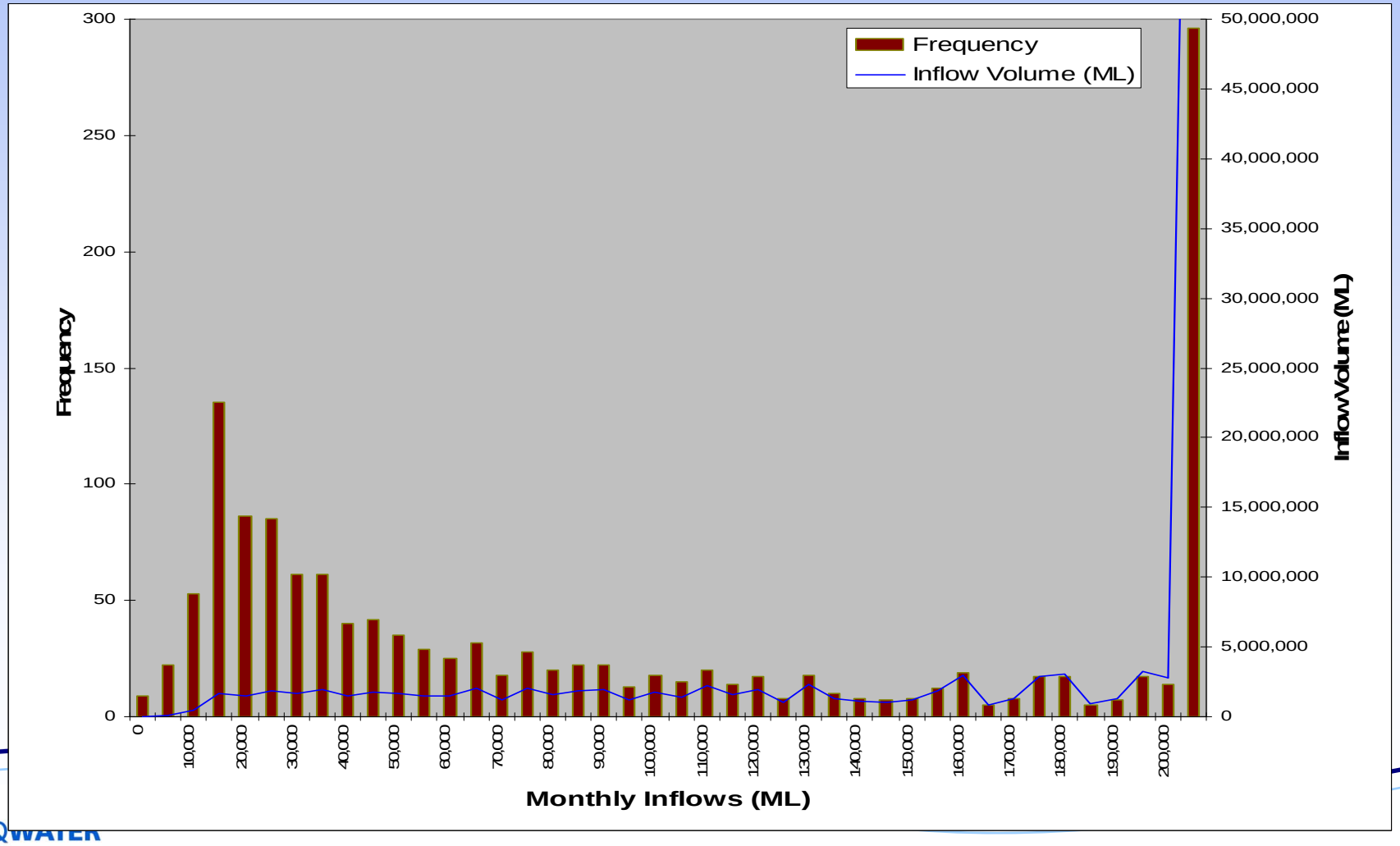
Frequency and volume contribution of Eildon monthly inflows



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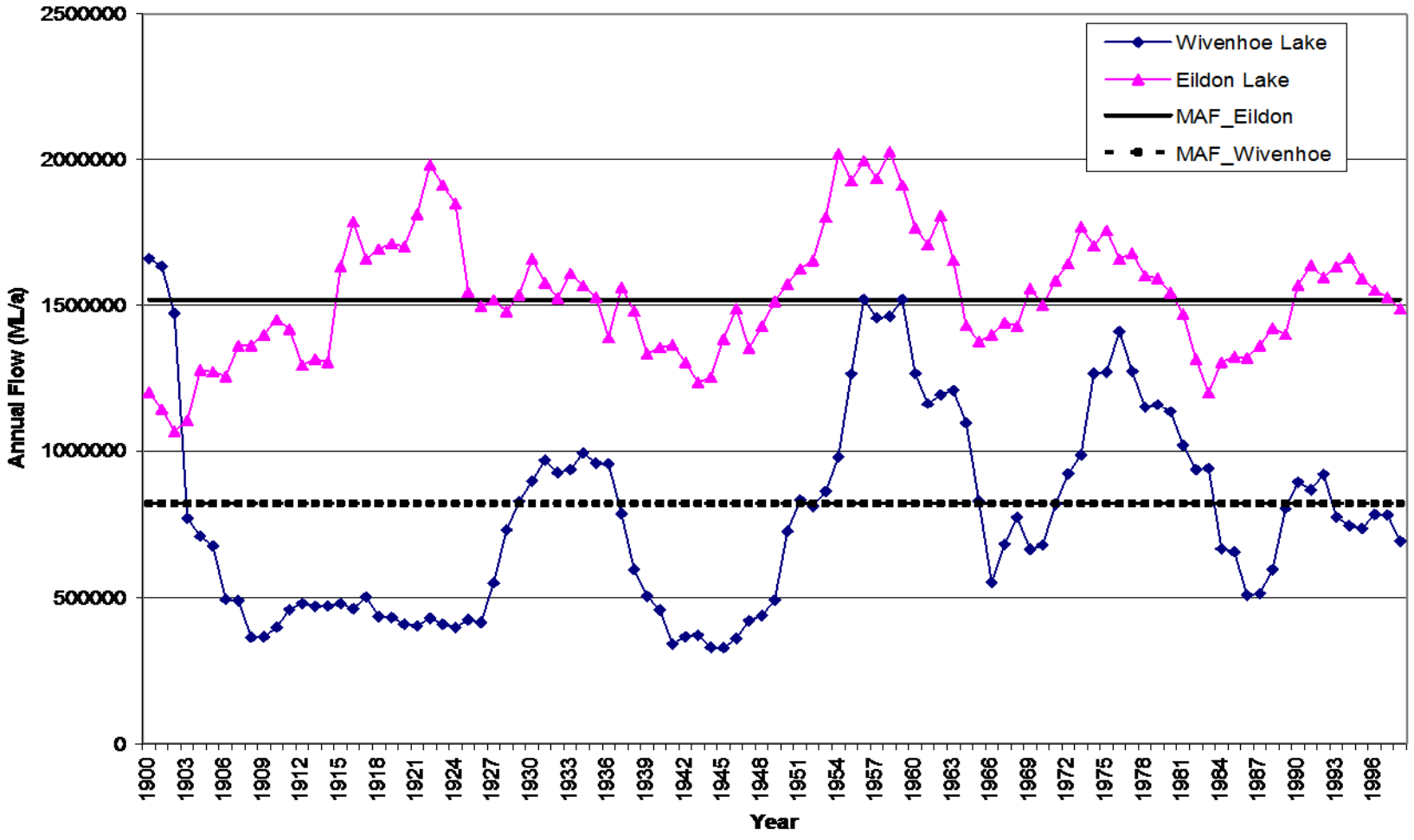
Based on or contains data provided by Goulburn-Murray Water [2008]

Climate Variability



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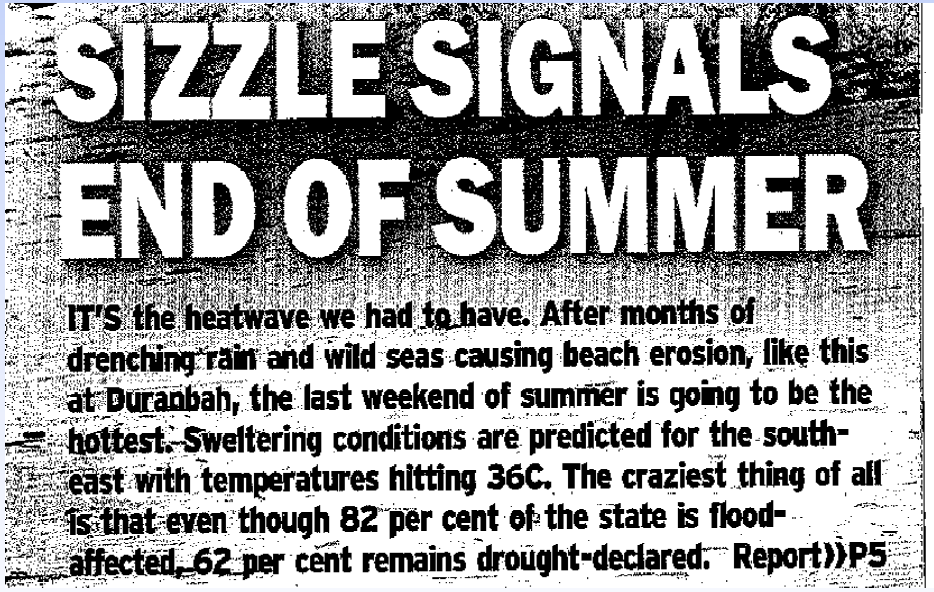
Climate Variability

- Both systems have cyclical performance over varied timeframes.
- Wivenhoe Dam rainfall is drought dominated prior to 1950 and flood dominated after 1950
- the world average CV is 0.33.
- CV for Brisbane catchment is 1.2 and 0.46 for Lake Eildon



SIZZLE SIGNALS END OF SUMMER

IT'S the heatwave we had to have. After months of drenching rain and wild seas causing beach erosion, like this at Duranbah, the last weekend of summer is going to be the hottest. Sweltering conditions are predicted for the south-east with temperatures hitting 36C. The craziest thing of all is that even though 82 per cent of the state is flood-affected, 62 per cent remains drought-declared. Report))P5

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Modelling Approach

- Integrated Quantity and Quality Model (IQQM) provided by NRW
- Model calibrated and validated by NRW
- Alternative extraction regimes investigated to meet organisational and operational performance efficiencies
- Outputs were assessed against the performance criteria set by NRW

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Potential Annual Water Take

- Maximum Extraction up to 355,000 ML at EL 67.0 m
- Mean Annual Diversion of 310,627 ML

Wivenhoe Dam Level (EL m AHD)	Wivenhoe Dam % Full	Storage Capacity (ML)	Maximum daily extraction rate (ML/d)	Maximum annual extraction (ML/yr)
67.0 – 65.0	100 – 82.8	1,165,200	975	355,000
65.0 – 63.0	82.8 – 68.2	965,200	858	328,925
63.0 – 60.0	68.2 – 50.1	794,560	819	300,320
60.0 – 53.25	50.1 – 21.4	583,930	780	286,000

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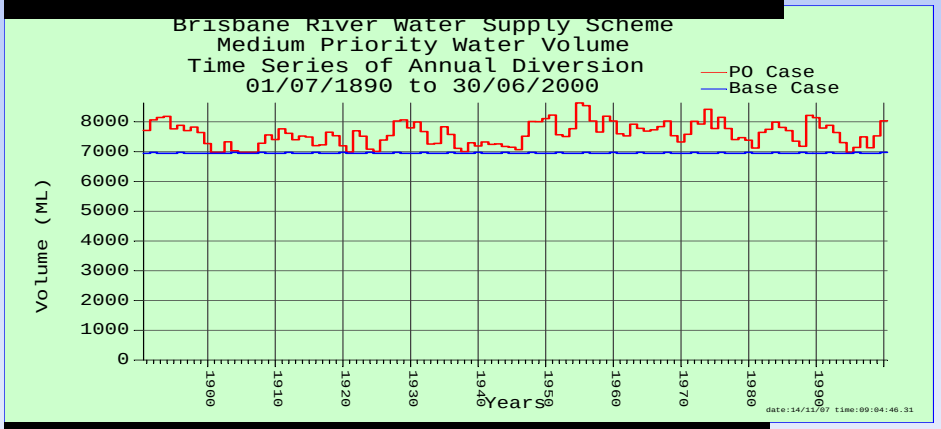
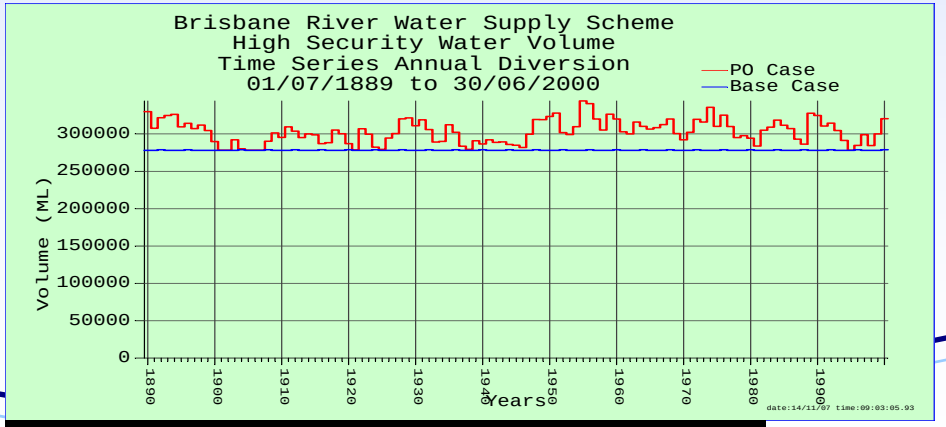
Potential Annual Water Take

- **Extraction regime**
  - 286,000 ML/a to 355,000 ML/a @ EL 67.0 m;
  - average annual diversion of 310,627 ML; and
  - an historic reliability of 99.7% for both user groups

Mean Annual Diversion



Medium Priority Users (Irrigators



High Priority Users (Urban Users)

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RATIONALE

- Finding the “best” outcome for customers and operator
- “Best” meets performance criteria
- Flexibility in operating rules
- Move beyond gross averages and coarse means
- Align with environmental needs
- System transparency

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CONCLUSION

- Greater versatility and adaptability are imperatives for future water management.
- New approach developed for the operation of a water supply system.
- Optimisation can identify promising solutions

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