




ARR Revision Project 6 Losses for Urban Catchments

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Outline


Concepts

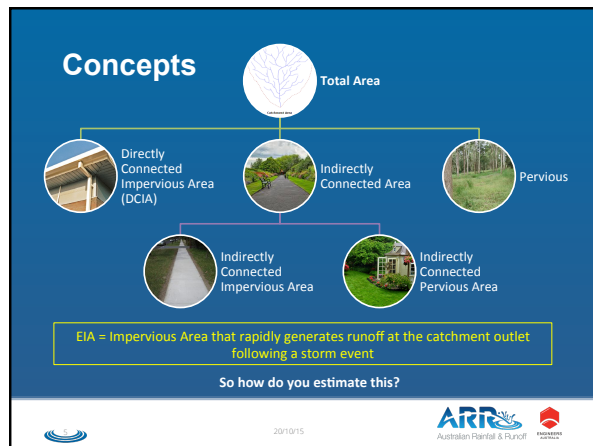
Effective Impervious Area

- Project 6
- Other Literature
- AR&R Guidance

Losses

- Recommended Model
- EIA Losses
- Indirectly Connected Area Losses
- Other Considerations





Estimation of EIA – Project 6

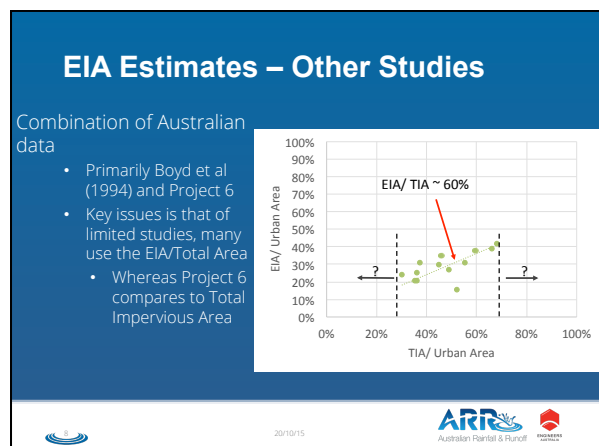
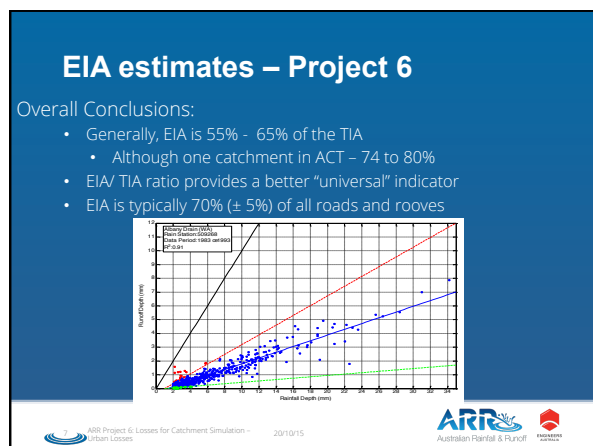
3 Different Approaches

- GIS
- Regression
- Land-use Based

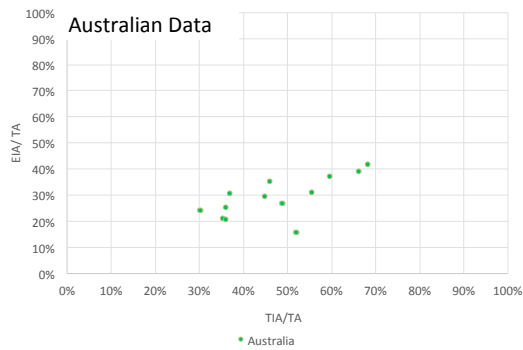
8 Study catchments across Australia

- small catchments
- Reasonable rainfall and gauge data
- Primarily urban catchment
- Geographical spread

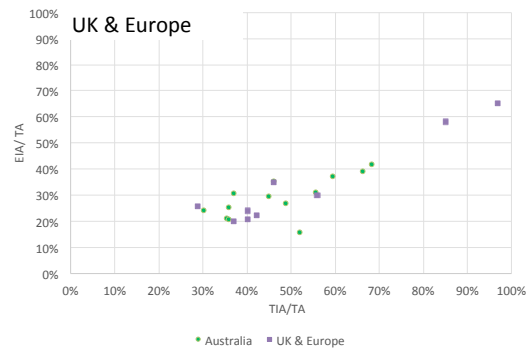
ARR Australian Rainfall & Runoff



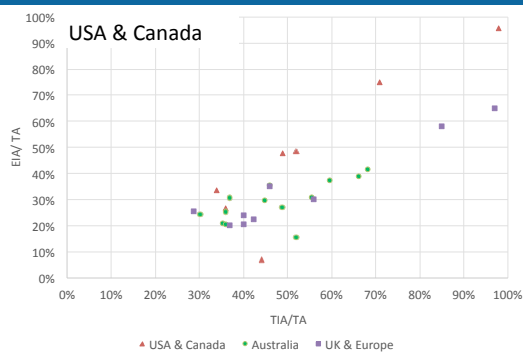
EIA Estimates – Other Studies



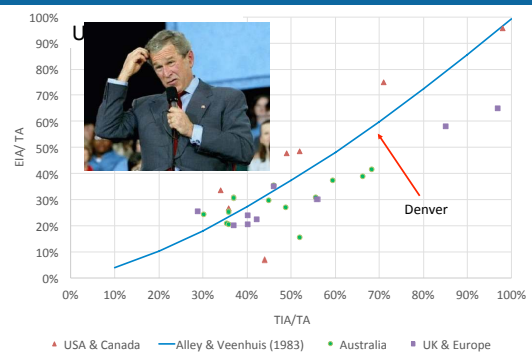
EIA Estimates – Other Studies



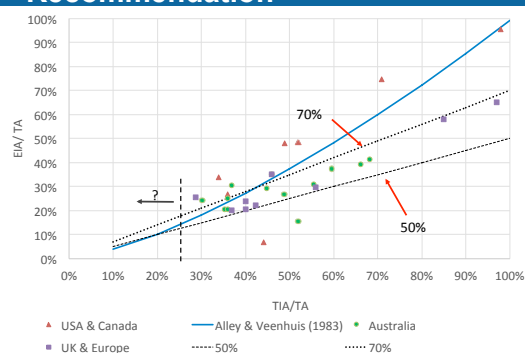
EIA Estimates – Other Studies



EIA Estimates – Other Studies



EIA Estimates – Recommendation



ARR Recommendations

Three options for estimating EIA

- Regression Analysis
 - Best option
 - Need sufficient data
- Adopt Typical EIA/TIA ratios
 - Between 50 to 70%
 - No distinct pattern across the states
- GIS methods
 - Detailed mapping to estimate DCIA
 - Adjust mapped DCIA by around 70% to estimate the EIA



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Considerations

- WSUD
 - Insufficient data to determine an effect
 - Issue is that need sufficient rainfall and flow records, for a catchment dominated by WSUD
 - one catchment in US with large amount of swales had a higher EIA ratio
- Total Impervious versus EIA
 - Significant errors in both flows and volumes if total impervious area is adopted



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Rainfall Losses

Initial Loss/ Continuing Loss

- Recommended model for runoff estimation
 - If no data to calibrate
- Primarily based on Project 6, with additional literature reviewed for checking

Guidance provided for proportional loss and Horton Loss models

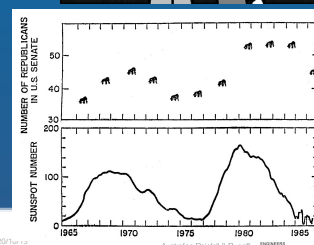
Very limited studies & catchments

- Around 85 catchments for rural Project 6



Example of Document Title Placement

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AR&R Guidance

Guidance to provide regional loss values where no data is available to calibrate

Provided for the two key areas:

- Effective Impervious Area (EIA)
- Indirectly Connected Area
 - Insufficient information to adequately split the components of this area (impervious and pervious)

Pervious Area

- At this stage, based on rural loss guidance



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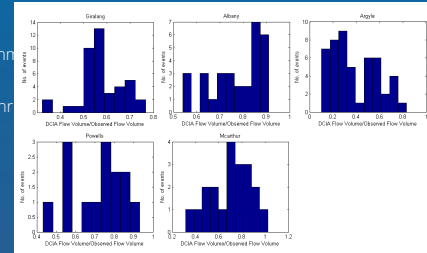
AR&R Recommendation - EIA Losses

Initial Loss

- 1 to 2mm

Continuing Loss

- 0 mm/hr

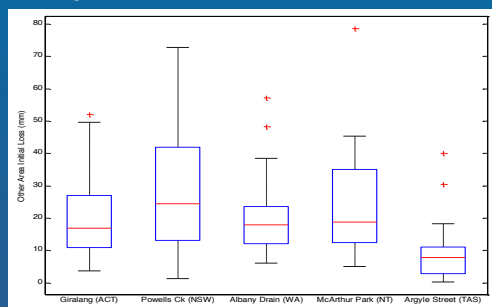


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Project 6 – Initial Loss Estimates



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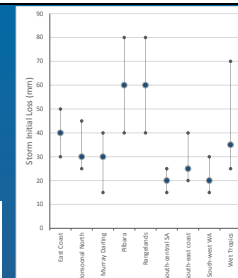
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AR&R Guidance

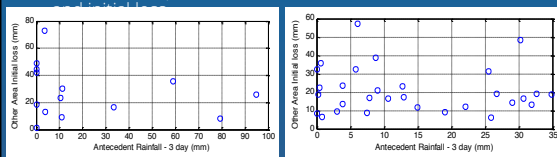
Initial Loss – indirectly Connected Area

- Adopt 60 to 80% of the recommended rural values



Key Considerations – Initial Loss

Guidance based on complete storms
 For very low proportion of impervious area in the Indirectly Connected Area, it may be appropriate to adopt rural losses
 No relationship was observed with antecedent conditions



Powells Creek (NSW)

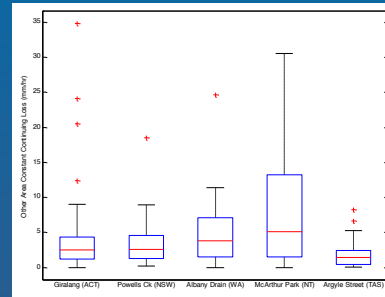
Albany Drain (WA)



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Project 6 – Continuing Loss



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AR&R Guidance

- For the South-East Coast, East Coast and Murray Darling regions
 - a typical value of 2.5mm/h, with a range of 1 to 3 mm/h, would be appropriate.
- For other areas, adopt a range of 1 to 4 mm/h.
- Similar to initial losses, where the impervious proportion of the indirectly connected area is very low, it may be appropriate to adopt the rural continuing losses. However, there is insufficient data to confirm this.



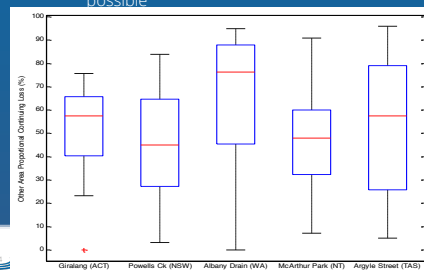
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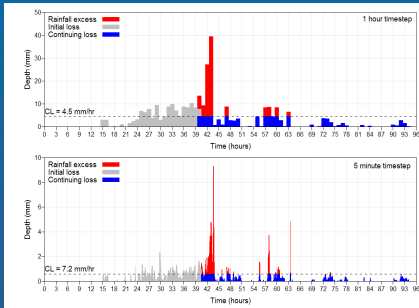
AR&R Guidance - Proportional Loss

Large ranges make it difficult to provide guidance

- Recommended to adopt only when calibration is possible



Other Considerations - Timestep

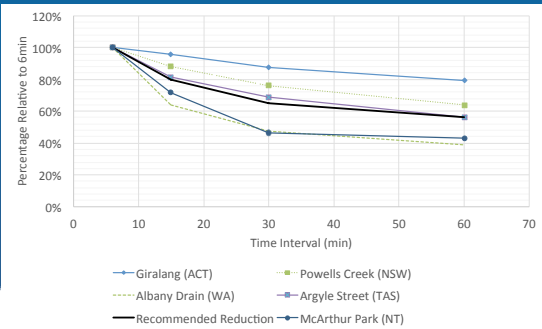


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Other Considerations - Timestep



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