



AR&R WORKSHOP

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Book IV – Chapter 3 Peak Flow Estimation - *Regional Methods*

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Overview

- Role of regional flood estimation methods
- Methods/data in current edition of AR&R
- Issues for revision
- Desirable attributes
- Status of revision
- Outlook



Role of Regional Methods

- Most small to medium sized catchments and many larger ones are ungauged (focus mostly on rural catchments)
- Large numbers of projects require design flood estimates – ARIs <1 - 100 years
- \$100's of millions spent every year
- Limited design budgets => rapid methods
- Common sense check for results of more detailed methods



Current AR&R

- Generic description of methods:
 - Probabilistic Rational Method (PRM)
 - Regional flood frequency methods
 - Design hydrographs, runoff routing methods
 - ‘Arbitrary’ methods (Rational Method, US SCS)
 - Envelope Curves



Current AR&R (cont.)

- Recommended methods for states/regions:
 - **NSW:** Eastern NSW (PRM), Western NSW
 - **VIC:** PRM for whole state
 - **ACT:** Regional flood frequency
 - **QLD:** several ‘arbitrary’ methods, whole state
 - **SA:** SE Region, N + W Region – RM (+ others)
 - **WA:** 7 regions – PRM + Index Flood Method
 - **NT:** whole territory: RM (+ other)
 - **TAS:** West – Reg. flood frequency, East – Nil



Issues for Revision

- *Large uncertainties* associated with most recommended regional flood estimation procedures
- *Coordinated R&D effort* required for significant improvements
- But whose *responsibility* is it?
- Desirable for *state agencies to act as ‘champions’*
- *Funding?*



Desirable Attributes

- Directly based on *observed flood data*
- *Defensible hydrologic assumptions*, plausible *relationships with catchment characteristics*
- Able to *use all relevant data*
- *Comprehensive coverage* of sites in region
- *Simple, safe to apply* with limited expertise
- Modest climate/catchment *data requirements*
- *Limited development effort*



Status of Revision - Overall

- No draft chapter available
- Intend to use similar format as current AR&R
- Progress in different state varies
- Some new work to be peer reviewed
- Some new developments may not be ready when revised AR&R is issued
=> make provision for continuing updating process



Status of Revision – S. East

- ARR87 methods plus others in common use
- Significant research effort by CRCCH and more recent work by Rahman (AJWR 9/1):
 - more solid basis for identifying hydrologically similar regions
 - efficient set of meaningful predictor variables
 - shows promise to become more reliable practical method
 - requires further testing



Status of Revision – QLD

[based on summary by Bill Weeks]

- ARR97 methods still widely used
- Extra work since then using PRM (Titmarsh, Weeks), so far not broadly adopted
- Plots of peak flow vs catchment area based on recent design flood estimates
- Parameter estimates for RORB runoff routing models



Status of Revision –NT

[based on summary by Weeks/Rajaratnam]

- ARR97 gave only very sketchy info for NT
- Substantial extra work in connection with Alice Springs Darwin railway design:
 - Regional flood frequency method for 5 regions
 - Rational Method for catchments <10 km² (3 regions)
- Regional RORB parameters



Status of Revision – SA

[based on summary by David Kemp]

- ARR87 probably still widely used
- More recent developments:
 - Studies by Trevor Daniell and students at UA (+ ongoing project)
 - Regional flood frequency for Mt Lofty Ranges (Kemp)
 - Others for specific regions (Tonkin Consulting)



Status of Revision – WA

[based on summary by Jerome Goh]

- Main Roads WA did extensive flood frequency analysis work for WA catchments:
 - confirmed LP3 as appropriate distribution
 - currently finalising regional flood frequency estimates for 6 regions
 - SW region still to be done
 - results being summarised in series of papers



Status of Revision – TAS

- Currently used methods – require further information
- Recent work by Hydro Tasmania focussed on estimation of Large to Extreme floods (based on results of recent risk assessment work for dams)
- Other developments?



Outlook

- *Considerable further work required to prepare this chapter*
 - Description of methods consistent with desirable attributes and Chapter 2
 - Design data for different regions
 - Guidelines for application
- *No quantum improvements in accuracy expected*



Outlook

- Practitioners have to *recognise uncertainties* in regional design flood estimates and *take them into account in design decisions*
- Development of regional methods likely to continue beyond current revision
=> need for process to adopt new design information
- Use of *more detailed estimation methods*
