Mean, Median or Central Vibe… Some true urban examples of ~~ARR2016~~ ARR2019

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GHD Water

Overview

- Main changes ARR1987 vs ARR2019
- ARR2019 Surface Types
- Critical Storm Selection
- Results post-processing
- Conclusion

Acknowledgement for colleagues
that have contributed:
Rushiru Kanakaratne
Greg Eaton
Gavin Hay

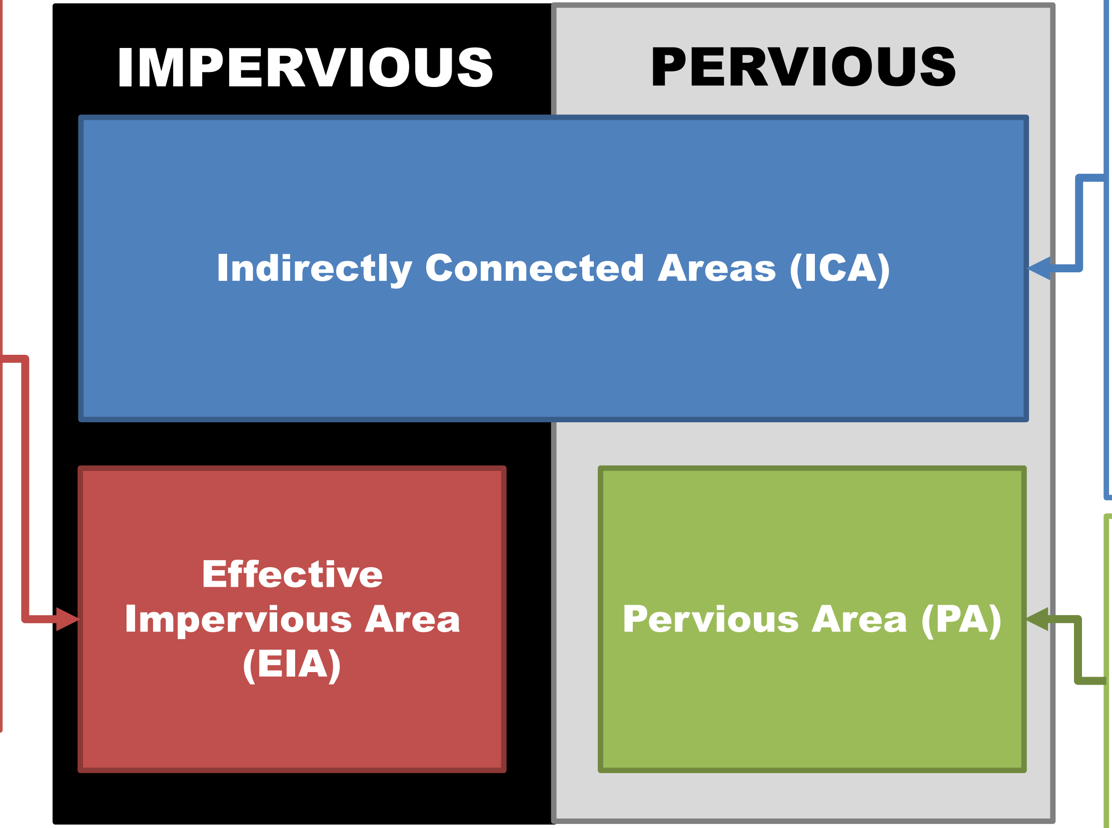
ARR2019 Changes

- IFD Data - including spatial variance
- Temporal Patterns
- ARF
- Surface Types
- Method to create AEP design flood envelope

ARR2019 Surface Types Definitions

"Generates a rapid runoff response"
Components:

- *Directly Connected Impervious Areas (DCIA)*
- *Rapidly responding portion of Indirectly Connected Impervious Area (ICIA)*



Remainder of urban catchment not considered EIA
Components:

- *Indirectly Connected Impervious Area (ICIA)*
- *Pervious Areas (PA) that interact with Impervious Area*

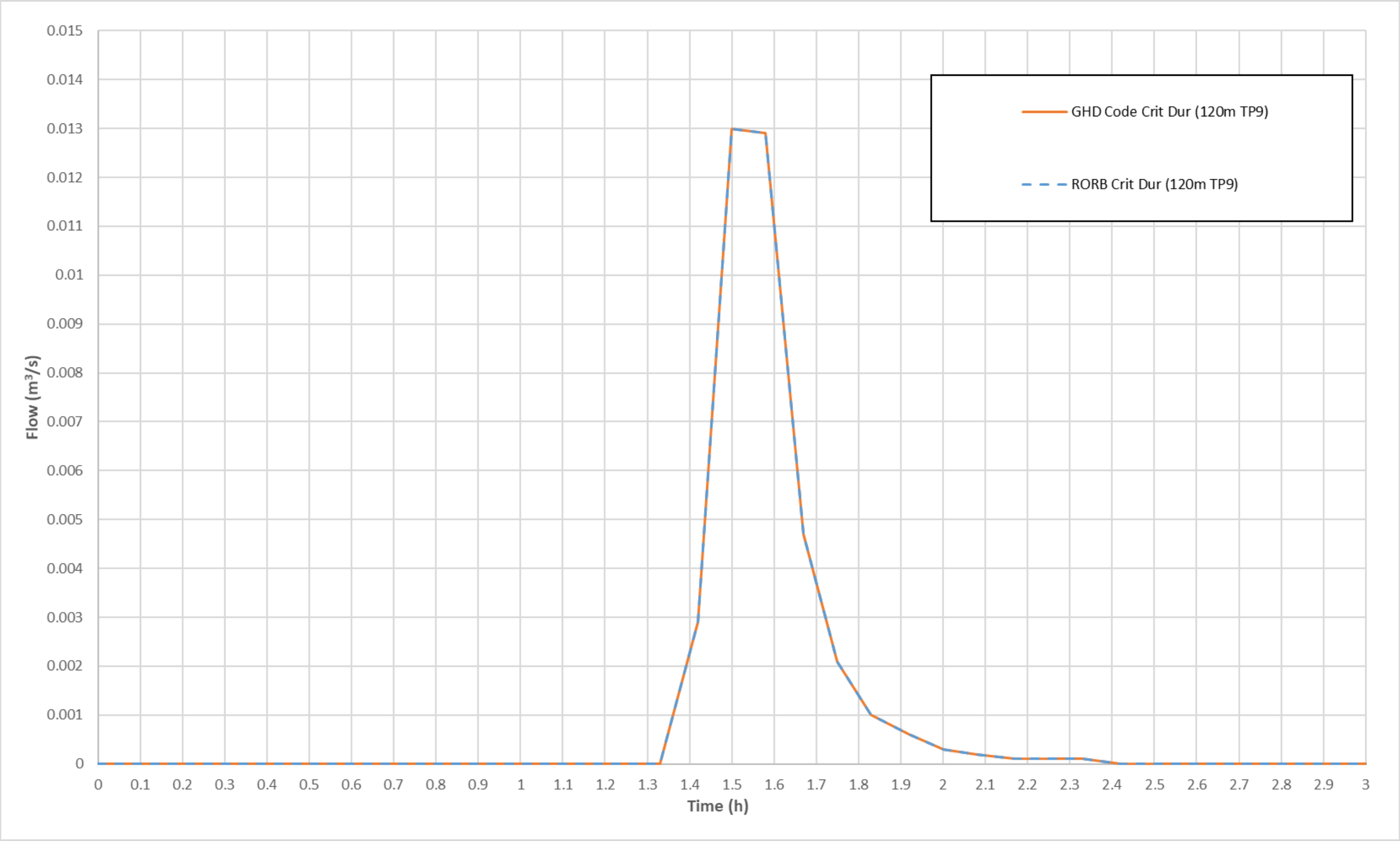
"Pervious areas consisting of parklands and bushland that do not interact with impervious areas"

ARR2019 Surface Types Method of Application

Surface Type	ARR2019 Recommendation		GHD		RORB	
	Storm Losses	Runoff Response	Losses	Runoff Response	Losses	Runoff Response
Effective Impervious Area (EIA)	IL_{EIA} = 1.5 mm CL_{EIA} = 0 mm/hr	Rapid	Independent routing as Reach Type 3	Explicitly as per ARR2019	Area weighted values based on ARR2019	Single reach type for routing off whole subarea
Indirectly Connected Area (ICA)	IL_{ICA} = 0.7 x IL_{PA} CL_{ICA} = 2.5 mm/hr	Moderate	Independent routing with reach type based on underlying land use	Explicitly as per ARR2019		
Pervious Area (PA)	IL_{PA} & CL_{ICA} = Local Data or 'Rural' Data Hub value	Slower	Independent routing with reach type based on underlying land use	Explicitly as per ARR2019		

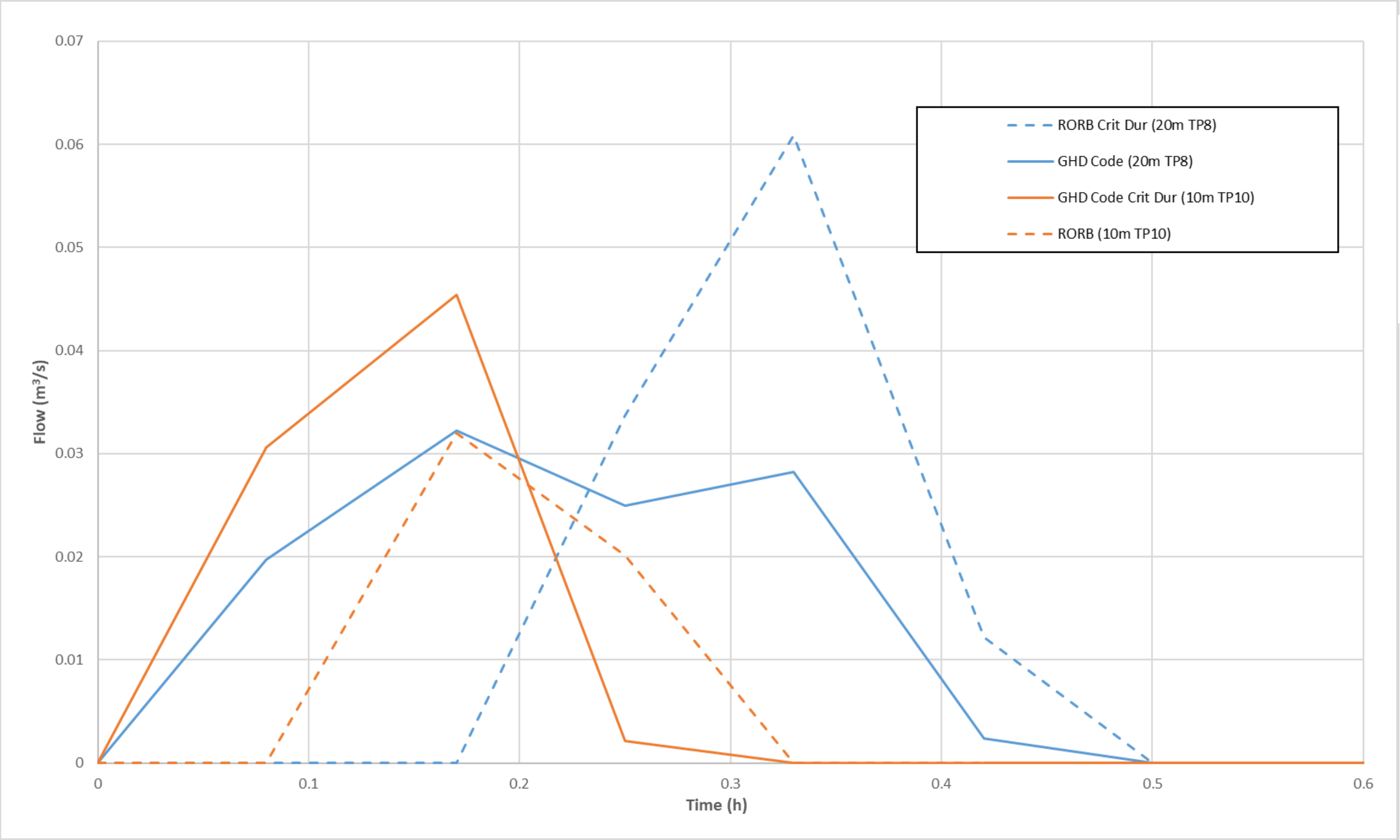
ARR2019 Surface Types Hydrograph Comparison

Example 1 – Subarea assumed all PA (20% AEP)



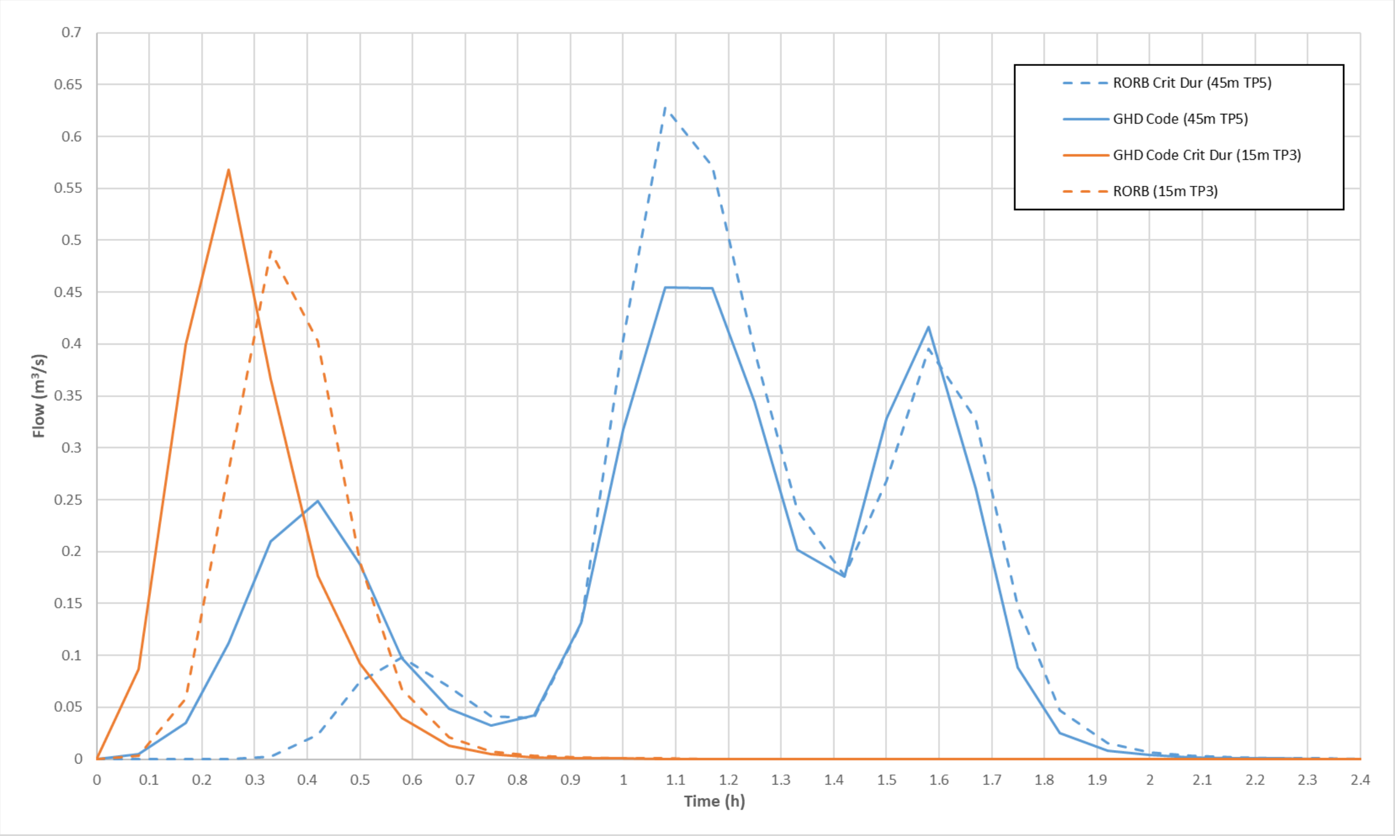
ARR2019 Surface Types Hydrograph Comparison

Example 2 – Subarea 50/50 split EIA & ICA (20% AEP)



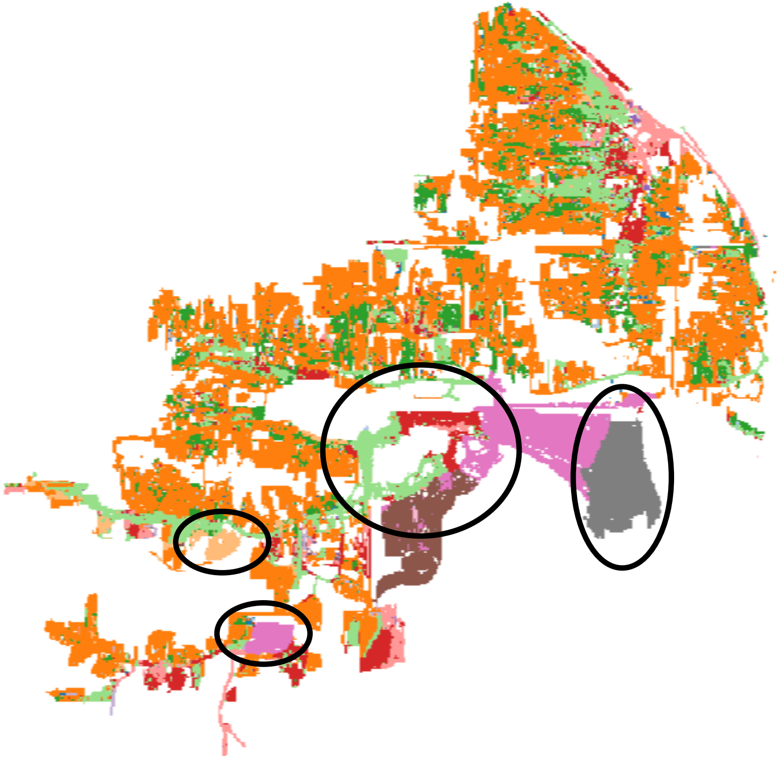
ARR2019 Surface Types Hydrograph Comparisons

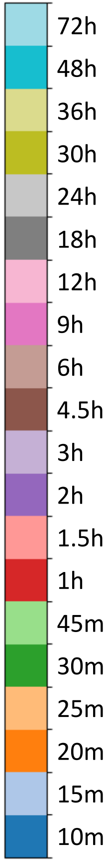
Example 3 – Combined routed flow off 16 subareas (20% AEP)



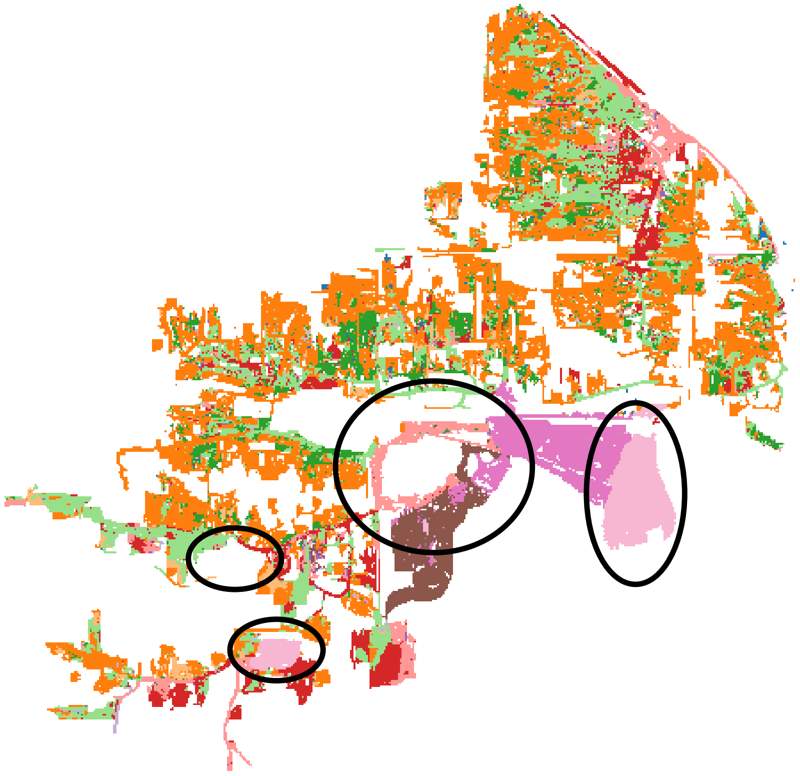
ARR2019 Surface Types Critical Duration Impacts

RORBwin Approach





GHD Approach



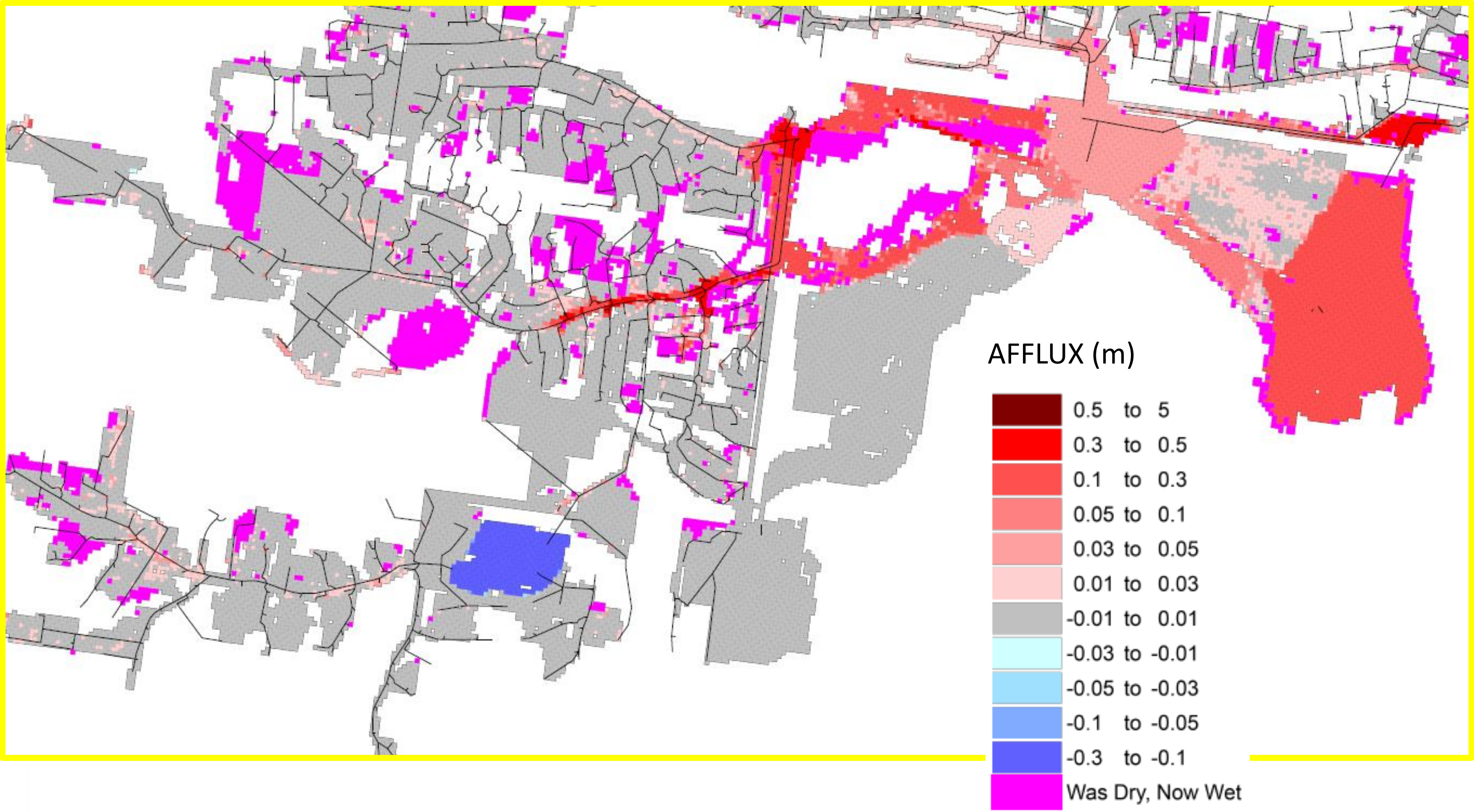
ARR2019 Surface Types Flood Level Impacts

AFFLUX =

WSL w/ RORBwin Inflows

–

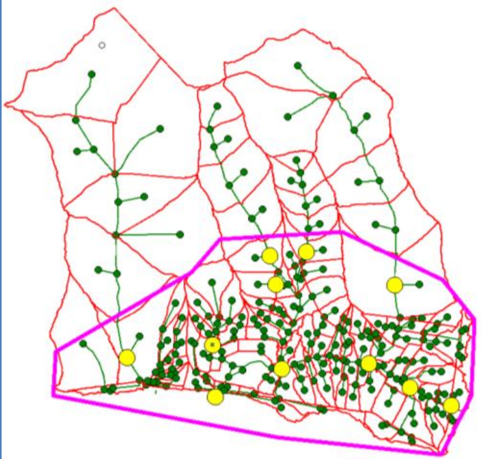
WSL w/ GHD Inflows

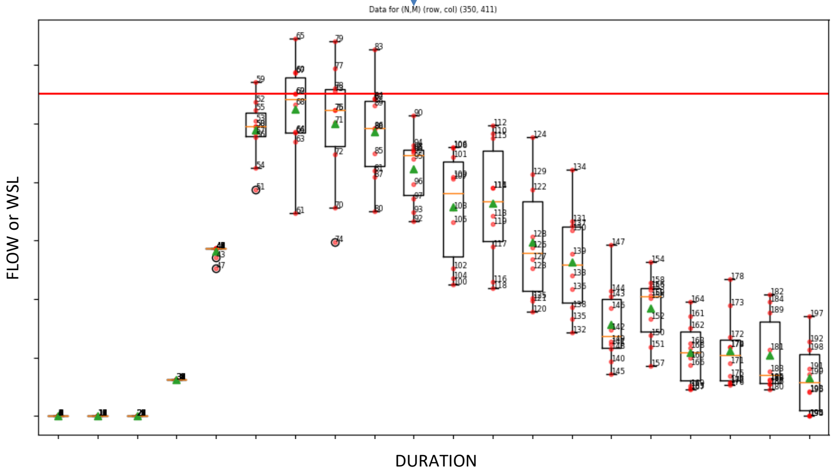


Storm Selection Available Approaches

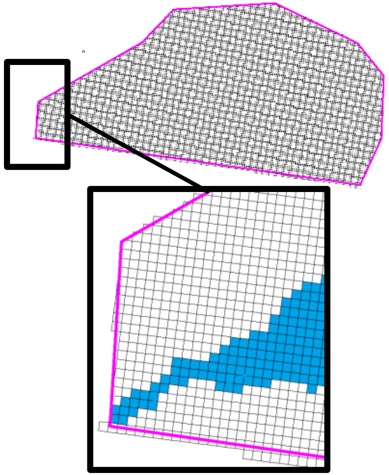
Flow at discrete locations

Hydrologic Approach





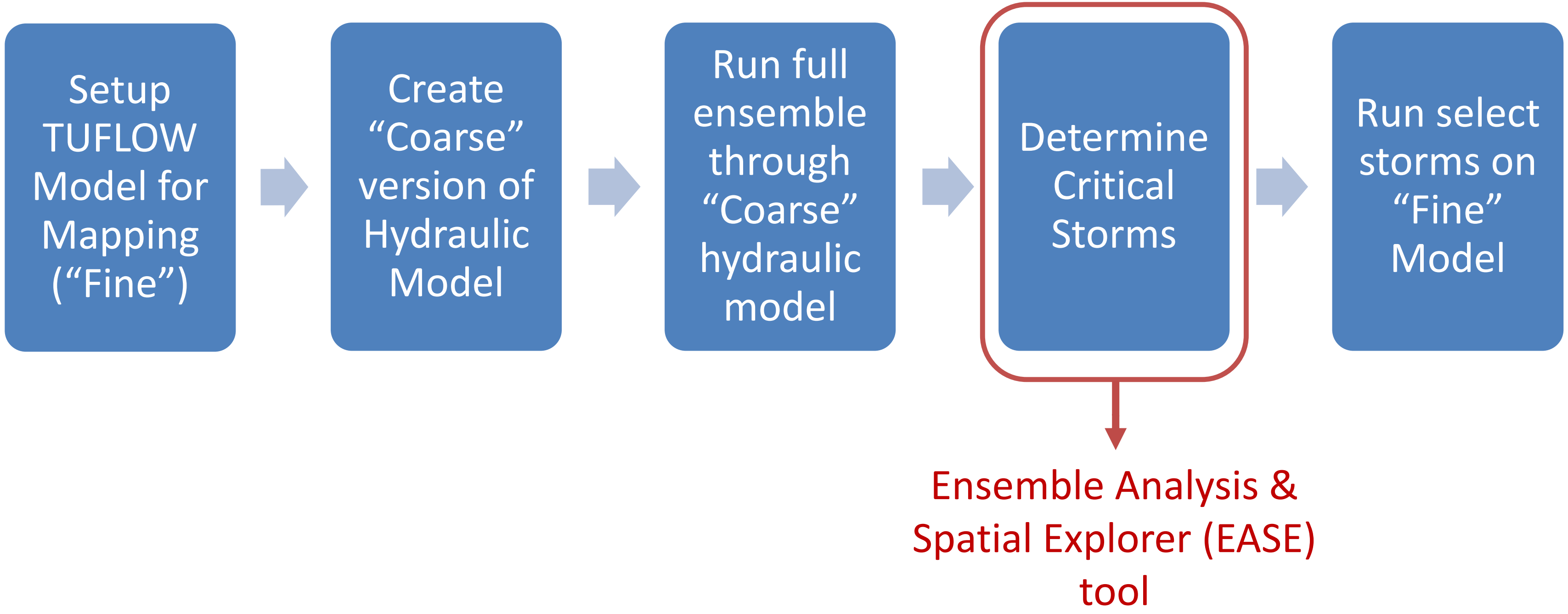
Hydraulic Approach



WSL/Depth for each model cell

GHD

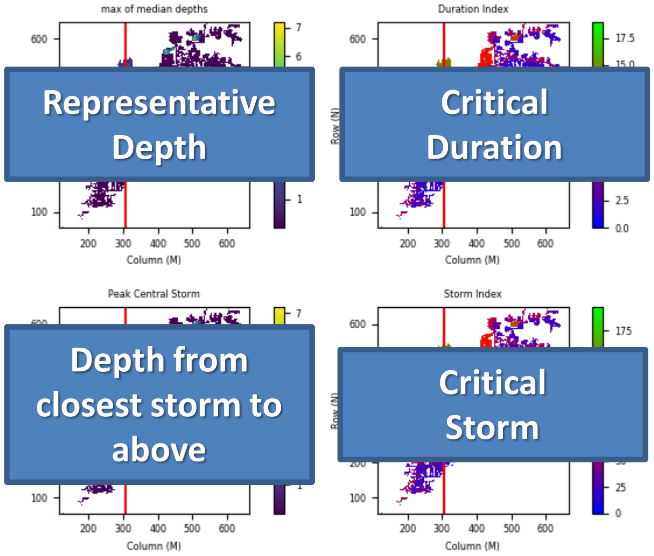
Storm Selection GHD Approach

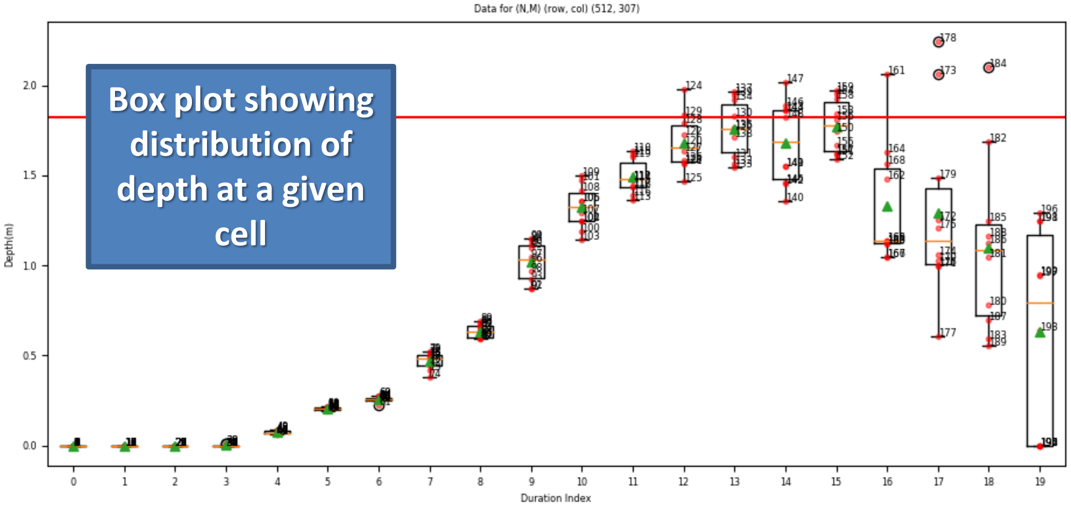


Storm Selection EASE Tool

Step 1 –

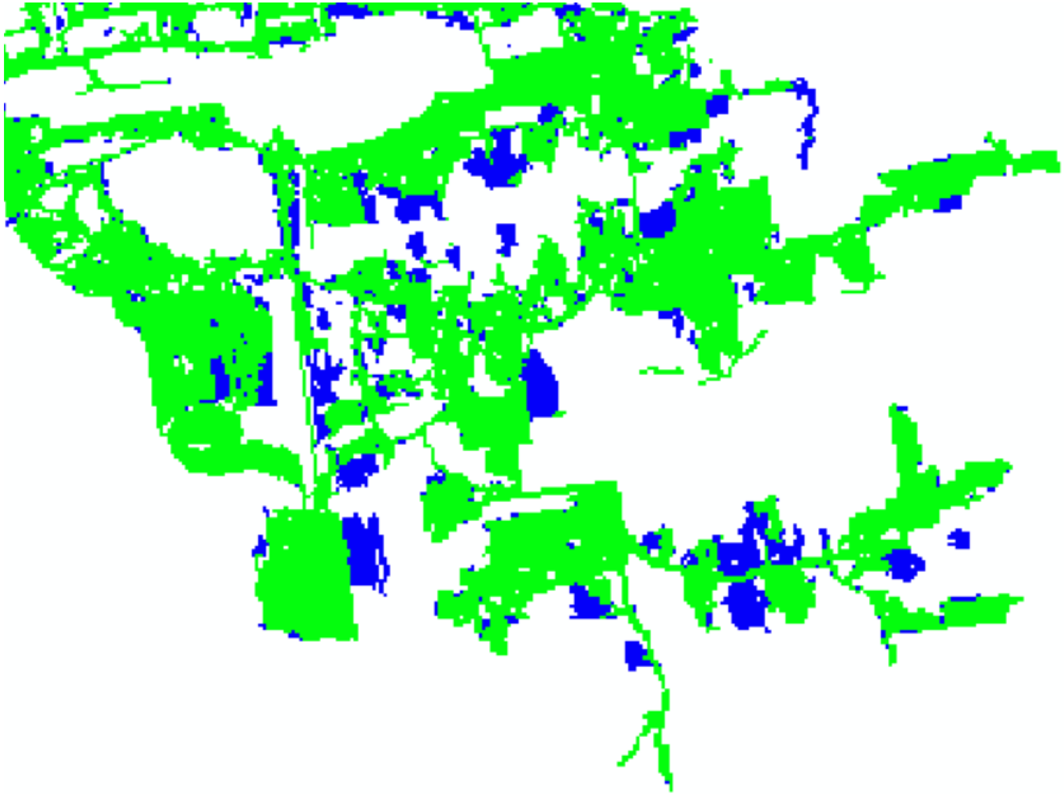
Process ensemble results to determine a representative flood depth across catchment (mean, median or central vibe….)





![GHD]

Storm Selection EASE Tool – Mean vs Median



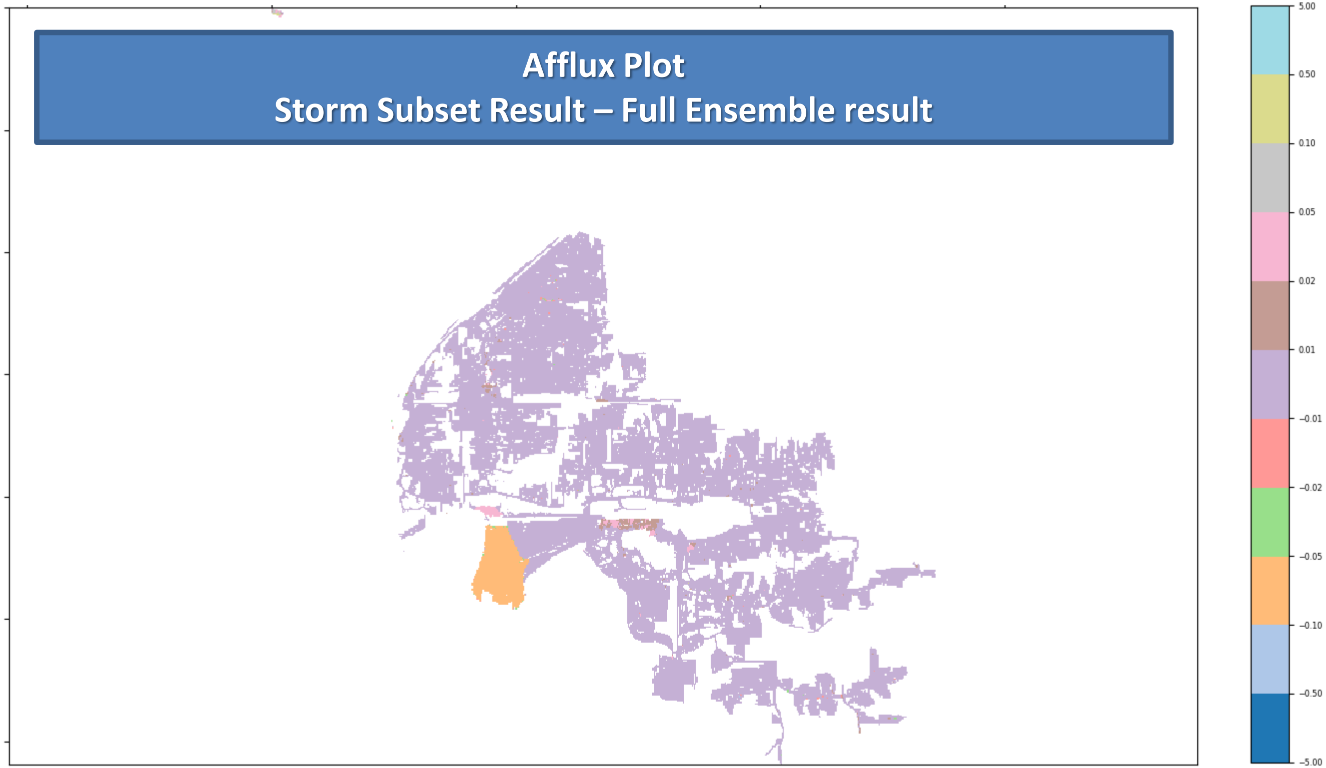
LEGEND

Mean

Median

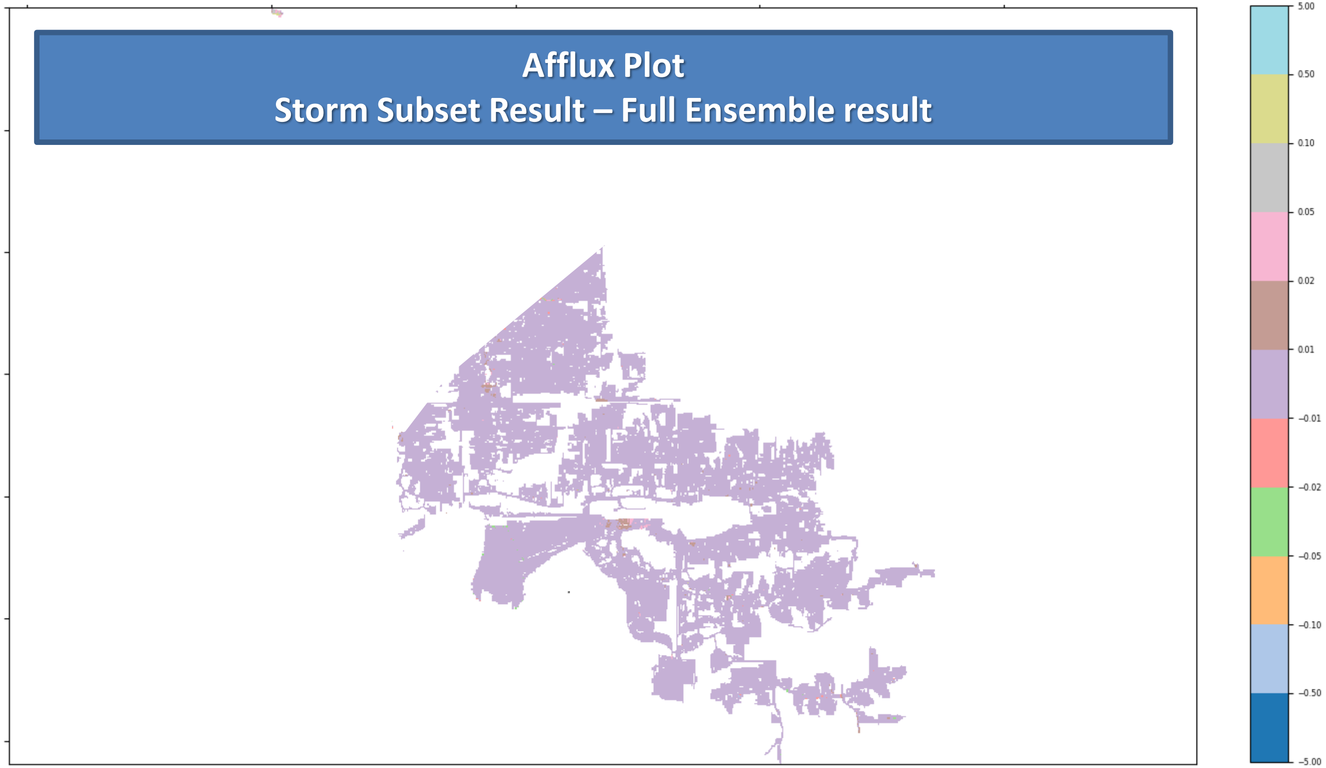
Storm Selection EASE Tool

Step 2 –
Select critical storms to run and check error relative to the full ensemble



Storm Selection EASE Tool

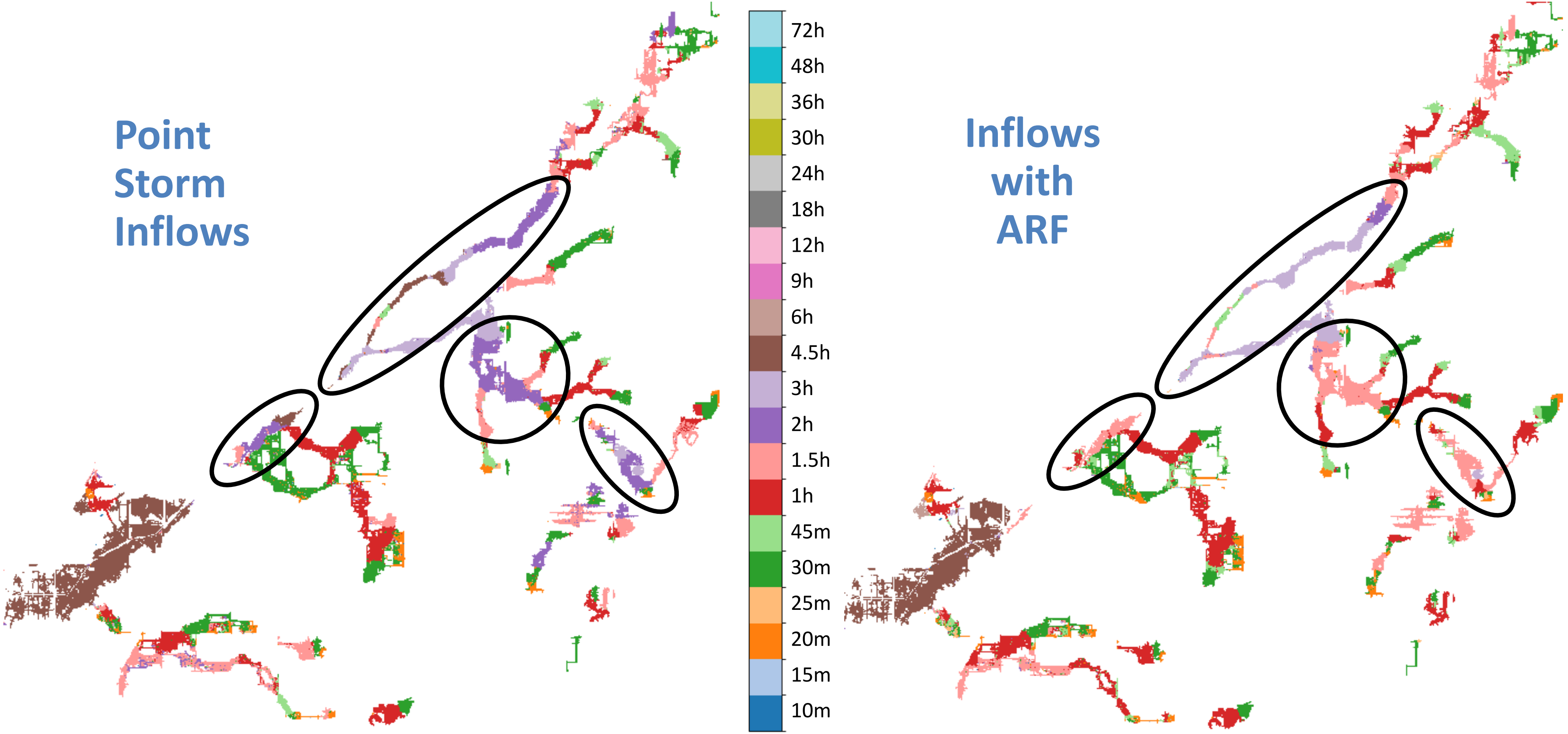
Step 3 –
Adjust selected storms until errors are acceptable.



Storm Selection Coarse vs Fine Selection

This shows afflux between storm subset selected using “coarse” model results from the full ensemble results on the “fine” model

Storm Selection ARF Impact



Results Post-Processing An approach

Old ARR1987 Approach

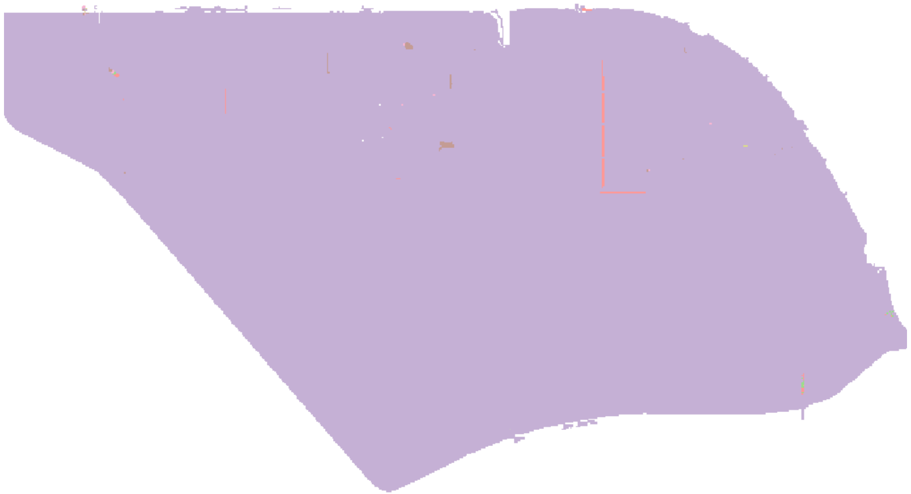
TUFLOW WSL Results from all durations → Create maximum WSL envelope → Representative AEP Flood Surface

New ARR2019 Approach

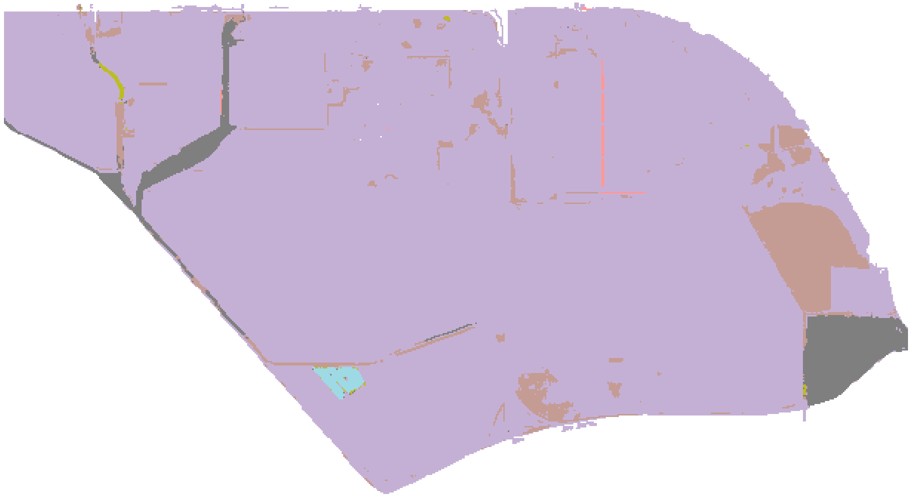
TUFLOW WSL Results from select storms → Identify where select storms apply → Jigsaw select storm results → Representative AEP Flood Surface

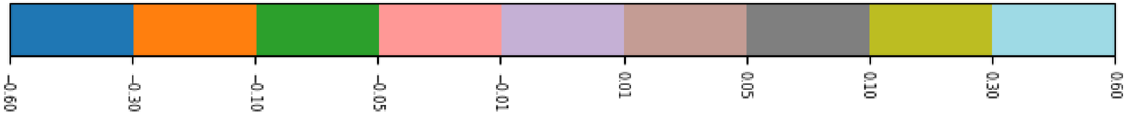
Results Post-Processing Impact of Approach

Jigsaw Surface



Maximum Envelope





Conclusion

- ARR2019 can be applied in its full form to urban catchments
- Surface t y has limitatio
- Hydrauli ndable process to transf
- Can no lo oduce final representative flood surface

To answer the title question….

It's the central vibe!

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