

The impact of stormwater from towns on rivers & streams

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Victorian Stormwater Conference, 2019

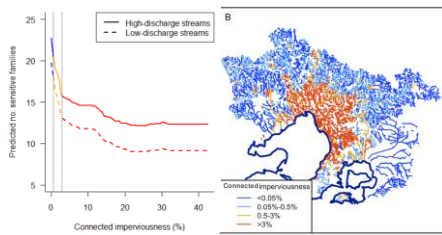


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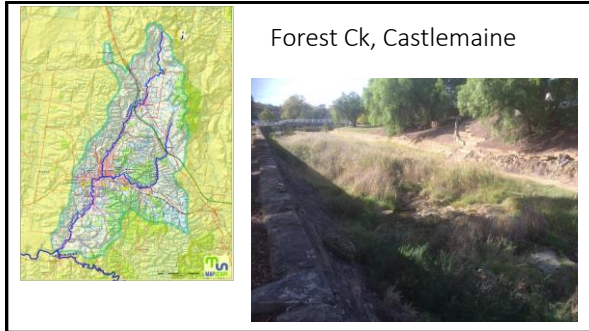
Most species are lost from streams with > 3% connected imperviousness



3



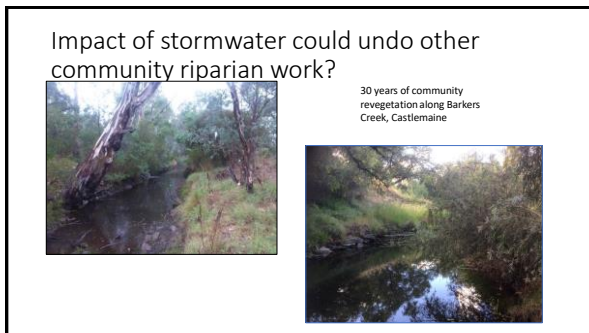
4



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7



8

Potential impact of towns
Up and downstream progressing disturbances
(Towns usually embedded in rural landscapes)

In the town

- Local channelisation
- Floodplain constriction/isolation

17



18

Potential impact of towns
Up and downstream progressing disturbances
(Towns usually embedded in rural landscapes)

Downstream

- Pollutants
(stormw./sewage/industrial)
- Hydrological disturbance
- Altered sediment supply

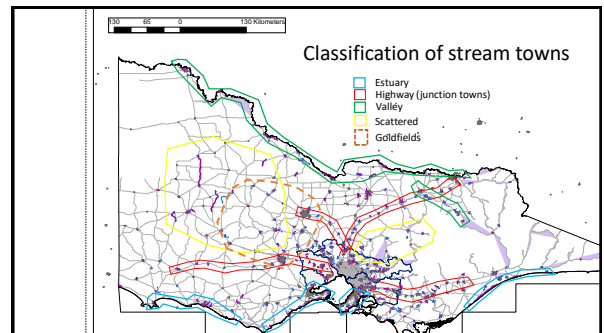
In the town

- Local channelisation
- Floodplain constriction/isolation

Upstream

- Backwaters
- Knickpoints (erosion)
- Barriers to migration

19

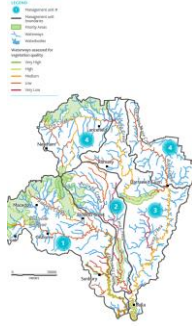


20

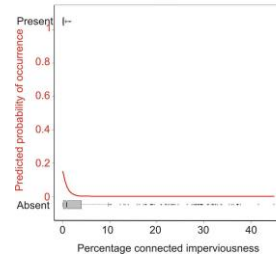
All towns have a cumulative effect

Dispersed Towns

E.g. Towns of the Upper Maribyrnong



21



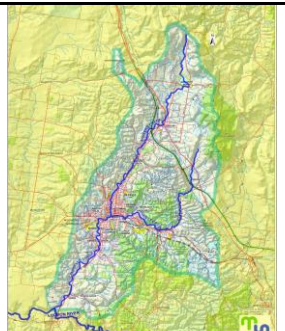
22

Castlemaine?

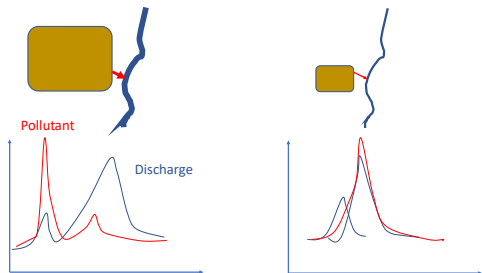
5% of Forest Ck.

But what does this mean?

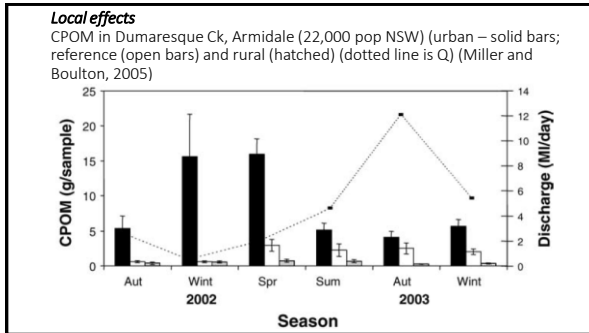
Hydrograph peaks?



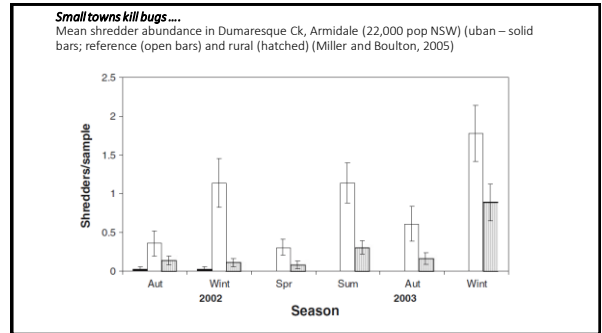
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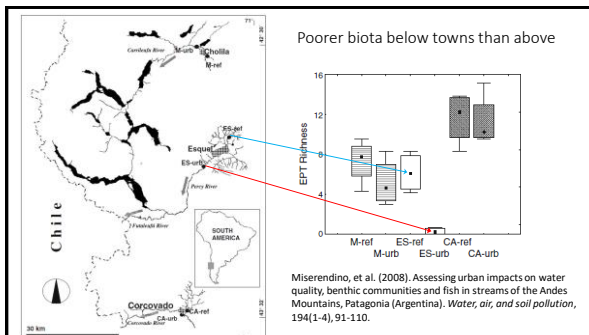
24



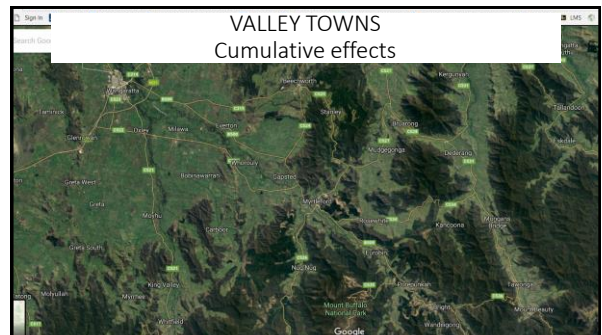
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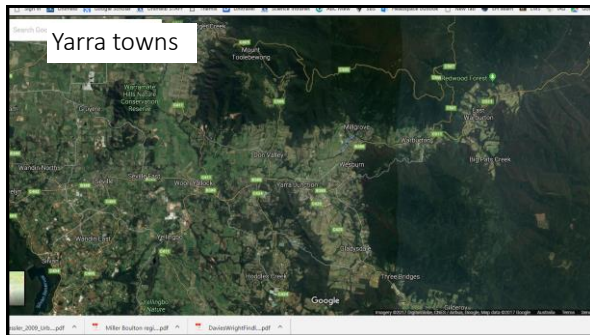
26



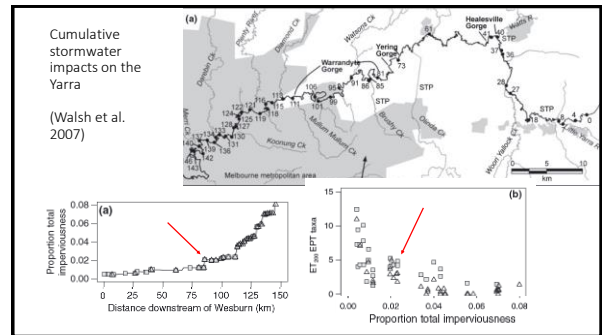
27



28



29



30

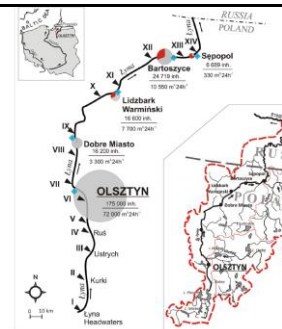
- “Compared to a small stream with a more sudden boundary of urban land use along its catchment, the accumulation of stressors associated with urbanisation along the Yarra River may diminish the potential for colonisation of sensitive taxa drifting from less disturbed reaches upstream. A gradual accumulation may also diminish the potential for stream processes to improve water quality downstream of an urban input”

• Walsh et al. 2007

31

Longitudinal RECOVERY? Cumulative water-quality effects of towns (Poland)

(Glińska-Lewczuk, et al. 2016)



32

Lyna River, Poland

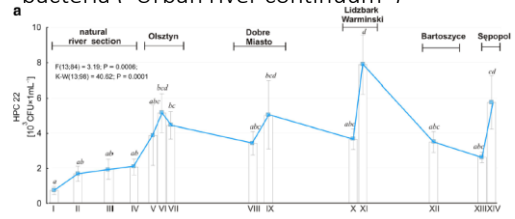


<https://ak7.picdn.net/shutterstock/videos/18959597/thumb/4.jpg>



33

Longitudinal effect of towns on indicator bacteria ("Urban river continuum")



34

Gold field towns

- *Rapid growth*



35

Gold field towns - sludge channels



Ballarat



Bendigo

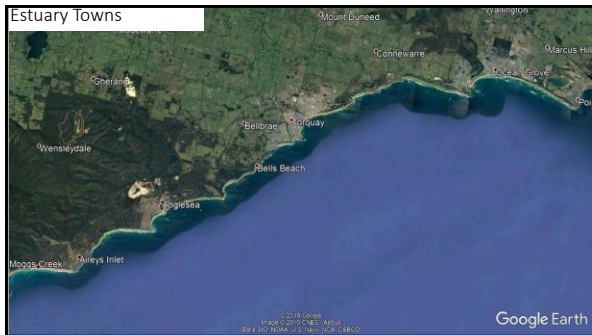


Castlemaine



Heathcote

36



37

Conclusions

- Don't forget the impact of towns on waterways
- Very different problem from big city stormwater problem
- Upstream, downstream, local effects
- Cumulative effects
- All towns are different but can be roughly classified
- Good time to think about policy implications?

38

What next?

- Basic inventory of streams and towns
- Identify high value streams clearly at risk from towns (few?)
- Some basic research on impacts (may be modest!?)
- Think about policy implications
- State Environmental Protection Policy
- New EPA legislation?
- New urban stormwater Best Practice Environmental Management guidelines (BPEM)?

39



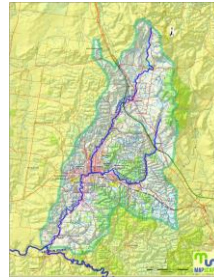
40

References

- Glińska-Lewczuk, K., Golaś, I., Koc, J., Gotkowska-Plachta, A., Harnisz, M., & Rochwerger, A. (2016). The impact of urban areas on the water quality gradient along a lowland river. *Environmental monitoring and assessment*, 188(11), 624.

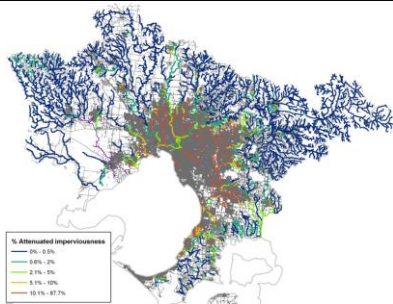
41

Forest Ck, Castlemaine



42

Melbourne
Water
catchments –
Attenuated
Imperviousness



43

Effect of upstream vegetation management on towns

Creswick, 3000 people (trib of Loddon River) 2011 flooded 4 times



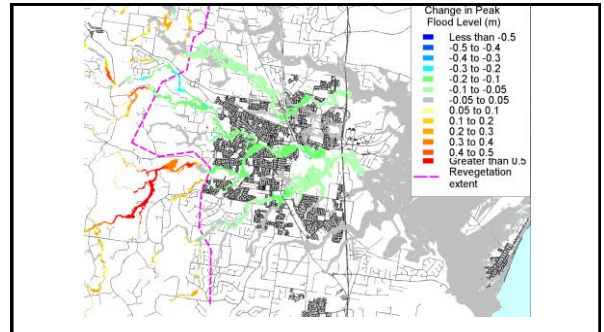
44

Riparian reveg and town flooding

- Richard Sharpe (BWT WBM Brisbane, 2012)
- 100 year flood in Caboolture, SE Qld
- Modelled 120 km of channel, 20m wide,
- $n = 0.15$

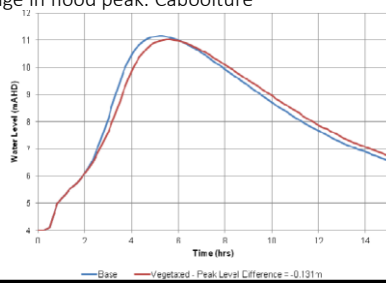


45



46

Change in flood peak: Caboolture



47