

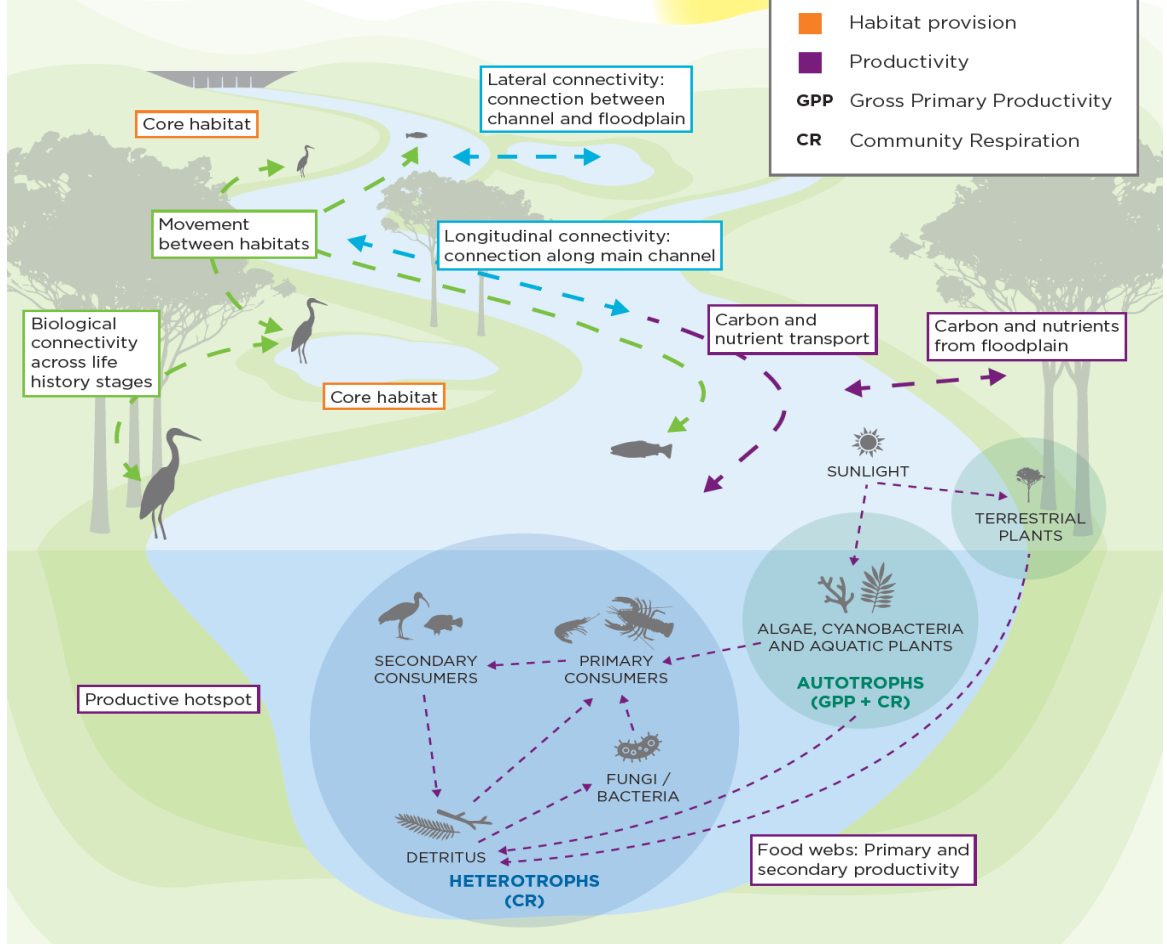


Estimating Longitudinal Connectivity in the Murray-Darling Basin

Science and User Workshop
November 16th, 2020

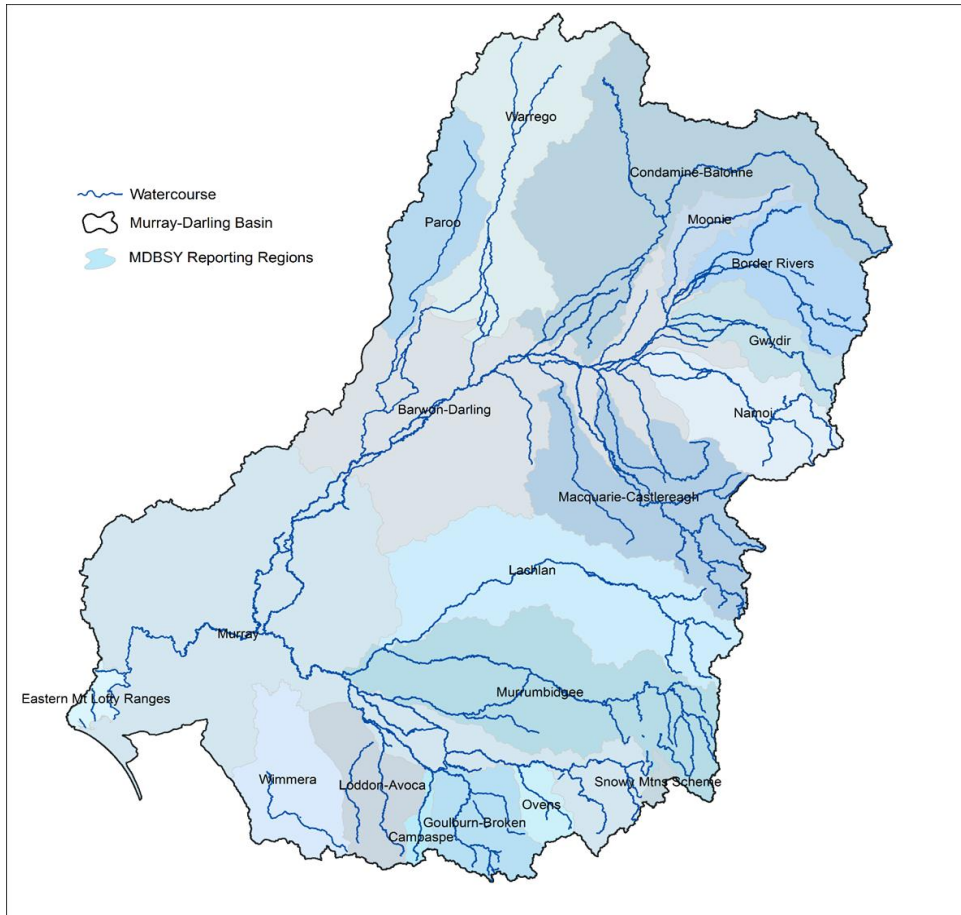


Spatial and temporal understanding in the Basin 1988-2022





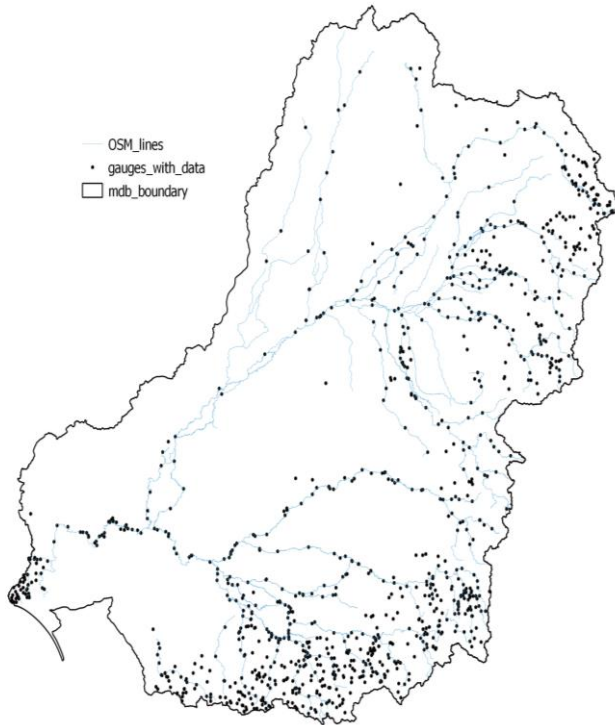
Longitudinal connectivity in Basin



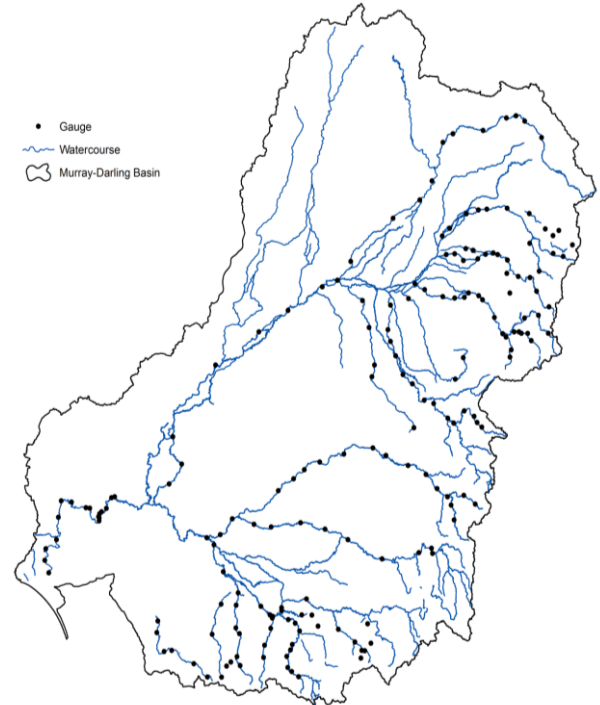


Longitudinal connectivity in Basin

Basinscale velocity trends

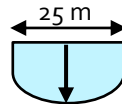
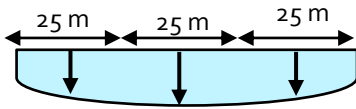
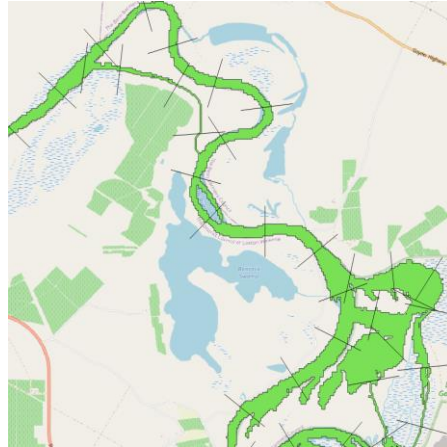


Velocity as a function of stage level



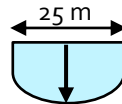
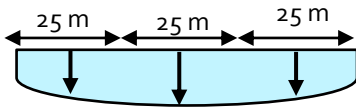
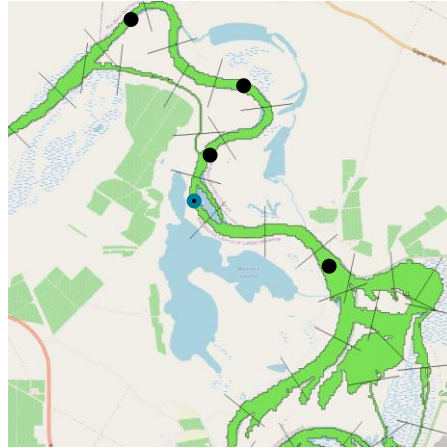


Longitudinal connectivity in Basin-Channel



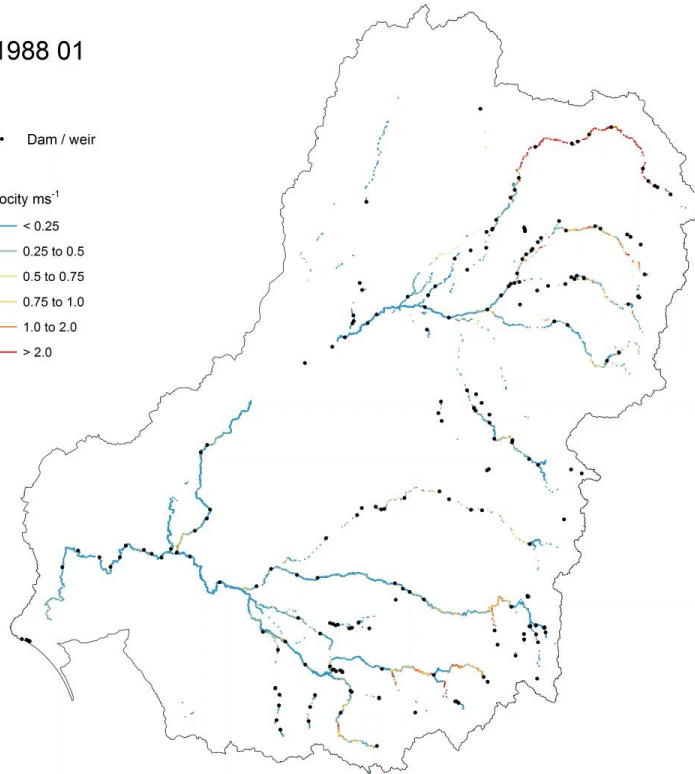
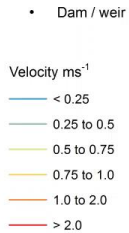


Longitudinal connectivity in Basin-Flow



Longitudinal connectivity in Basin

1988 01

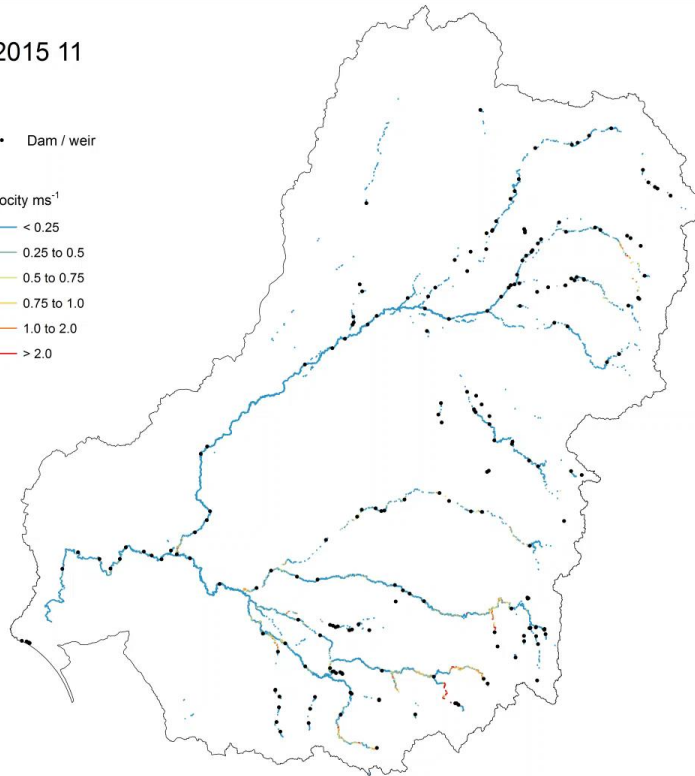
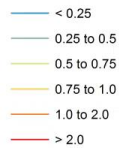


Longitudinal connectivity in Basin (wet to dry)

2015 11

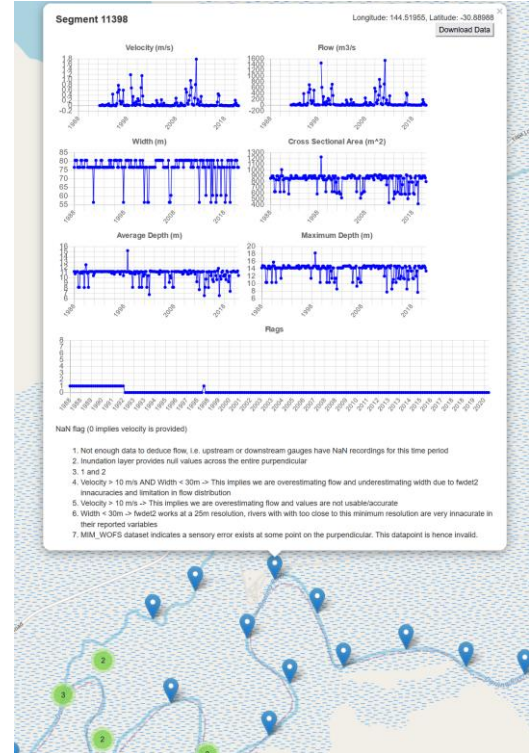
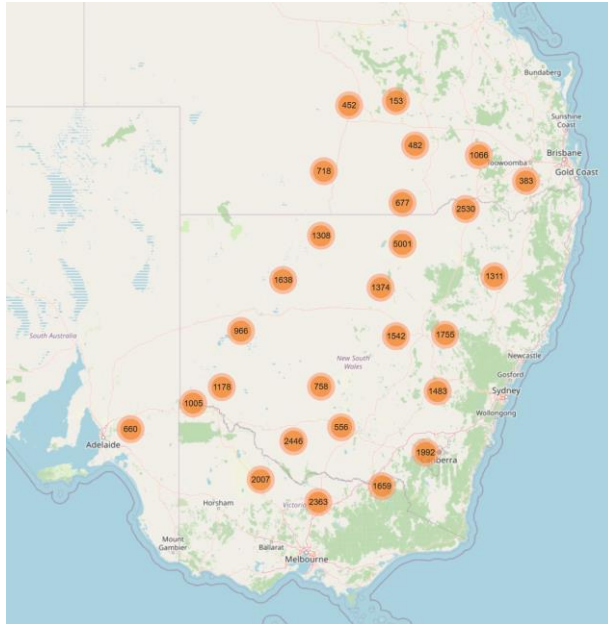
- Dam / weir

Velocity ms^{-1}





Longitudinal connectivity in Basin-Data layer



<http://lw-79-cdc.it.csiro.au:5000/>



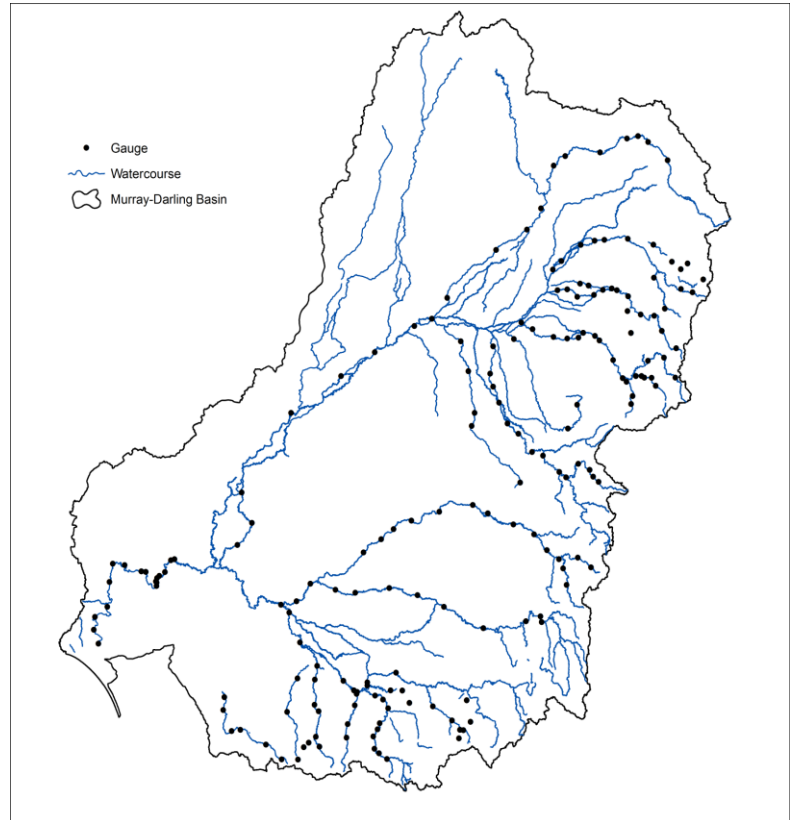
Velocity as a function of stage level

Gauges (20 river catchments)

NSW/QLD: 119

VIC: 49

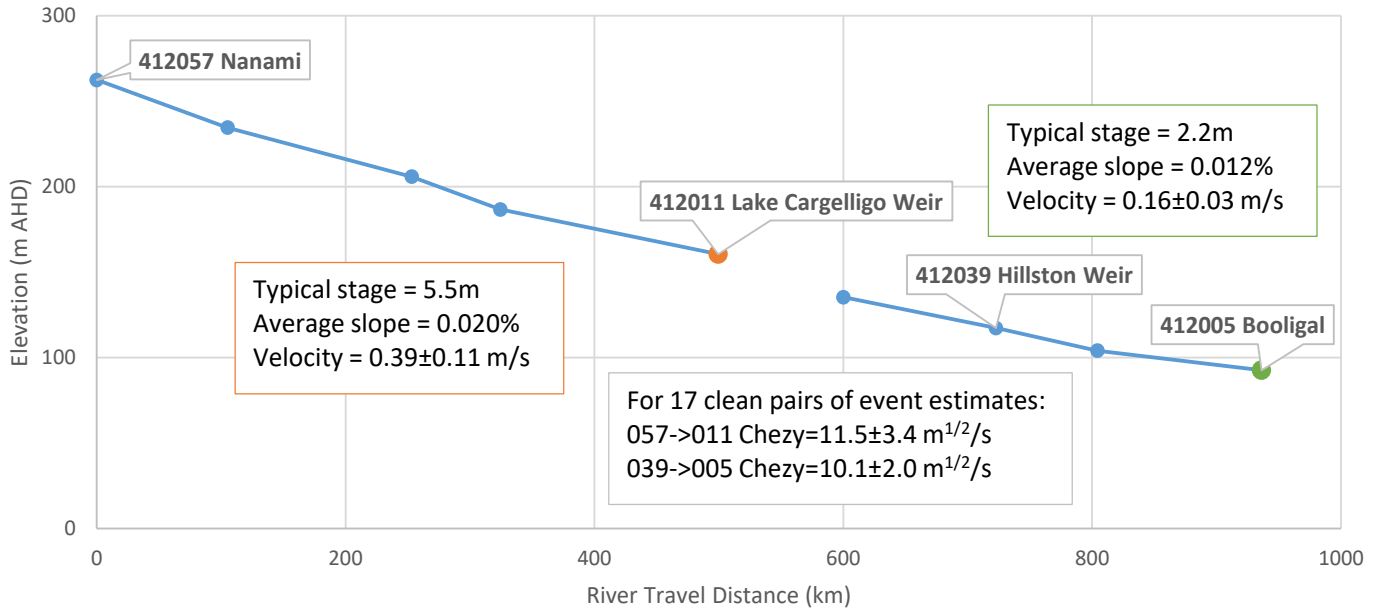
SA:17





Velocity in Lachlan River (NSW)

Mid and Lower Lachlan River





The Chézy equation

$$V = C\sqrt{Ri}$$

where

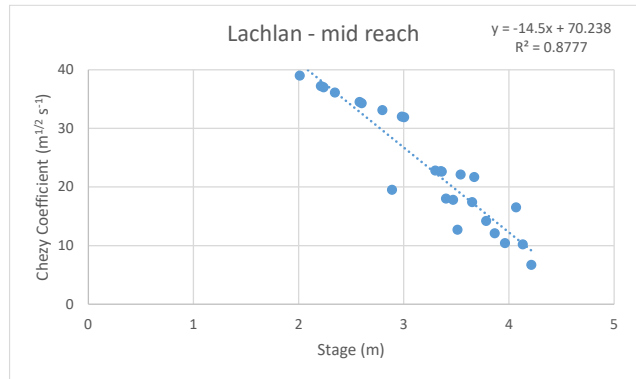
V is flow velocity (m s^{-1})

C is Chézy coefficient ($\text{m}^{1/2} \text{s}^{-1}$)

R is hydraulic radius (m)

i is hydraulic slope (m m^{-1})

For channels that are much wider than they are deep, R can be approximated by river stage, and i by local bed slope.



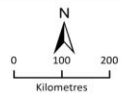
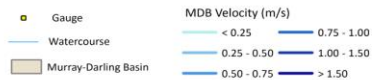
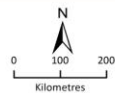
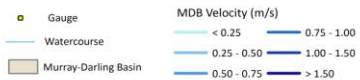
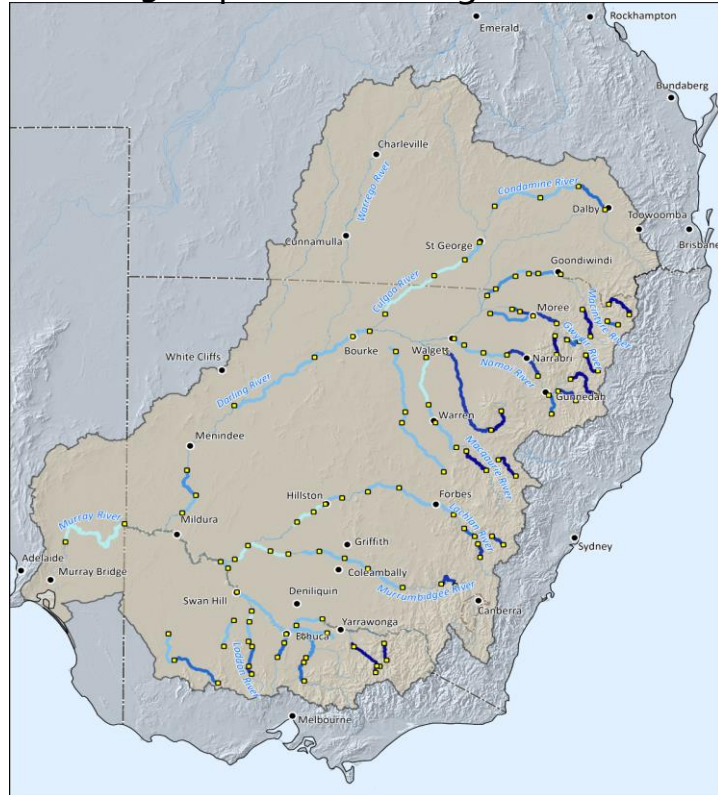
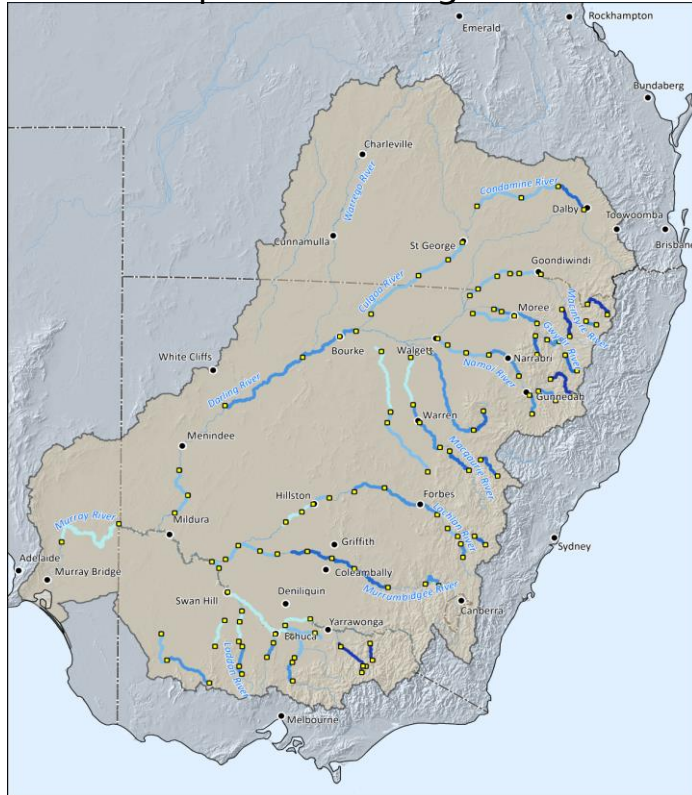
Chézy coefficient in mid-Lachlan reach; apparent step at 3m stage; 15 ± 7 when $>3\text{m}$, ~ 40 when $<3\text{m}$



High and low flows

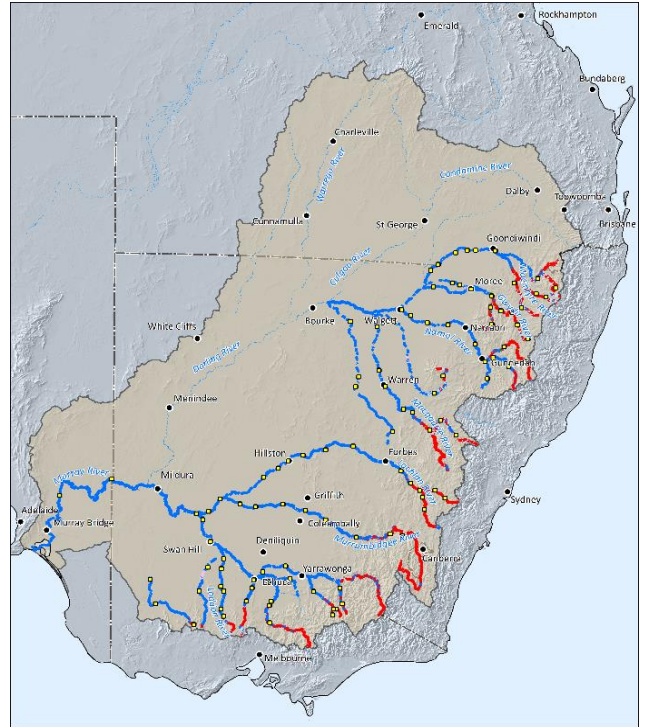
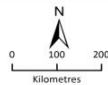
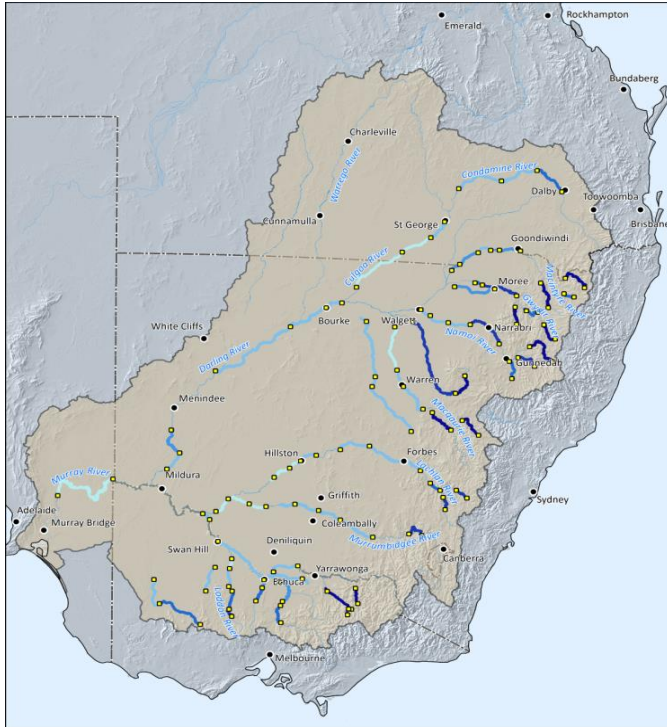
10th percentile stage level

90th percentile stage level





Comparing to Stein Index





Thank you

Ashmita Sengupta
ashmita.Sengupta@csiro.au