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THE INFLUENCE OF DAMS IN PLATYPUS POPULATIONS; INSIGHTS FROM GENOME-WIDE NEUTRAL AND ADAPTIVE LOCI

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Could river regulation differentially impact on the fate of adaptive and neutral loci of platypuses from below and above Pindari Dam populations on the Severn River?
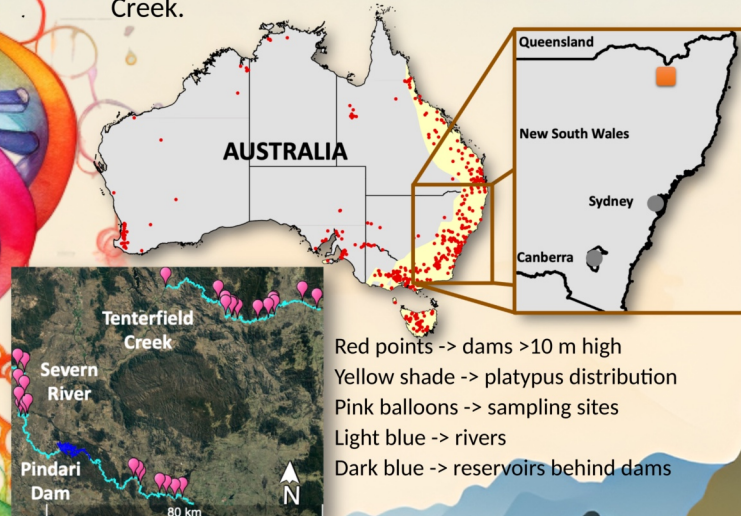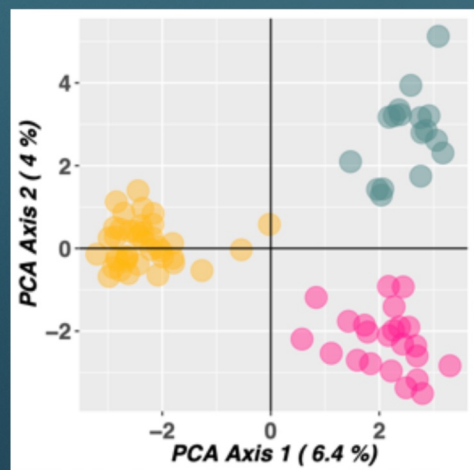
The platypus (*Ornithorhynchus anatinus*) is one of Australia's most iconic native animals but has declined dramatically due to a variety of factors. Previous research of platypuses on putatively neutral loci (i.e. non-coding genomic regions) found that genetic differentiation (F_{ST}) between below and above Pindari Dam populations on the Severn River was 4- to 20-fold higher than along similar stretches of adjacent undammed Tenterfield Creek.

9.2 million SNPs in 25,862 genomic regions:
- Coding sequences (possibly adaptative)
- Non-coding regions (usually presumed neutral)

Red points -> dams >10 m high
Yellow shade -> platypus distribution
Pink balloons -> sampling sites
Light blue -> rivers
Dark blue -> reservoirs behind dams

I'm the platypus!

We searched for cases where F_{ST} differed by more than three standard deviations between any combination of the dammed (Severn) versus undammed (Tenterfield) streams and coding versus non-coding.
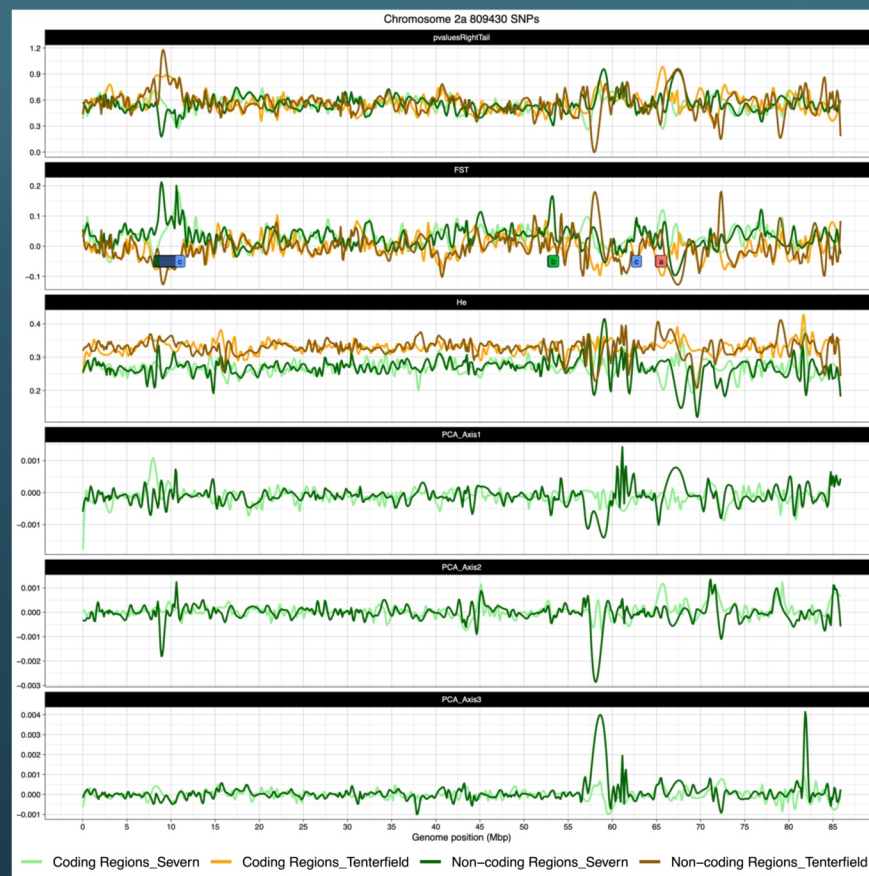
Three potential effects of the dam:
a) only adaptive regions diverged
b) only neutral regions diverged
c) adaptive regions diverged and influenced adjacent neutral loci

Next steps

Further analyses using a two-criteria approach (i.e. confirmation with at least two measures of genetic differentiation such as G_{ST}, Jost's D, mutual information and Adjusted AFD) are underway to validate whether those loci are putatively under natural selection.

Thank you!

We found 115, 46, and 185 genomic regions explained by scenarios a), b) and c), respectively. Our preliminary analyses identified potential genomic regions under natural selection in genes with metabolic and development functions, including KCNIP4, ADAM10 and OXR1.

Coding Regions_Severn   Coding Regions_Tenterfield   Non-coding Regions_Severn   Non-coding Regions_Tenterfield

● Severn River above the dam   ● Severn River below the dam   ● Tenterfield Creek

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