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Habitat Suitability Models are powerful tools for **helping** diverse **stakeholders agree** on stream restoration **priorities**

INTRODUCTION

We developed spatially explicit, quantitative models and applied conservation prioritisation software (Zonation) to support stakeholder deliberations to identify priority actions and targets in Melbourne's new Healthy Waterway Strategy.

METHODS

We developed Habitat suitability models (HSMs) using extensive ecological data collected between 1995-2009 for 52 macroinvertebrate families, 13 native fish species, and platypus.

Combined with 10-12 candidate environmental predictors (e.g. air temperature, runoff depth, impervious cover, vegetation cover) we used Boosted Regression Trees to predict habitat suitability across a >8,000-km stream network.

The benefit of management actions (e.g. stormwater disconnection, streamside revegetation, environmental flows, fishways) in isolation or combination, was compared to a Business-as-Usual Future scenario (assuming past practice with anticipated urban growth and a drier, warmer climate).

We then used Zonation to prioritise cost-effective management actions to optimise protection and restoration of instream biodiversity

RESULTS/DISCUSSION

Benefits of this approach included:

- spatially continuous estimates of biodiversity
- ability to consider potential interactive impacts of future threats
- ability to quantify expected differences made by individual or combined management actions
- prioritisation based on cost-effectiveness
- ability to spatially prioritise management actions and set quantitative management targets
- mapping outputs were an effective way to summarise and communicate data to different audiences during the strategy co-design process.

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Figure 1 The five major catchments of the Port Phillip and Westernport region

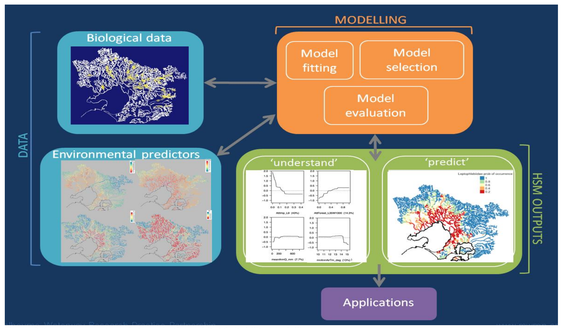

Figure 2 Key components and stages in the Habitat Suitability Modelling process

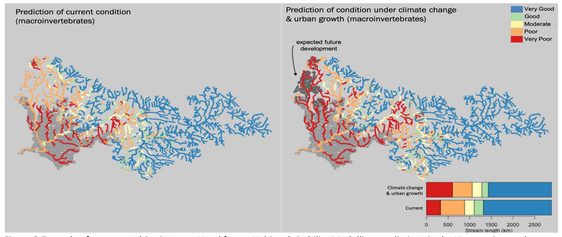

Figure 3 Example of current and Business-as-Usual future Habitat Suitability Modelling predictions in the Yarra major catchment (see Figure 1) for aquatic macroinvertebrates

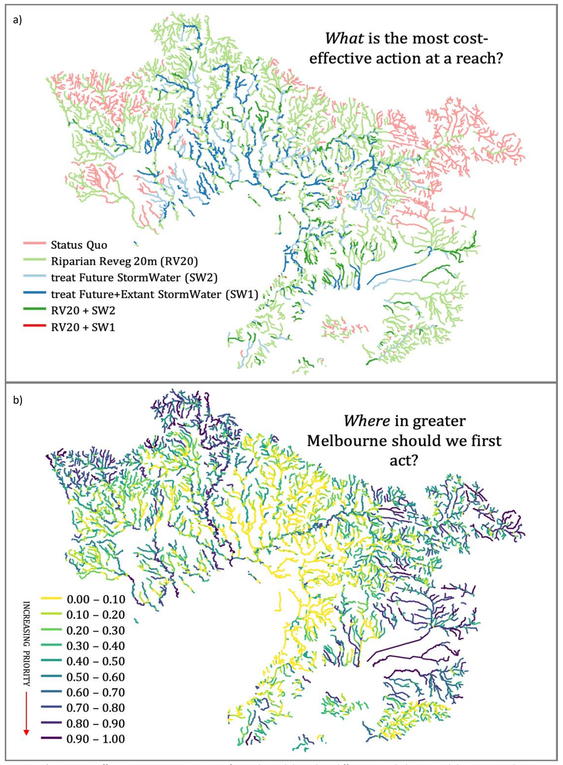

Figure 4 a) Most cost effective management actions for each reach based on differences in habitat suitability compared to a Business-as-Usual Future, and b) Management priorities based on total biodiversity benefits across the region using Zonation

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