National Science Challenges

SUSTAINABLE SEAS

Ko ngā moana whakauka

Uncertainty in mapping of the pollution removal ecosystem service

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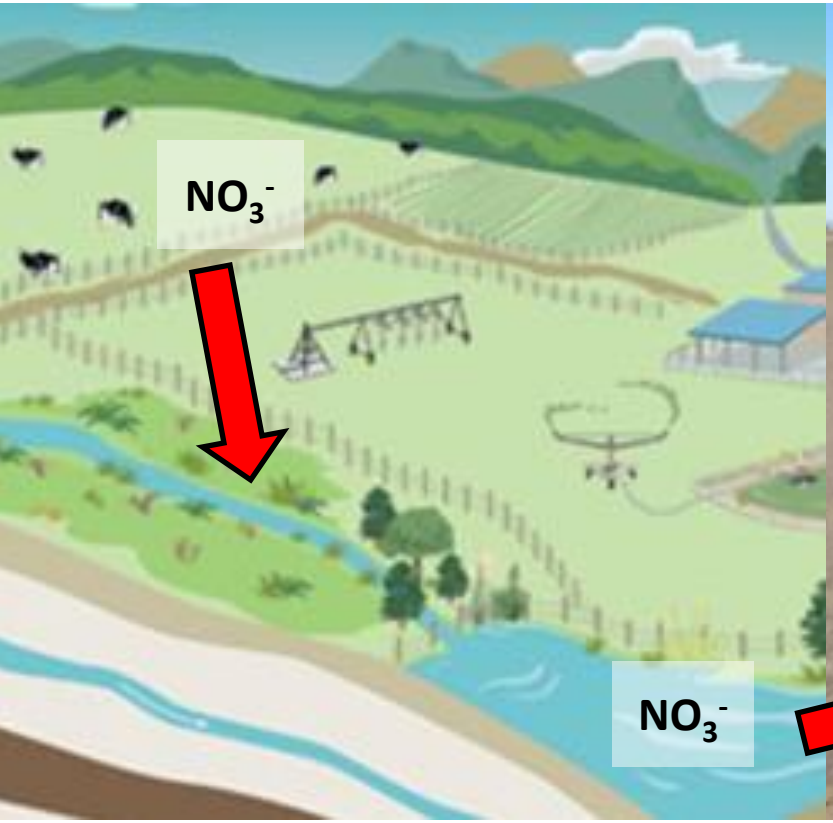
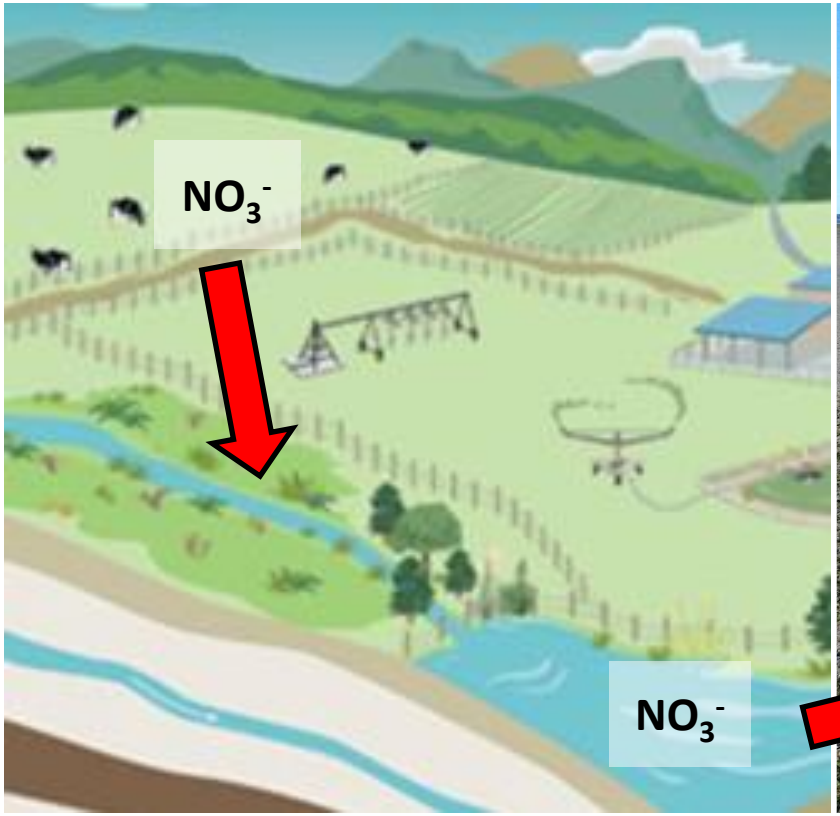
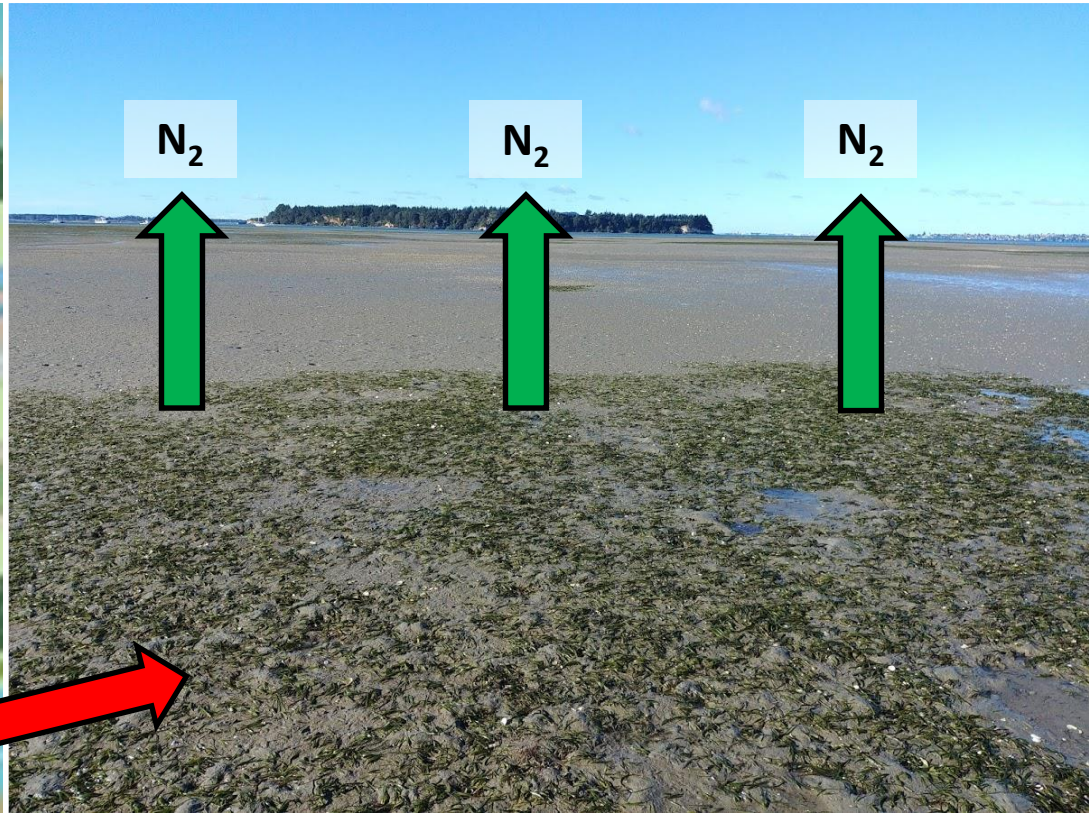
Removal of excess nitrogen (a catchment-derived pollutant) is a key ecosystem service



Denitrification is central to this pollution removal ecosystem service





$$NO_3^- \rightarrow N_2O \rightarrow N_2$$

Denitrification

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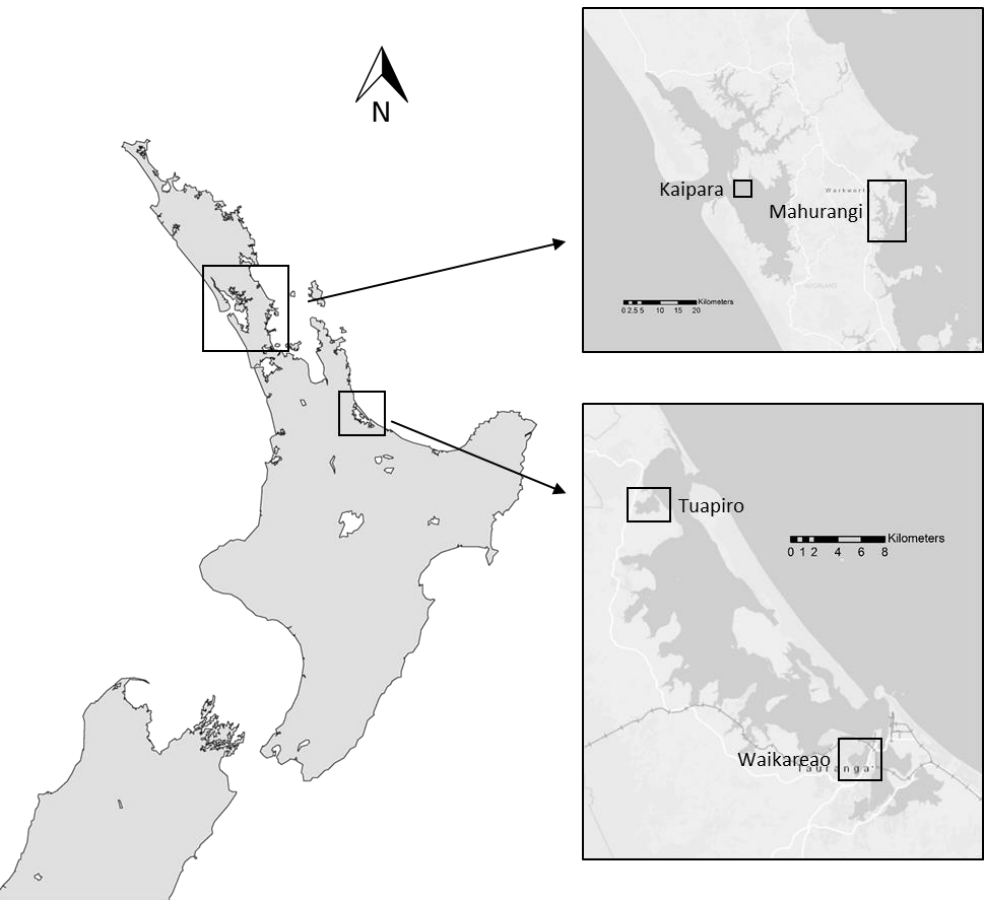
Making data-based spatial predictions with a model



Environmental variables

Denitrification Assay [**DEA**]

Boosted Regression Trees

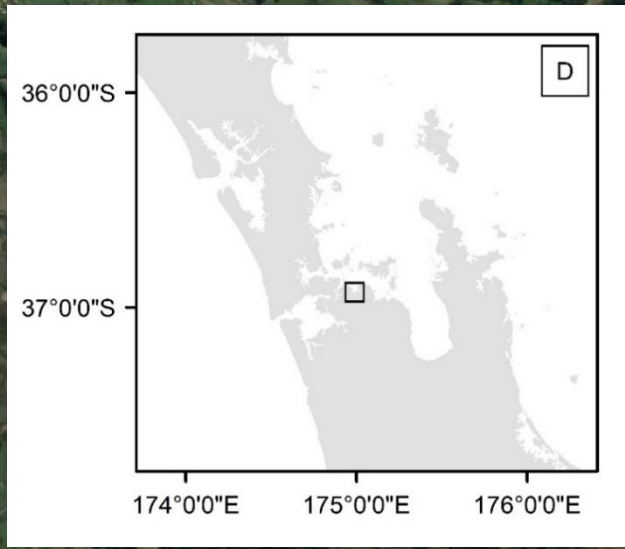
Global model

118 sites across 4 estuaries

Spatial environmental data available for Whitford

- Mud content
- Organic content
- Chlorophyll a

Existing spatial sediment data



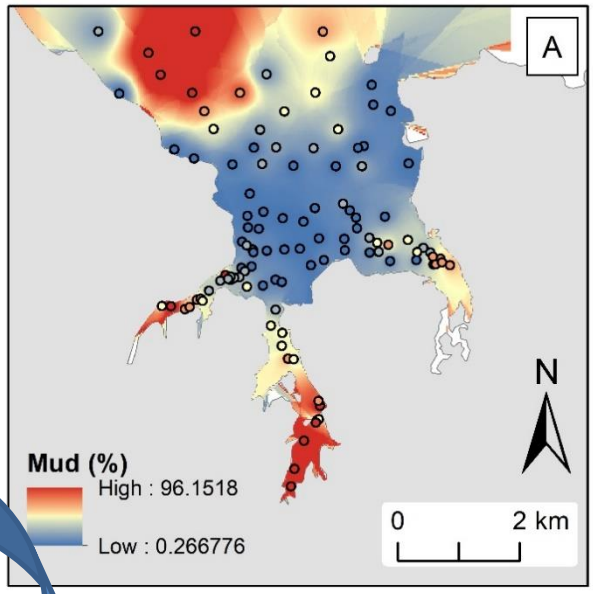
Approach used for mapping nutrient pollution removal ES

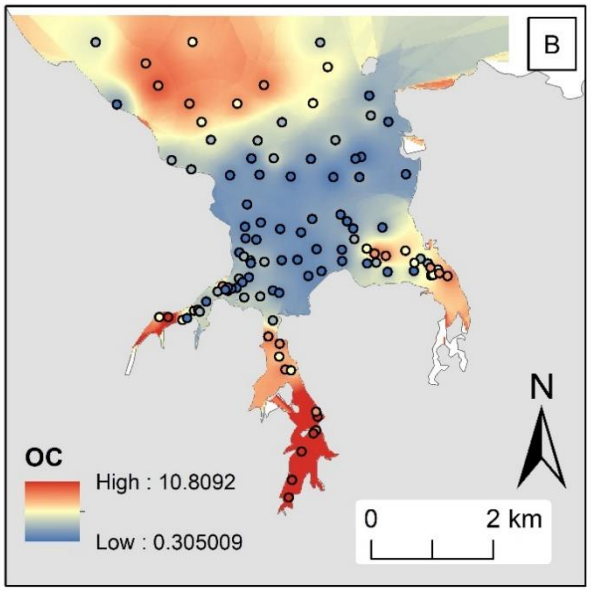
Existing spatial sediment data

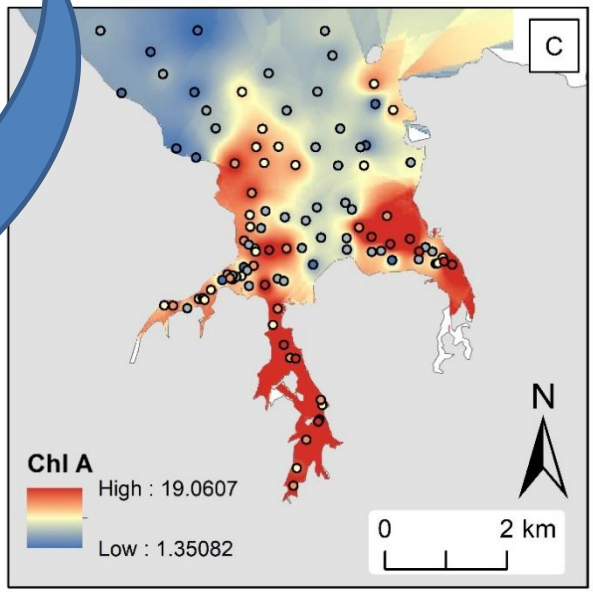
Global model

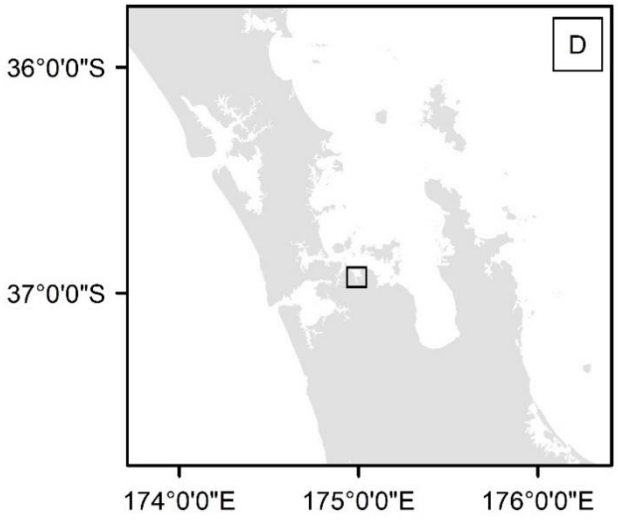
Boot-strapping

DEA prediction





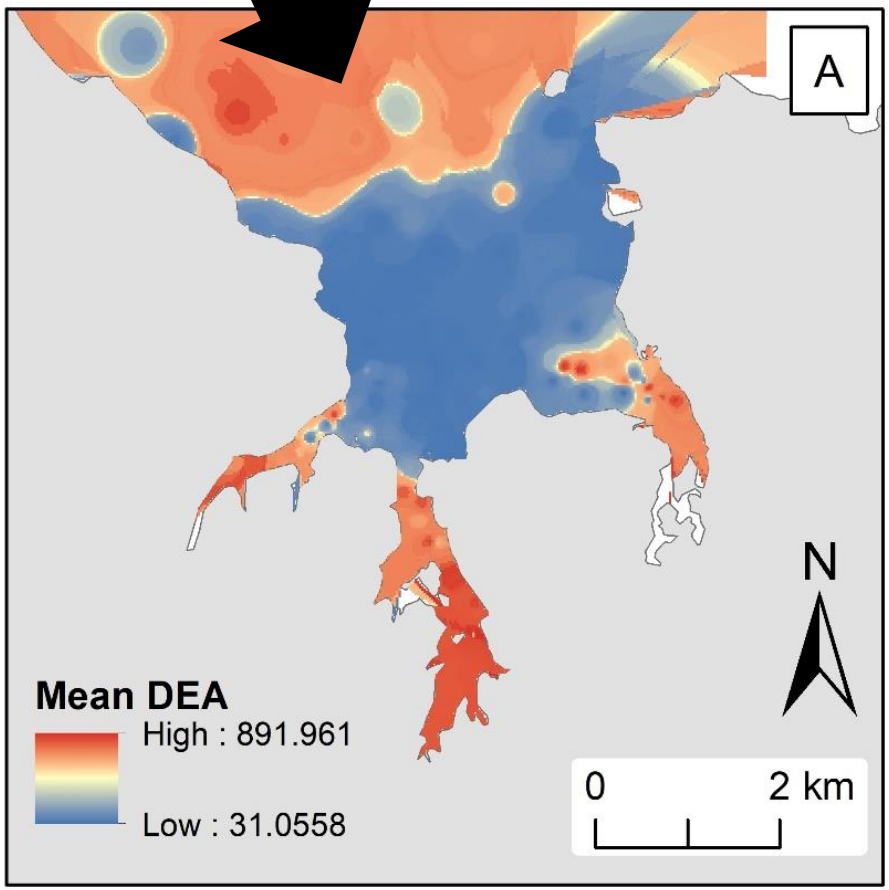




Predicting DEA in the Whitford Embayment

Existing spatial sediment data

Global model



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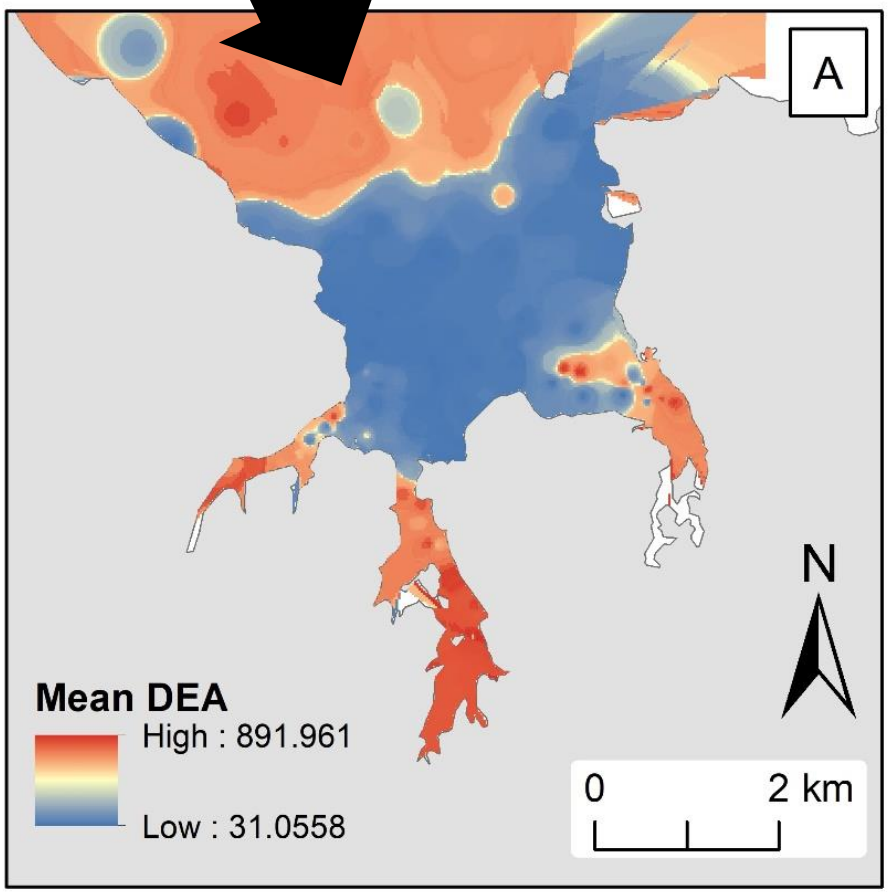
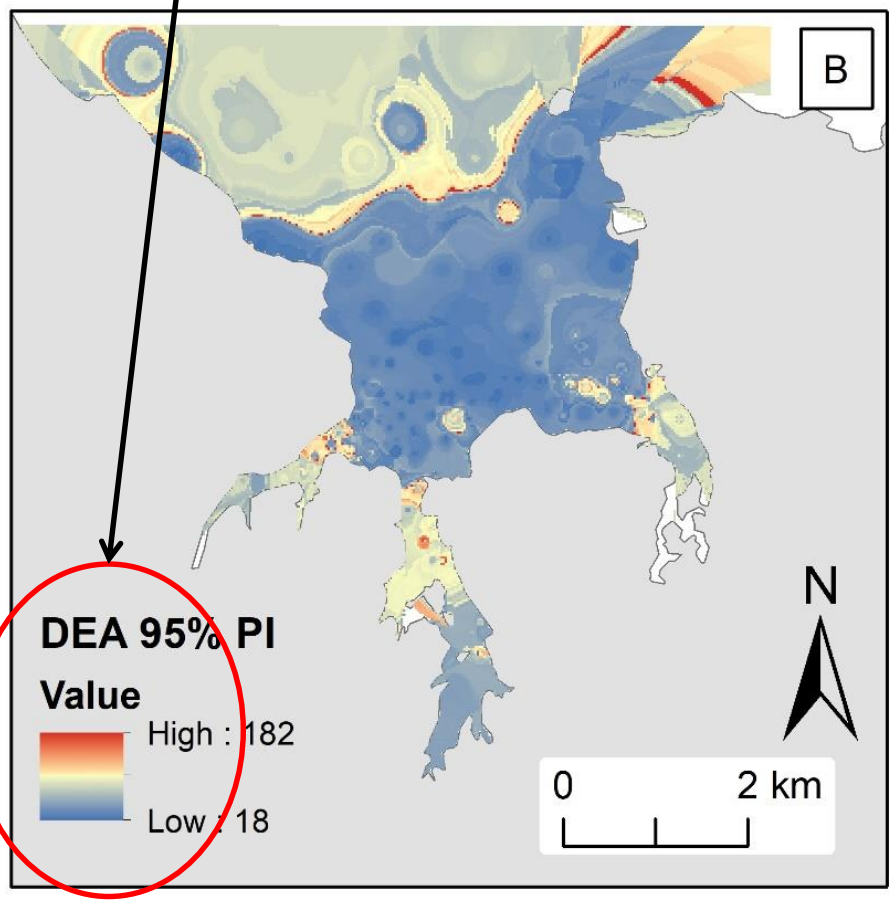
Predicting DEA in the Whitford Embayment

Existing spatial sediment data

Global model

Prediction uncertainty

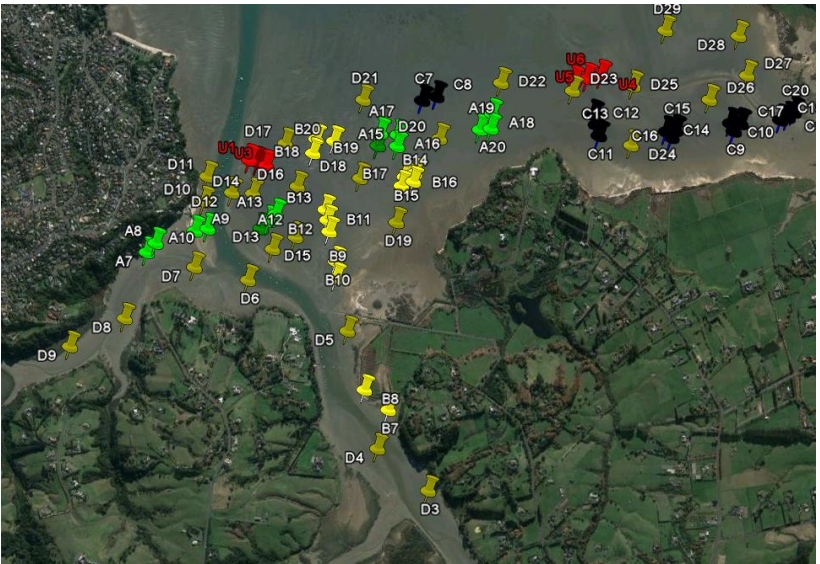


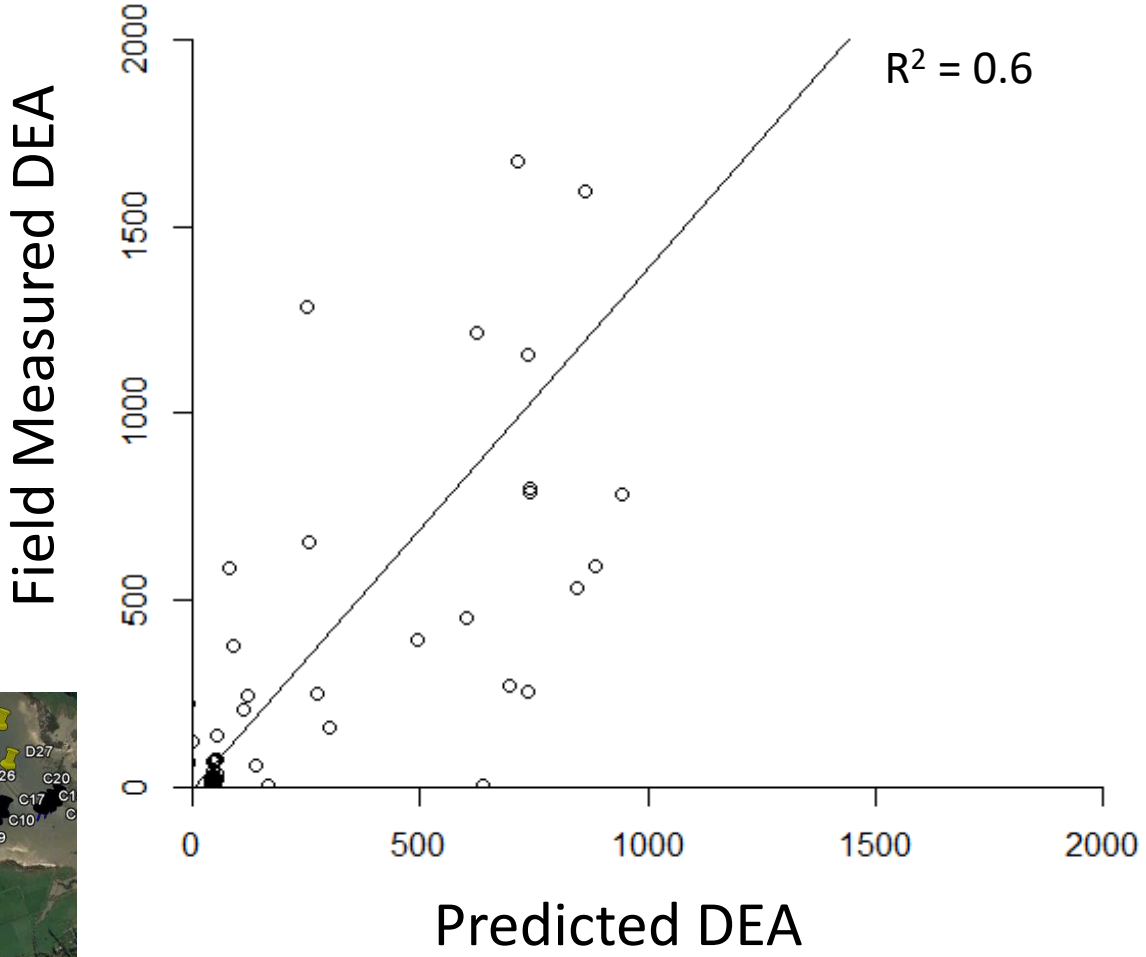


Validating the DEA map

New data

90 new sites measured





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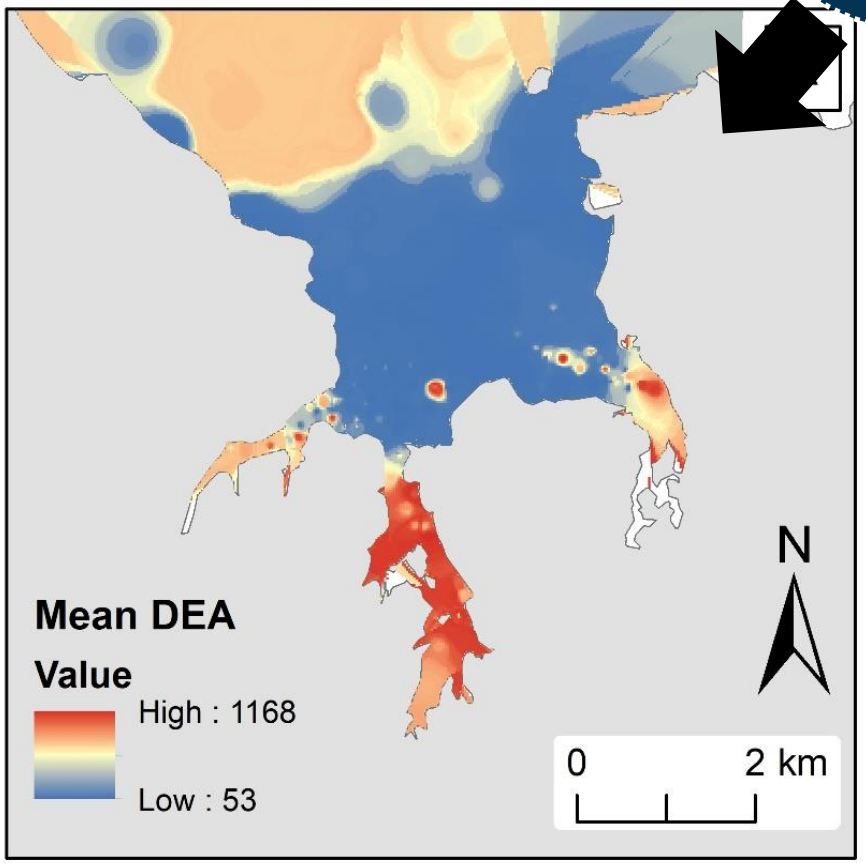
Predicting DEA using the updated global model

Existing spatial sediment data + New data = Updated global model



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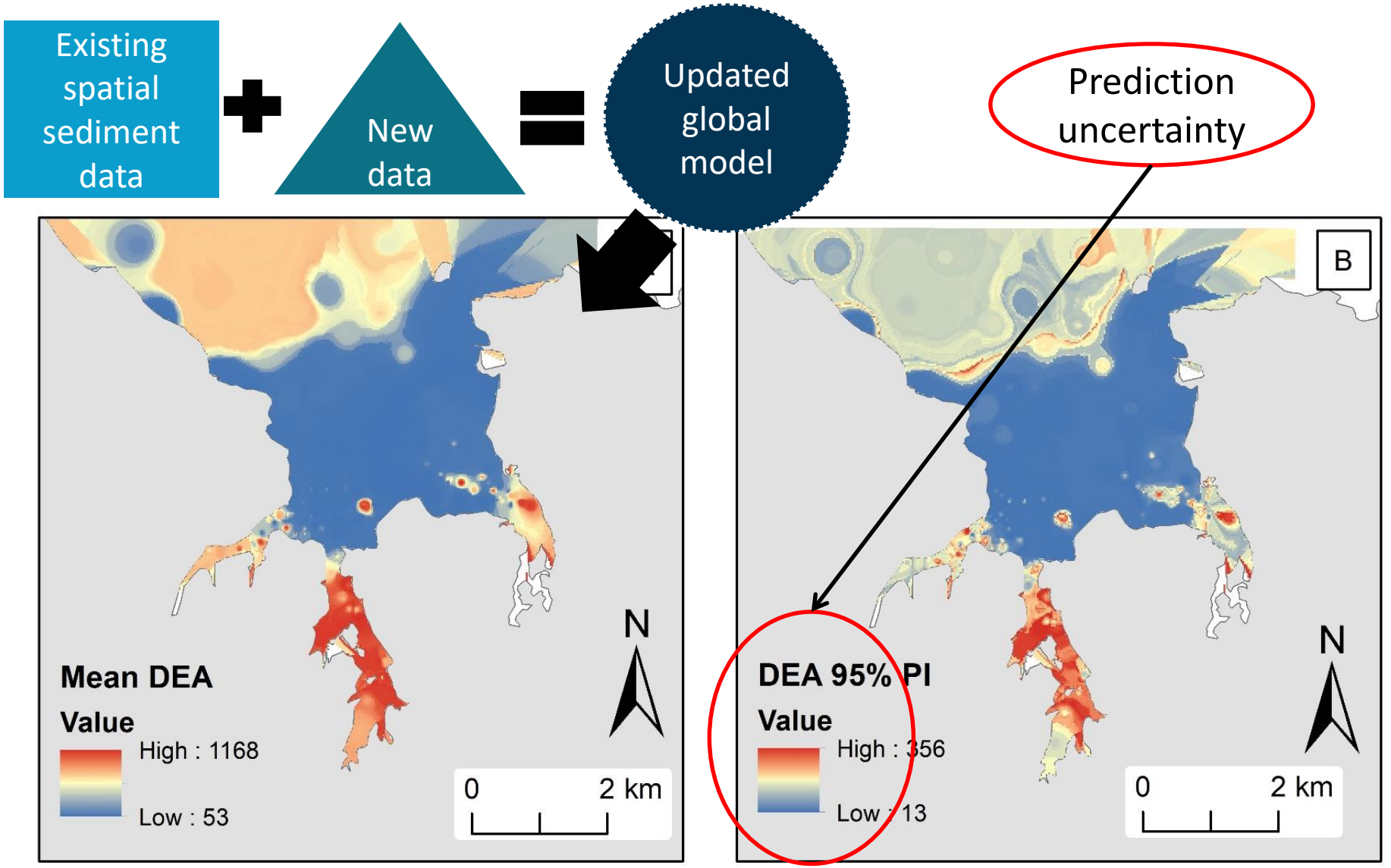
Predicting DEA using the updated global model



Concluding remarks