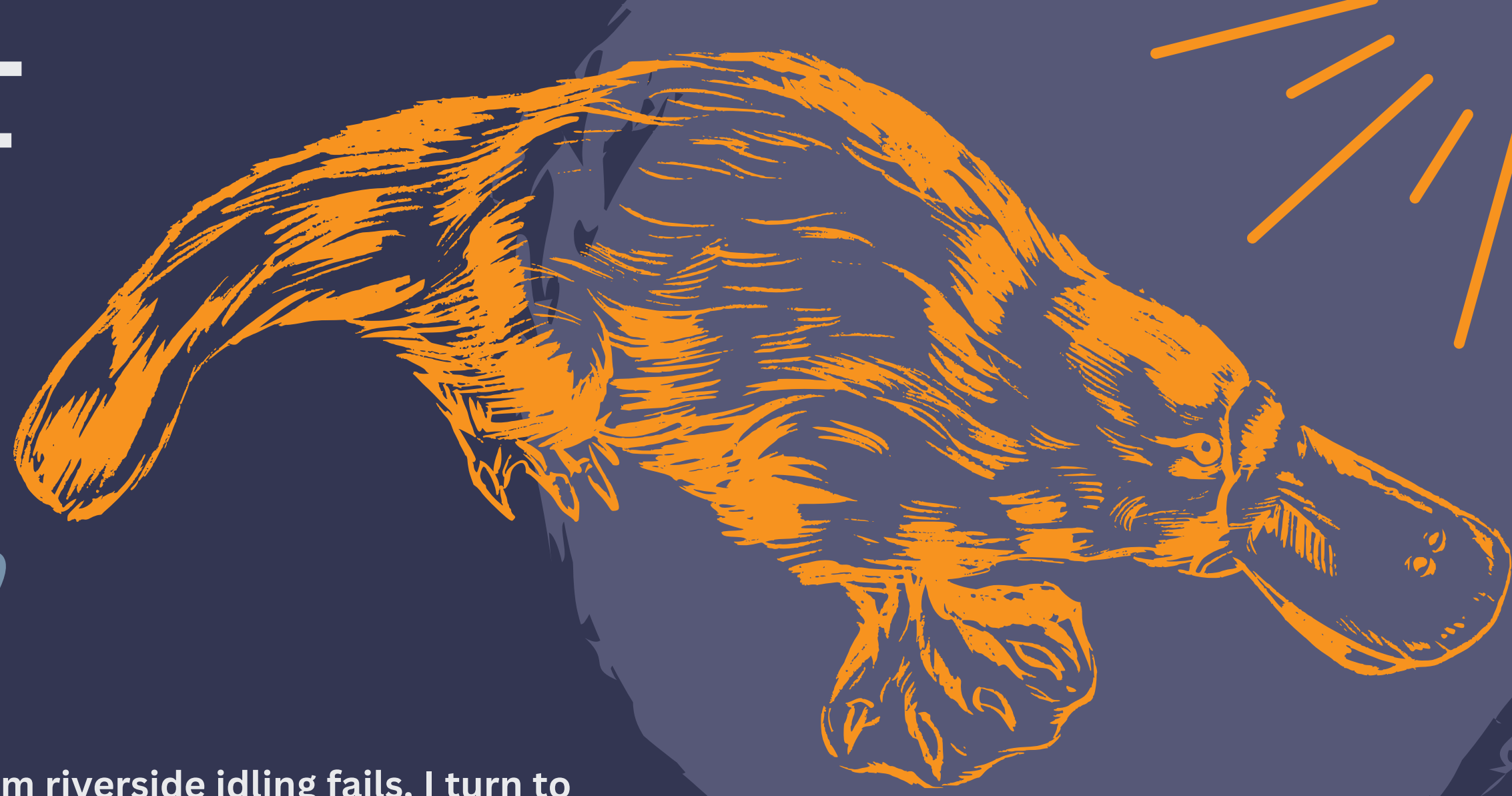


IN SEARCH OF Platypus



This year, I have been on a quest to spot a platypus in the wild. When random riverside idling fails, I turn to computational models. Aided by ALA, and some nifty data science, I have developed a system to assess the suitability of any part of Australia to platypus habitation, and created a tool to find nearby rivers so that you too can search for Australia's most elusive aquatic monotreme.

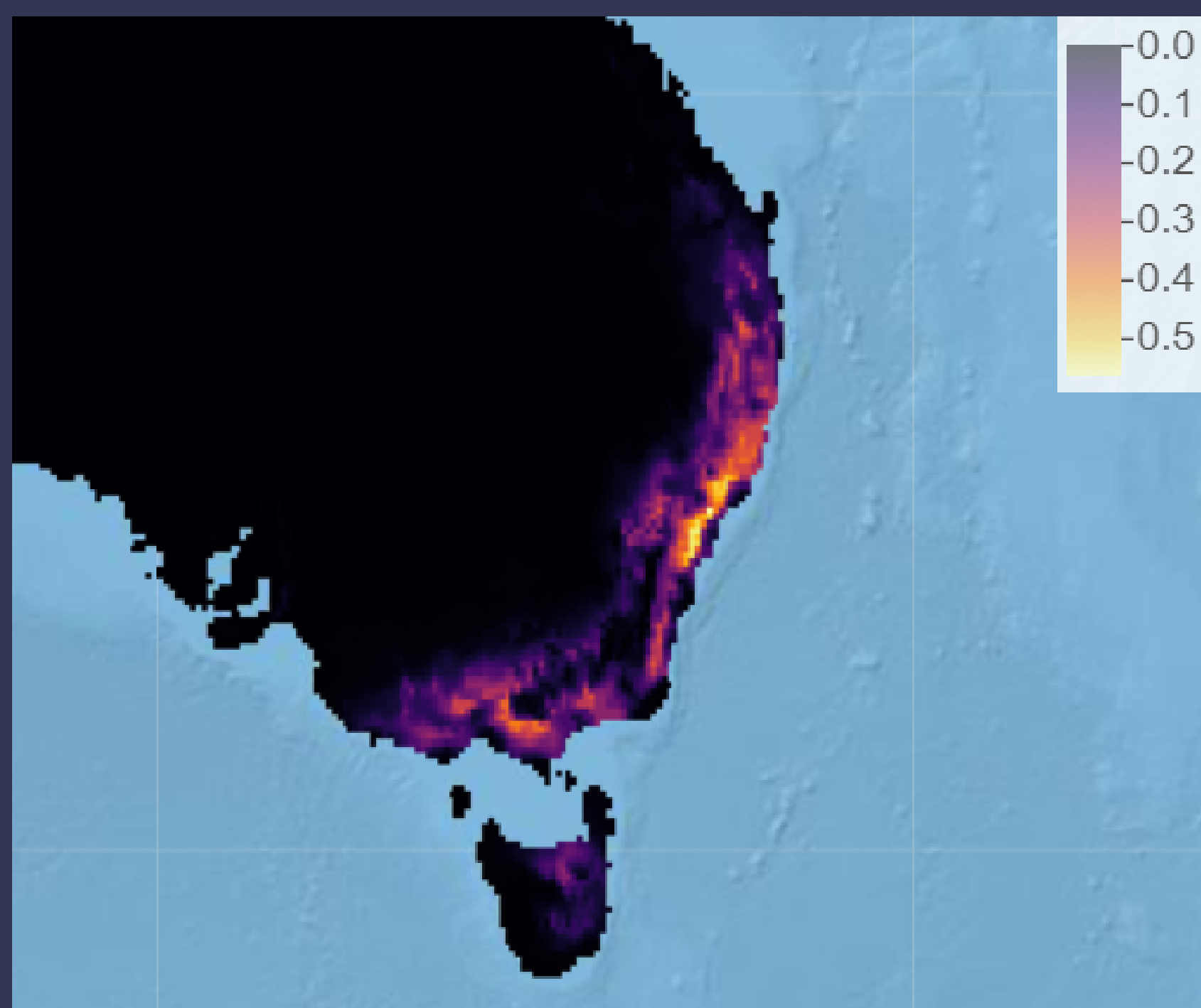
What is ENM?

ENM (Environmental Niche Modeling), commonly referred to as Species Distribution Modelling (SDM) is the use of computational models to predict habitats that particular species may be found. These models are based off of a variety of approaches. I have selected to use BioClim, which inputs observation data of platypus, then finds key relations of presence and absence with a number of climatic variables. The model then gives each square on a grid map of Australia a score, whereby which higher values indicate more suitable climatic conditions, and lower values represent less suitable conditions.

BioClim is not the only approach to SDM. More complex methods, such as Generalized Linear Modelling, and less complex methods, such as Domain, are available.

The best way to utilise the suitability function is through relative comparison. Try out a few locations, and have a look what the function determines is more suitable out of the options.

BioClim Model of Platypus Environmental Suitability



Road Trip!

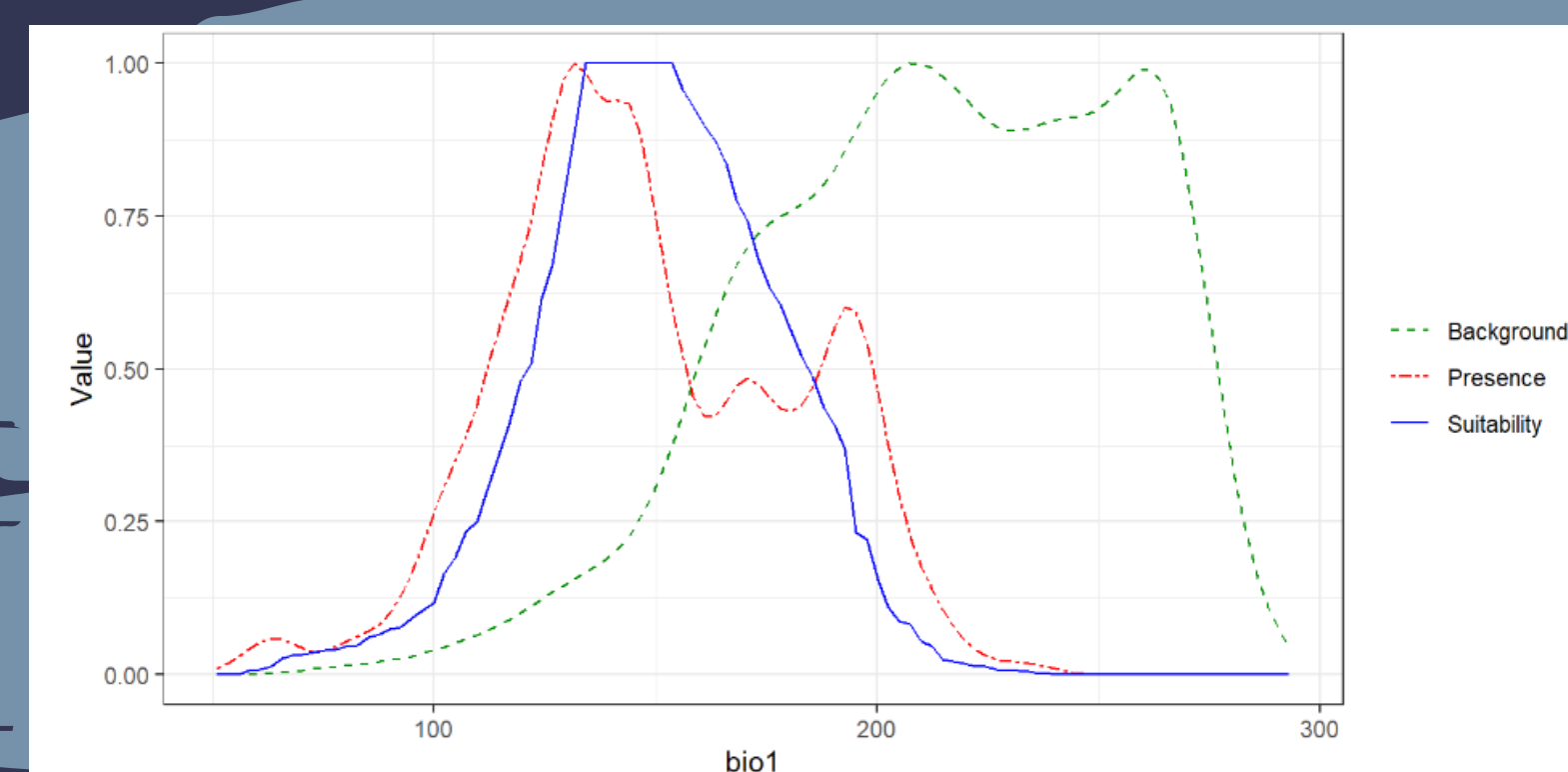
Lets say were planning a road trip from Canberra to Coffs Harbour, and we really want to spot a platypus. Where would we be most likely to do so? Should we travel through Dubbo, or camp a night at Barrington Tops?

Understanding Bioclim Plots:

The x-axis in these plots signifies specific climatic variables, such as Annual Mean Temperature. Each plot assesses the relationship between the climatic variable and the presence of platypus.

A high value on the red axis (close to 1) indicates a strong presence of platypus in that condition, while a green plot near 1 suggests areas in Australia with conditions that match the variable but have a low platypus presence.

When the green plot is close to or at 0, it implies that no Australian environments match that condition. The blue plot represents our model's prediction of platypus presence in this environment when all other climatic conditions are at their mean values.



Annual Mean Temperature (BIO1) Response Plot

Overall I assessed 19 different environmental conditions. I will outline some of the interesting findings.

Platypus can withstand a decently wide range of climates, being found in Australia's coldest environments (BIO1), but also in the warmer of regions of Queensland, all the way up to Cape York (Barungguan). Being aquatic, they are found commonly in climates with decent rainfall around all months. Platypus are found more commonly in climates with less fluctuation in monthly temperatures (BIO3) and less temperature seasonality (BIO4).

Canberra	Dubbo	Barrington Tops	Coffs Harbour
Murrumbidgee River	Castlereagh River	Karuah River	Bellinger River
Distance (in km): 2.444379	Distance (in km): 9.551319	Distance (in km): 8.026624	Distance (in km): 8.364607
Locations suitability value: 0.08401697	Locations suitability value: 0.01867044	Locations suitability value: 0.1783121	Locations suitability value: 0.1144743