**Multiband Sandwiches - Using Multispectral Imagery with Neural Networks to find Kahikatea trees across New Zealand**

Forests that have been dramatically depleted relative to their prehuman extent are being replanted around the country; due to the varied geographic distribution of planting efforts, tracking progress remotely is essential. The availability of satellite information combined with accessible machine learning algorithms allows for environmental sensing to happen at a near autonomous level. The Eco-index Team have been using this approach to assist with the restoration efforts of native ecosystems in Aotearoa. With an initial goal to find kahikatea (*Dacrycarpus dacrydioides*) stands, we have developed a detection framework; it uses a combination of high resolution PlanetScope multispectral imagery, multiple open source satellite datasets and regional council and restoration group validation data sources. While powerful for prediction, this approach results in various challenges, including: varying image resolution and dimensions across multiple sources, management of large datasets, and scaling the predictions. NumPy arrays provide an effective way of combining various dimensional datasets into a data cube (or ‘multiband sandwich’) structure. Additionally, the framework outlines clear pathways for handling large datasets on local hardware and provides a simplified method for scalability to the national level. Within this framework, our detector is are currently capturing kahikatea trees across the Waikato region with a computation time of approximately 1 week. This relatively quick detection turnaround time provides a platform to monitor ecosystems through seasonal and annual changes. Future applications of the detector will include deployment on a national scale, predicting age of restoration areas using available historic satellite imagery, and monitoring the health of the growing ecosystems. Broadly, provided that there is sufficient training data to feed into the modelling process, our framework provides a means of detecting any type of land cover.