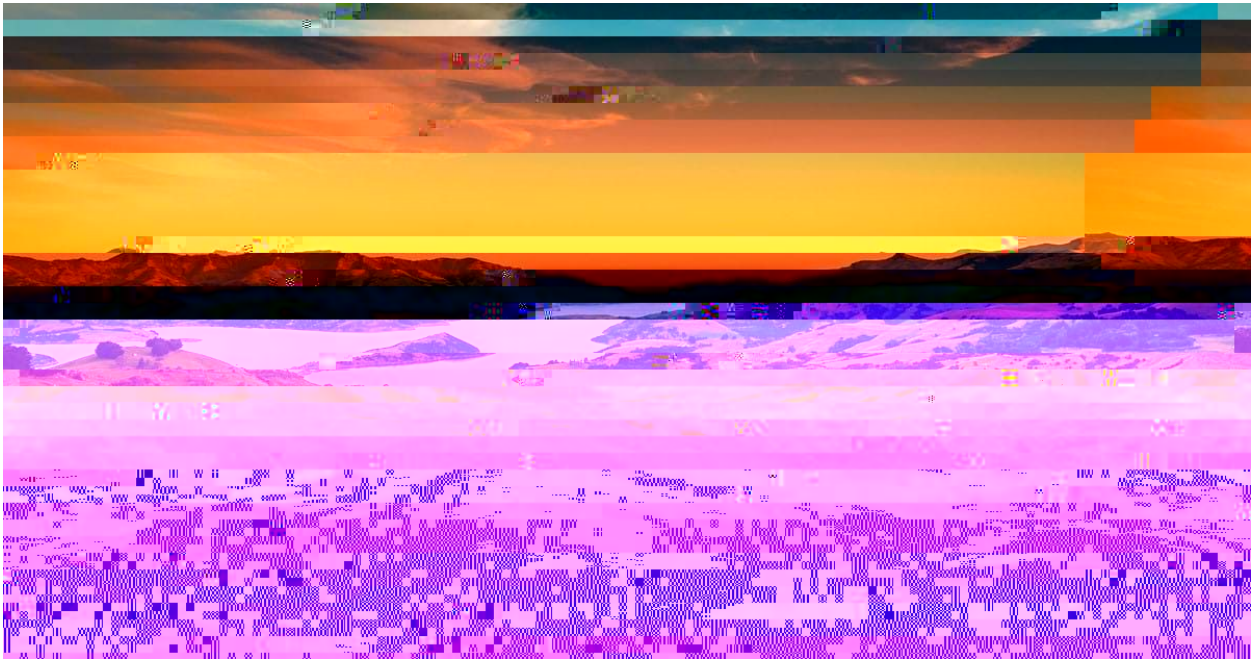


# How can we tell if too much surface water is being taken from Banks Peninsula streams?

Key aim: To determine whether it is a fair assumption that stock and household surface water takes from Banks Peninsula streams are insignificant.



Lyttelton Harbour views (Source: ChristchurchNZ)

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## Executive Summary

B

## 1.0 Introduction

Extensive land-use changes have been ongoing for centuries in Banks Peninsula, with a major shift from native forests to agricultural and household land (Wood & Pawson, 2008). This change in land-use has led to an increased demand for water (Christchurch City Council, 2009). The majority of water for consumption in Banks Peninsula is extracted from surface water (Christchurch City Council, 2009). Surface water in Banks Peninsula is particularly vulnerable during the summer months as flows are lower and water demand is higher (Christchurch City Council, 2009). Whilst groundwater is a key component of hydrology within the peninsula, this report focuses on surface water, as this is the area where there are many uncertainties.

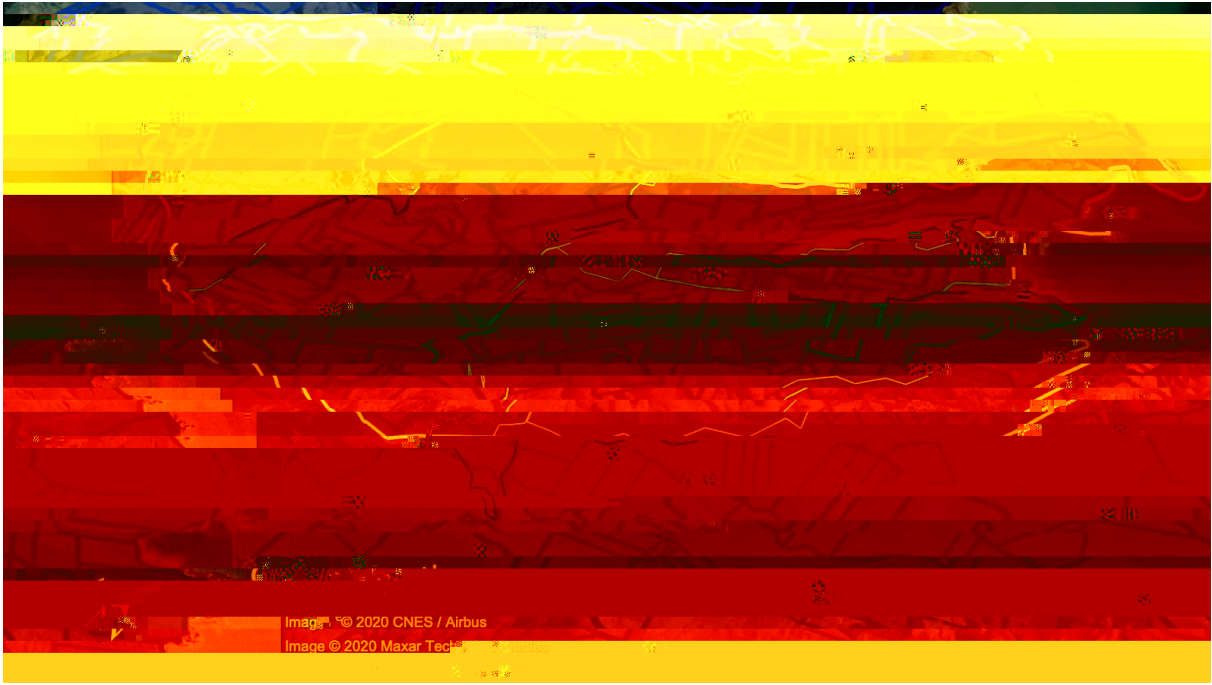
Concerns have been raised by locals on whether

this, recommendations regarding policy are able to be made, further influencing the major role that policy had on this research. This topic was also of interest to the Banks Peninsula Water Zone Committee, who established this project due to the uncertainty regarding the adequacy of the current policy.

### *2.2 The Impacts of Climate Change on Current and Future Water Use:*

Global surface temperature is predicted to rise by over 1.5 degrees celsius by the end of the 21st Century (Kundzewicz, 2014). Climate change is projected to have many implications for Banks Peninsula, such as increased evaporation, water temperature, drought and decreased precipitation (Christchurch City Council, 2009). Thus significantly impacting water quality and quantity. For these reasons it is important that the surface water issues facing Banks Peninsula are addressed now, as reduced flows, with the same rate of extraction, could potentially have adverse effects on the environment.













#### *4.4 Extraction Rates Compared To*

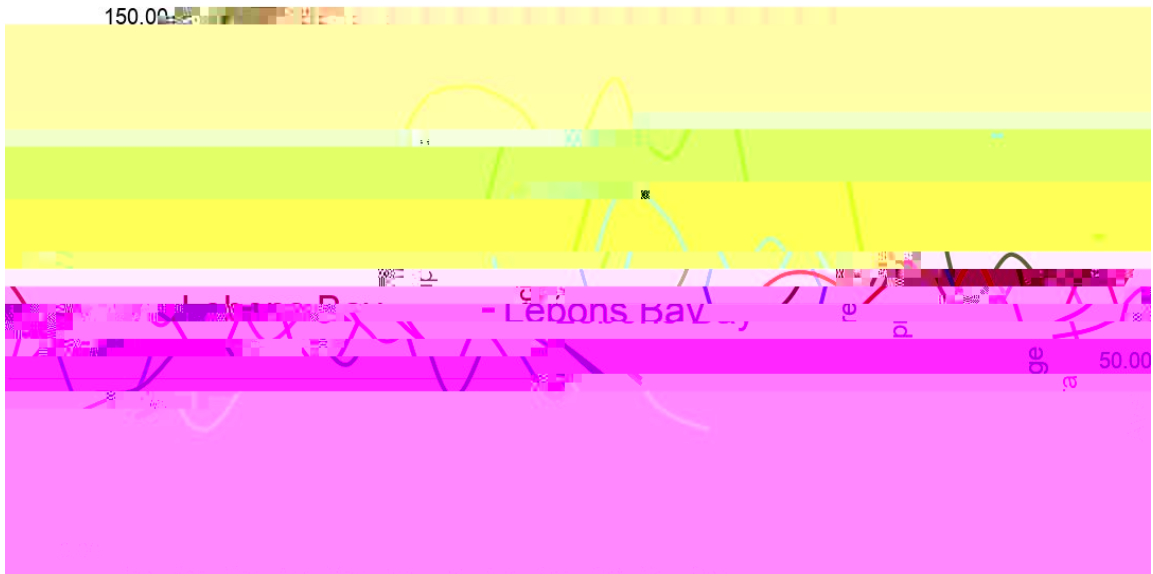


Figure 8: Average monthly precipitation in Banks Peninsula Catchments.



Figure 9: Weather station locations alongside outlined catchments.

## 5.0 Discussion

### *5.1 Significance of Permitted Water Takes:*

In order to mitigate adverse effects, rivers with a mean flow rate of less than 5 cubic meters per second should have a minimum flow of 90% of the MALF (Ministry for the Environment, 2008) & (Bradford & Heinonen, 2008). The majority of streams in Banks Peninsula fall within this category, therefore, no more than 10% of the MALF should be extracted in these locations.

Figure 6 sho



amount and type of stock was unable to be obtained so this assumption had to be made. As hectare values were used to calculate the number of stock in these locations, the results may vary, as not all non-urban areas are suitable for grazing.

the biodiversity within and surrounding the streams by providing more habitats (Boothryod et al, 2004).

## **6. Conclusion**

This research project has found that permitted surface water takes in Banks Peninsula has the potential to have adverse effects on the environment. The effects from permitted takes will be greatest during the summer months when stream flow is low and water demand is high. Therefore, this report recommends that the current policy regarding permitted water takes in Banks Peninsula should be reviewed. It is important to acknowledge that the results and findings from this report have been built upon many limitations and assumptions, and is the outcome of an undergraduate learning experience. More research and detail will be required to improve the reliability of the results.



## **7. Acknowledgements**

The group would firstly like to acknowledge Gina Waibl and Paula Smith from the Banks Peninsula Water Zone Committee. We would also like to acknowledge Harry Millar, Jen Dodson, Suzanne Gabites & Tim Davie from Environment Canterbury for providing stream flow and stocking rate data. Additionally, we would like to acknowledge Dr. Sam Hampton for his advice on this project and for providing spring location data. Lastly we would like to acknowledge our supervisor Dr. Heather Purdie for her great advice and encouragement throughout this research project.

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