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Report to the Rural Services and Wairarapa Committee  
from Mike Harkness, Hydrologist, Environment Division

## **Wairarapa Drought Prediction using the Southern Oscillation Index**

### **1. Purpose**

To inform the Committee of the results of an investigation and report into the links between the Southern Oscillation and seasonal rainfall in the Wairarapa.

### **2. Background**

The year to year fluctuations in the various weather parameters such as rainfall are of great interest, particularly to those involved in agriculture. Until now drought prediction has been a 'closed book'. Some recognisable patterns are now emerging, allowing a certain amount of seasonal forecasting to be attempted. The most important of these patterns is the Southern Oscillation and its two components - El Nino and La Nina.

The intensity of the Southern Oscillation is measured as the Southern Oscillation Index (SOI).

This report is the sixth in a series produced by the Resource Investigations Department investigating the relationship between the SOI and hydrological processes within the Region.

Reports are available for Committee members who would like a copy.

### **3. Report Summary**

This report defines the Southern Oscillation and the effects that El Nino and La Nina have on the Wairarapa's weather.

Rainfall data from ten sites in the Wairarapa is used in the study to investigate linkages between the prevailing weather pattern (El Nino or La Nina) and seasonal rainfall.

Using statistical analyses a number of forecasts have been prepared to predict low rainfall in the Wairarapa.

#### **4. Major Findings**

The report highlighted the fact that both an individually high monthly value of SOI (either La Nina or El Nino) and persistent and consistent high seasonal values can affect rainfall in the Wairarapa.

Although some of the results varied across the region, in general terms if an El Nino event is present the chance of summer drought over the Wairarapa increases. If La Nina is present the chance of autumn drought over the Wairarapa increases.

A series of maps have been created that provide a generalised view of which areas have increased probability of low rainfall due to preceding SOI conditions.

For a more accurate breakdown of the maps a series of seasonal low rainfall forecasts have been prepared. For example, given a La Nina summer:

*At Martinborough there is a 42 percent chance of a five-year return period low summer rainfall of less 141 millimetres.*

Forecasts based on the SOI give the greatest lead in times for the prediction of drought and the results from this study will provide the public and agricultural sector of the Wairarapa with another tool to assist in planning for the seasons ahead.

Given the recent droughts and increased public awareness of El Nino and La Nina, this method for predicting an increased chance of drought will be beneficial to the community.

#### **5. Quarterly Forecasts**

At the end of each season the average seasonal SOI value will be calculated. If the SOI value (be it El Nino, La Nina, or average) fits into any of the forecast scenarios, then these will be issued.

The quarterly forecasts will be issued to local authorities, agricultural, horticultural and other interest groups, and also internally to various Council departments.

## **6. Communications**

Copies of the report have been distributed to Wairarapa district councils as well as to public libraries and college libraries in the Wairarapa.

A press release will be issued to inform the wider community of the results of the report. Press releases will also be issued when quarterly seasonal forecasts are made.

If local organisations such as Federated Farmers are interested a presentation of the findings can be arranged.

## **7. Recommendation**

*That this report be received and its contents noted.*

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