



Report 03.551
Date 15 September 2003
File Y/13/1/8

Committee Rural Services and Wairarapa
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Spring 2003 Low Rainfall Probability – Southern Oscillation Index Based Forecast

1. Purpose

To inform the Committee of the SOI-based forecast of low rainfall in the Wairarapa during spring 2003.

2. Background

The Southern Oscillation Index (SOI) can be used as an early method of forecasting an impending drought. Previous studies have found that the SOI can be related to seasonal rainfall patterns in the Wairarapa. An SOI-based forecast does not predict what the rainfall total for a season will be. Rather, the forecast shows whether or not the likelihood of a drought of a certain magnitude is increased.

3. Spring 2003 forecast

An average winter SOI of -3.6 , as experienced this year, tends to increase the likelihood of low spring rainfall in many parts of the Wairarapa. In the Eastern Hills and south-west Wairarapa (Waiorongomai) there is about a 60% chance of a 2-year return period low rainfall total or less. The probability of a 5-year return period low rainfall has significantly increased in most places. The probability of a more severe rainfall drought (10, 20 and 50 year return periods) is roughly doubled at most locations.

The increased low rainfall probabilities are shown in the table below. Note that this forecast does not apply to northern Wairarapa, as there is no clear relationship between a winter SOI of -3.6 and increased probability of low rainfall in that area.

In summary, we have a higher than usual likelihood of low spring rainfall this year. If this does occur and continues on into the summer period the demand for water will be higher than usual and we are more likely to have to enact water restrictions.

Rainfall station	Spring rainfall total less than:	Usual probability of occurrence (%)	Probability of occurrence this year (%)
Featherston	221 mm	20 (5 year return period)	29
	190 mm	10 (10 year return period)	23
Waiorongomai	367 mm	50 (2 year return period)	63
	302 mm	20 (5 year return period)	30
	273 mm	10 (10 year return period)	21
	253 mm	5 (20 year return period)	13
Martinborough	139 mm	20 (5 year return period)	25
	124 mm	10 (10 year return period)	14
	112 mm	5 (20 year return period)	10
	100 mm	2 (50 year return period)	5
Ngatapa	223 mm	50 (2 year return period)	61
Hikawera	159 mm	10 (10 year return period)	19
Lagoon Hill	263 mm	50 (2 year return period)	58
	201 mm	20 (5 year return period)	25
	175 mm	10 (10 year return period)	17
	155 mm	5 (20 year return period)	9
Te Wharau	171 mm	20 (5 year return period)	37
Te Awaiti	155 mm	20 (5 year return period)	37
	134 mm	10 (10 year return period)	19
	119 mm	5 (20 year return period)	10

4. Regional context

There is no clear relationship between a winter SOI of -3.6 and increased probability of low rainfall in Wellington's water supply catchments. The SOI can however be used on the Kapiti Coast. The likelihood of the total spring rainfall being at a low rainfall of 5 or 10-year return period is slightly increased at Otaki and Paekakariki. At Waikanae, the probability of a low rainfall of 5 or 10-year return period is double that of the usual probability. Similarly, a 10 or 20-year return period drought is two times more likely than usual at Paraparaumu.

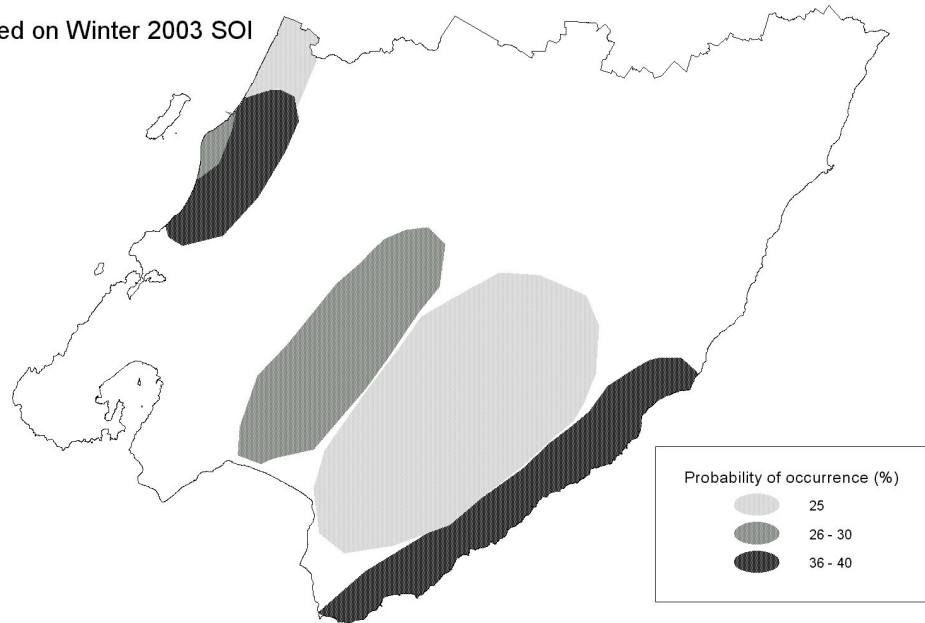
The SOI conditions experienced over winter increase the probability of low river flows on the Kapiti Coast over spring. There is a 60% chance that the mean spring flow in the Otaki River will be equal to or less than a 2-year return period low flow. The probability of mean spring flow in the Waikanae River being at a 5 or 10-year return period low flow is double the usual probability of occurrence.

In summary, the chance of low rainfall and river flows on the Kapiti Coast is higher than usual. This is particularly so for Waikanae and Paraparaumu. If this continues into summer than we are more likely than usual to have to enact water restrictions.

The figure below shows areas where the probability of a low spring rainfall 5-year return period is increased above the normal chance of occurrence (20%).

Probability of a 5-year return period
Low Spring rainfall (or less) in 2003

Based on Winter 2003 SOI



5. Looking ahead

The average SOI for spring 2003 can be used to predict the probability of low rainfall over summer, if the SOI falls between certain values. The SOI-based forecast for summer rainfall will be issued in December 2003.

6. Communication

The forecast for the Kapiti Coast has been sent to Kapiti Coast District Council. The summer SOI forecast will be distributed to territorial authorities in December.

7. Recommendation

That the Committee receive the report and note its contents.

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