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Hydrological Modelling Dataset

Report 3a: Storage and Spill Series Comparison

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Cover image: Aratiatia Rapids (Samwell Warren, 2019).

PREFACE

A large proportion of New Zealand's electricity needs are met by generation from hydro power. Information about the distribution of inflows and the capability of the various hydro systems is necessary to ensure a reliable, competitive, and efficient market and electricity system.

The hydrological modelling dataset (HMD) is a dataset of hydrological information made available by the Electricity Authority. The dataset was known as the SPECTRA update until 2010. In 2015 the dataset was revised to become the HMD, a comprehensive dataset that can be relied upon by modellers and analysts to test scenarios, provide commentary and inform decisions.

The HMD is comprised of data provided by hydro generators and supplemented with data from other sources. These parties are acknowledged for their contribution and for making this data available.

The HMD consists of three main components:

1. **Infrastructure and hydrological constraint attributes:**
    - This dataset records standing information about the capability of the main hydro schemes.
2. **Flows:**
    - This time series dataset records data for inflows for reservoirs and flows at various existing or potential hydro generating sites.
3. **Storage and spill:**
    a. This time series dataset records storage for the main hydro schemes.

This report describes the differences between the 2022 and 2024 HMD storage and spill series data.

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1 INTRODUCTION

Care is taken to ensure consistency of data between successive HMD updates. A comparison of the storage and spill flows for each series was undertaken and any changes are discussed further in Sections 2, 3 and 4.

2 DATA DIFFERENCES FOR CALCULATED FLOW SITES

Differences between datasets may occur from one update to the next for a variety of reasons. These include: rating changes; data modifications; and various other reasons. Table 2.1 shows if there were any differences in the data between the previous and current update for the storage sites and Table 2.2 shows if there were any differences in the data between the previous and current update for the storage sites. The following sections highlight the reasons for these differences. It should be noted that only differences >0.1 are highlighted.

Table 2.1: Data differences for previous and current updates for storage sites

Storage site name	Data differs
Lake Taupō	NO
Lake Waikaremoana	NO
Lake Ōhau	YES
Lake Tekapo	NO
Lake Pūkaki	NO
Lake Wānaka	YES
Lake Hāwea	NO
Lake Wakatipu	YES
Lake Te Anau	YES
Lake Manapōuri	YES

Table 2.2: Data differences for previous and current updates for spill sites

Lake	Spill site name	Data differs
Lake Waikaremoana	Onepoto	NO
	Waikaretaheke River at Piripaua	NO
	Waikaretaheke River at Upstream Mangaone	NO
Lake Tekapo	Lake Tekapo at Gate 17	NO
	Lake George Scott to Tekapo River	NO
Lake Pūkaki	Lake Pukaki	NO
Lake Ruataniwha	Lake Ruataniwha	NO
Lake Ōhau	Lake Ohau	NO
Lake Benmore	Lake Benmore	NO
Lake Aviemore	Lake Aviemore	NO
Lake Waitaki	Lake Waitaki	NO
Lake Te Anau	Lake Te Anau	YES
Lake Manapōuri	Lake Manapouri	YES
Lake Hāwea	Lake Hawea	NO
Lake Dunstan	Clyde Dam	NO
Lake Roxburgh	Lake Roxburgh	NO
Lake Taupō	Lake Taupo	NO
Lake Aratiatia	Lake Aratiatia	NO
Lake Ōhakuri	Lake Ohakuri	NO
Lake Ātiamuri	Lake Atiamuri	NO
Lake Whakamaru	Lake Whakamaru	NO
Lake Maraetai	Lake Maraetai	NO
Lake Waipapa	Lake Waipapa	YES
Lake Arapuni	Lake Arapuni	YES
Lake Karapiro	Lake Karapiro	NO

3 STORAGE SITES

3.1 LAKE ŌHAU

There are minor differences in the active storage when comparing the data from the previous update (2022) and the data from the current update. These differences are in the magnitude of approximately ±6 Mm^3 and occur due to new data being used this update which overwrites the previous data used.

3.2 LAKE WANAKA

There are minor differences in the active storage. These differences are caused by the new data provided, which has some differences as large as -55.41 Mm^3 but the average does not change (less than a 0.01 Mm^3 difference overall).

3.3 LAKE WAKATIPU

There are minor differences in the active storage. These differences are caused by the new data provided, which has some differences as large as -3.55 Mm^3 but the average does not change (less than a 0.01 Mm^3 difference overall).

3.4 LAKE TE ANAU

There are minor differences in the active storage. These differences are caused by the new data provided, which has some differences as large as -2.55 Mm^3 but the average does not change (less than a 0.01 Mm^3 difference overall).

3.5 LAKE MANAPOURI

There are minor differences in the active storage. These differences are caused by the new data provided, which has some differences as large as -6.01 Mm^3 but the average does not change (less than a 0.01 Mm^3 difference overall).

4 SPILL SITES

4.1 LAKE TE ANAU

Rating changes at this site of resulted in minor differences in the spill flow between the previous update and the current update. The magnitude of these differences is ±0.4 m^3/s.

4.2 LAKE MANAPOURI

Rating changes at this site of resulted in minor differences in the spill flow between the previous update and the current update. The magnitude of these differences is ±1.2 m^3/s.

4.3 LAKE WAIPAPA

A change in raw data for this site from 2009 has resulted in changes in the spill data for this site between the previous update and the current update.

4.4 LAKE ARAPUNI

A change in raw data for this site from 2009 has resulted in changes in the spill data for this site between the previous update and the current update.