

2024-2025 Annual Water Operating Report



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About this Report

Since the Snowy Scheme's completion in 1974, Snowy Hydro Limited has carefully managed the water that flows through the Scheme's dams, tunnels, aqueducts and power stations in accordance with our water licence.

This report outlines how we are managing the water that flows through the Scheme. Snowy Hydro operates a complex hydro-electric scheme utilising the water captured by the Scheme to generate energy to meet the market's needs, while also moving water from east to west to support irrigation districts.

Each year, we have to reach certain targets for downstream and environmental water releases. Snowy Hydro has operational flexibility day-to-day to strategically manage our generation and water releases, while at the same time providing long-term security to the downstream users around annual water releases. In the Snowy Scheme, water releases and electricity generation are inseparably linked.

Snowy Hydro operates under the Snowy Water Licence, issued by the NSW Government. The licence has many legally-binding and enforceable obligations on the company.

Snowy Hydro is obligated under the Snowy Water Licence to:

- → Target water releases to the River Murray and Murrumbidgee River catchments, the annual volumes of which are determined according to highly-prescriptive formulae set out in the Snowy Water Licence;
- → Target water releases from Jindabyne Dam into the Snowy River for environmental purposes (Snowy River Increased Flows); and

→ Facilitate additional natural flows to nominated rivers for environmental purposes (Snowy Montane Rivers Increased Flows).

This report is an important channel to educate and inform our stakeholders about the water operations of the Scheme. While we generate energy from the water that moves through the Scheme, we don't own a drop of it; nor do we sell the water, or charge people to access it.

Snowy Hydro must operate the Snowy Scheme to first meet its water release obligations and then to maximise electricity market opportunities within the constraints imposed by the Snowy Water Licence.

The Snowy Water Licence recognises the difficulties inherent in achieving precise release volumes at each release point, so any shortfall or excess is accounted for and generally dealt with by an 'unders' and 'overs' approach, whereby the shortfall or excess is added or subtracted to the following year's target – i.e. there is no way that Snowy Hydro can consistently 'underdeliver' water to any aspect of the release program.

For more information about the Snowy Water Licence we encourage people to visit the NSW Department of Climate Change, Energy, the Environment and Water at <u>dpie.nsw.gov.au/water/our-work/projects-and-</u> <u>programs/snowy-scheme</u>

2023-2024 Compliance Report

What water went out

Snowy Hydro complied with all of the requirements imposed upon the company under the Snowy Water Licence during the 2023-2024 water year, including each water release target relating to:

- → The Required Annual Release to the River Murray catchment.
- → The Required Annual Release to the Murrumbidgee River catchment.
- → Environmental releases into the Snowy River from Jindabyne Dam.
- → Environmental releases into the Murrumbidgee River from Tantangara Dam.

- → Environmental releases into the Goodradigbee River from Goodradigbee Aqueduct.
- → Environmental releases into the Geehi River from Middle Creek and Strzelecki Creek Aqueducts.
- → Environmental releases into the Snowy River from Bar Ridge, Diggers Ck and Falls Ck Aqueducts.

Western River Releases

River Murray Catchment

Snowy Hydro complied with its obligation to target the Required Annual Release (RAR) from the Snowy-Murray Development to the River Murray catchment during the 2023-2024 water year.

The total accounted release volume was 905 GL. This was made up of:

- → 718 GL being the 2023-2024 RAR calculated under the Snowy Water Licence; plus
- \rightarrow 187 GL of pre-release of the 2024–2025 RAR; plus

→ 0 GL of Discretionary Above Target Water Releases (water not required for RAR releases that Snowy Hydro is able to release at its discretion).

This total accounted release volume includes 19 GL of montane environmental flow releases provided to the Geehi and Swampy Plains River which did not flow through the Scheme's power stations.



Inflows and Releases to the River Murrary Catchment during 2023-24

Murrumbidgee River Catchment

Snowy Hydro complied with its obligation to target the Required Annual Release (RAR) from the Snowy-Tumut Development to the Murrumbidgee River catchment during the 2023-2024 water year.

The total accounted release volume was 1,188 GL. This was made up of:

- → 519 GL being the 2023-2024 RAR calculated under the Snowy Water Licence; plus
- → 200 GL of pre-release of the 2024–2025 RAR; plus

→ 469 GL of Discretionary Above Target Water release (water not required for RAR releases that Snowy Hydro is able to release at its discretion).

This total accounted release volume includes 49 GL of montane environmental flow releases provided to the Murrumbidgee and Goodradigbee Rivers which did not flow through the Scheme's power stations.



Inflows and Releases to the Murrumbidgee Catchment during 2023-24

Environmental Releases

Snowy River Increased Flows

Snowy Hydro complied with its obligation to target releases from Jindabyne Dam for environmental purposes during the 2023-2024 water year.

The volume of Snowy River Increased Flows (SRIF) released from Jindabyne Dam during the 2023-2024 water year was 211.0 GL, which was 1.0 GL under the target volume of 212.1 GL. That deficit is well within the +/-10% annual tolerance around the target volumes allowed under the Snowy Water Licence. The 2024-2025 target has been adjusted up to account for this release deficit.

In addition to the environmental releases, 8.5 GL Base Passing Flow (BPF) was also released from Jindabyne Dam and 0.5 GL riparian flow was released from the Mowamba Weir.

All daily and monthly releases were within the +/-20% tolerance allowed under the Snowy Water Licence.

Even though allocations for the 2022–23 water year exceeded 100 GL, a flushing flow was not scheduled for the Snowy River.

Releases were reduced on 1 December 2023 at the request of NSW Government to assist with potential downstream flood risks. The flow was below the daily target and outside the permissible +/- 20% tolerance, but this was not deemed a breach of licence conditions. The reduced volume of 167 ML is included in over/s and unders to roll into the next Water Year.

The comparison of the annual, monthly and daily release targets for the Snowy River Increased Flow releases against the actual releases is shown in the following charts.





Snowy River Increased Flows (SRIF) and Jindabyne Base Passing Flow (BPF) releases including Mowamba riparian releases

Snowy River Increased Flows (SRIF) and Jindabyne Base Passing Flow (BPF) releases and daily limits



The Temperature of Releases from Lake Jindabyne

The Snowy Water Licence requires the outlet works at Jindabyne Dam to be capable of releasing water from above any thermocline in the reservoir. The thermocline is a thin, but distinct, layer in a large body of water in which water temperature changes more rapidly with depth than it does in the layers above or below. Typically, as the summer progresses, the surface waters warm and the deeper waters remain cold. This causes a lack of mixing between the upper and lower layers, which can result in the lower layer having reduced oxygen levels. For these reasons, the deeper waters within reservoirs are generally viewed as having undesirable water quality characteristics for releases, hence the requirement for the outlet works to be able to draw water from above the thermocline. The intake works at Jindabyne are located at the end of a channel excavated into the bank of Lake Jindabyne. In addition to the variable level shutters in the intake tower, the level of the base of the channel means that the deeper waters of the reservoir are inaccessible. This means that the thermocline is only likely to be above the levels of the intake channel when the lake is at much higher levels.

Snowy Hydro undertakes temperature monitoring at the intake tower to detect the presence of a thermocline and adjusts shutter height as necessary. As can be seen in the chart below, all releases were made from above the thermocline.



Jindabyne Dam Intake Water Temperatures and Level (May 2023 to April 2024)

Snowy Montane Rivers Increased Flows

Snowy Hydro complied with its obligation to target Snowy Montane Rivers releases for environmental purposes during the 2023-2024 water year.

During the 2023-2024 water year, Snowy Hydro was directed to make Snowy Montane Rivers Increased Flows (SMRIF) from the following locations:

- → Tantangara Dam to the Murrumbidgee River,
- → Goodradigbee Aqueduct to the Goodradigbee River (a tributary of the Murrumbidgee River),
- → Middle Creek Aqueduct to Middle Creek and Strzelecki Creek Intake (on the Geehi River Aqueduct) to Strzelecki Creek (tributaries of the Geehi River),
- → Diggers Creek Aqueduct to Diggers Creek and Bar Ridge Aqueduct to Tolbar Creek (tributaries of the Snowy River below Island Bend Dam), and
- → Falls Creek to the Snowy River below Guthega Dam.

The target volume for SMRIF totalled 93.2 GL, with 41.2 GL from Tantangara Dam, 7.0 GL from Goodradigbee Aqueduct, 22.7 GL from Middle Creek and Strzelecki Ck, 9.4 GL from Diggers Creek and 9.5 GL from Bar Ridge Aqueduct and 3.4 GL from Falls Creek, all to be targeted over the whole water year.

The total actual montane release volume was 85.0 GL. This was made up of 41.3 GL from Tantangara Dam, 7.6 GL from Goodradigbee Aqueduct, 18.8 GL from Middle Creek Aqueduct and Strzelecki Ck combined, 7.6 GL from Diggers Creek Aqueduct and 6.9 GL from Bar Ridge Aqueduct and 2.8 GL from Falls Creek, released over the whole water year.

The comparison of the annual, monthly and daily

release targets for the SMRIF against the actual release from Tantangara Dam is set out in the graphs opposite. All daily, monthly and annual release targets were within the compliance limits.

Releases from Tantangara Dam were reduced on 26 March 2024 at the request of NSW Government to assist with potential downstream water quality risks. While the release was below the original daily target, it remained within the permissible 50 GL tolerance under the Snowy Water Licence.

Monthly releases from Goodradigbee, Middle Creek, Strzelecki Creek, Diggers Creek and falls Creek are also provided on the following pages. As these releases are made from small catchments and the inflows (and therefore releases) cannot be predicted or controlled, there are no annual compliance targets for these releases. The above/below target delivery of water in these catchments in 2023-2024 reflects the inflows received in these locations. In years when inflows are above average, above average volumes of water will be delivered to these catchments, and vice versa.



Snowy Montane Increased Flows (SMRIF) and Riparian Releases from Tantangara Dam

Snowy Montane Increased Flows from Tantangara Dam and daily limits





Snowy Montane Increased Flows from Diggers Creek Aqueduct

Note: There are no monthly or annual compliance targets for Diggers Creek.

Snowy Montane Increased Flows from Falls Creek Aqueduct



Note: There are no monthly or annual compliance targets for Falls Creek.



Snowy Montane Increased Flows from Goodradigbee Weir

Note: There are no monthly or annual compliance targets for Goodradigbee.

Snowy Montane Increased Flows (SMRIF) from Bar Ridge Aqueduct



Note: There are no monthly or annual compliance targets for Bar Ridge.



Snowy Montane Increased Flows (SMRIF) from Middle Creek Aqueduct

Note: There are no monthly or annual compliance targets for Middle Creek.

Snowy Montane Increased Flows from Strzelecki Creek Aqueduct



Note: There are no monthly or annual compliance targets for Strzelecki Creek.

The Temperature of Releases from Tantangara Reservoir

The Snowy Water Licence requires the outlet works at Tantangara Dam to be capable of releasing water from above any thermocline in the reservoir.

The thermocline is a thin, but distinct, layer in a large body of water in which temperature changes more rapidly with depth than it does in the layers above or below. Typically, as the summer progresses, the surface waters warm and the deeper waters remain cold. This causes a lack of mixing between the upper and lower layers, which often results in the lower layer having reduced oxygen levels. For these reasons, the deeper waters within reservoirs are generally viewed as having undesirable water quality characteristics for releases, hence the requirement for the outlet works to be able to draw water from above the thermocline.

The new intake works at Tantangara Dam are located on the upstream face of the dam wall. They comprise a series of 'telescoping' shutters to create a variable level off-take. Snowy Hydro undertakes temperature monitoring at the intake tower to detect the presence of a thermocline and adjusts the shutter height as necessary. As can be seen in the chart below, releases were made from above the thermocline for most of the Water Year. At the request of the NSW Government, Snowy Hydro lowered the shutters on 27 March 2024 to allow releases to be made from predominantly below the surface horizon until the end of the Water Year. These actions were requested to mitigate downstream water quality risks associated with a natural blue-green algal bloom in Tantangara Reservoir.



Tantangara Dam Intake Water Temperatures and Level

2024-2025 Operating Plan

Summary of Obligations

Snowy Hydro will operate the Snowy Scheme to target the requirements imposed upon the company under the Snowy Water Licence during the 2024-2025 water year, including each water release target relating to:

- → The Guaranteed Minimum Water Release to the River Murray and Murrumbidgee River catchments.
- → The expected Required Annual Release to the River Murray and Murrumbidgee River catchments.
- → Environmental releases into the Snowy River from Jindabyne Dam.
- → Environmental releases into the Murrumbidgee River from Tantangara Dam.
- → Environmental releases into the Goodradigbee River from Goodradigbee Aqueduct.

- → Environmental releases into the Geehi River from Middle Creek and Strzelecki Creek Aqueducts.
- → Environmental releases into the Snowy River from Bar Ridge, Diggers Ck and Falls Ck Aqueducts.

This report will also contain:

- → Any agreements by the Water Consultation and Liaison Committee regarding matters relevant to the Annual Water Operating Plan; and
- → Other information with respect to water releases and diversions Snowy Hydro and/or the Ministerial Corporation see fit.

Western River Releases

River Murray Catchment

Snowy Hydro will guarantee a minimum water release from the Snowy-Murray Development to the River Murray of 662 GL, on the basis of pre-release volumes, water available in storage at the start of the water year and the maximum relaxation volume occurring throughout the year.

The expected Required Annual Release is 737 GL. This volume can increase or decrease through the year based on numerous factors set out in the Snowy Water Licence, particularly the Dry Inflow Sequence Volume under dry conditions and Relaxation Volumes under wet conditions.

The Required Annual Release is expected to include 19 GL of montane environmental flow releases provided to the Geehi and Swampy Plains River without flowing through the Scheme's power stations.

Snowy Hydro will closely monitor inflows and will provide monthly advice to water authorities regarding the Dry Inflow Sequence Volume and the extent of the possible reduction in the Required Annual Release.

Murrumbidgee River Catchment

Snowy Hydro will guarantee a minimum water release from the Snowy-Tumut Development to the Murrumbidgee River of 671 GL, on the basis of prerelease volumes, water available in storage at the start of the water year and the maximum relaxation volume occurring throughout the year.

The expected Required Annual Release is 697 GL. This volume can increase or decrease through the year based on numerous factors set out in the Snowy Water Licence. The Required Annual Release is expected to include 42 GL of montane environmental flow releases provided to the Murrumbidgee and Goodradigbee Rivers without flowing through the Scheme's power stations.

Snowy Hydro will closely monitor inflows and will provide monthly advice to water authorities regarding the Dry Inflow Sequence Volume and the extent of the possible reduction in the Required Annual Release.



Environmental Releases

Snowy River Increased Flows

Snowy Hydro will target the daily, monthly and annual release targets from Jindabyne Dam, as developed and prescribed by the NSW Government. The volume of Snowy River Increased Flows (SRIF) apportioned to be released from Jindabyne Dam of 197.5 GL was increased by the under release from last Water Year of 1.0 GL to ensure the Snowy River does not receive more or less than allocated by NSW Government in the long term. In addition to the environmental releases, 8.5 GL Base Passing Flow (BPF) will be released from Jindabyne Dam and 0.5 GL riparian flow from the Mowamba Weir. Total releases from Jindabyne Dam will therefore be 196.5+1.0+8.5 = 206.0 GL.

Although allocations for the 2024-2025 water year are greater than 100 GL, NSW Government has not directed Snowy Hydro to operate Jindabyne Dam to target a flushing flow delivery in 2024-2025. However, it has notified that it wishes to hold discussions with Snowy Hydro around August 2024 to determine if conditions allow for an opportunistic release from the Jindabyne Dam spillway in October. NSW Government, working with representatives across local, state and Commonwealth Government agencies, will be responsible for the advice to downstream landholders and other stakeholders that would be impacted by the increased Snowy River levels if an opportunistic flushing flow is requested.

Snowy Hydro is working with the NSW Government who have requested the delivery of four "trigger flows" from Jindabyne Dam during the 2024-2025 water year. This trial will allow the minor flow peaks of the months of May and July 2024 and March and April 2025 to be released following a natural flow cue to maximise environmental outcomes for river health and support water-dependent plants and animals including native fish. A trial allowing flows to be adjusted during drier periods in early 2025 is also being planned to reduce the risk of the mouth of the Snowy River closing.

The annual, monthly and daily release targets for the Snowy River Increased Flow releases are shown in the following table and charts. More details on the NSW Government's SRIF program can be found at water.dpie.nsw.gov.au.



Jindabyne Dam Monthly Release Targets



Jindabyne Dam Daily Release Targets

Jindabyne Dam Release Targets including 8-hour Peak Flow Targets



Snowy Montane Rivers Increased Flows

Snowy Hydro will target the daily, monthly and annual release targets from Tantangara Dam, and the annual targets for Goodradigbee, Middle Creek, Strzelecki Creek, Bar Ridge, Diggers Creek and Falls Creek Aqueducts, as developed and prescribed by NSW Government for the 2024-2025 water year.

The apportionment volume for SMRIF totaled 87.1 GL, with 35.1 GL from Tantangara Dam, 7.0 GL from Goodradigbee Aqueduct, 22.7 GL from Middle Creek and Strzelecki Ck, 18.9 GL from Bar Ridge and Diggers Creek Aqueducts and 3.4 GL from Falls Creek, all to be targeted over the whole water year.

The adjusted annual target volume for releases from Tantangara Dam is 35.0 GL after being reduced by 0.1 GL of over release from last Water Year.

Snowy Hydro is working with the NSW Government who have requested the delivery of two "trigger flows" from Tantangara Dam during the 2024-2025 water year. This trial will allow the minor flow peaks of the months of June 2024 and April 2025 to be released following a natural flow cue to maximise environmental outcomes.



Monthly Release Targets for Snowy Montane Rivers Increased Flows From Tantangara Dam



Daily Release Targets for Snowy Montane Rivers Increased Flows From Tantangara Dam



snowy hydro