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Department of Planning and Environment

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# Snowy Montane Rivers Increased Flows: Safety Management Plan 2022-2027

WINTER-SPRING HIGH FLOW RELEASES INTO THE UPPER MURRUMBIDGEE RIVER  
BELOW TANTANGARA DAM

May 2022





# Acknowledgement of Country

The Department of Planning and Environment acknowledges that it stands on Aboriginal land. We acknowledge the Traditional Custodians of the land and we show our respect for Elders past, present and emerging through thoughtful and collaborative approaches to our work, seeking to demonstrate our ongoing commitment to providing places in which Aboriginal people are included socially, culturally and economically.

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Snowy Montane Rivers Increased Flows: Safety Management Plan 2022-2027

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# 1. Introduction

The Snowy Water Initiative (SWI) was formally established in 2002 to significantly improve river health by releasing environmental water into the Snowy, upper Murrumbidgee and upper Murray river systems. Embodied in the *Snowy Water Inquiry Outcomes Implementation Deed 2002* (SWIOID 2002), the SWI is an agreement for water recovery and environmental flows between the NSW, Victorian and Australian governments (the partner governments) and Snowy Hydro Limited (SHL). The NSW Government is responsible for the implementation of the SWI.

The SWIOID 2002 also provides for environmental releases into a number of higher altitude (montane) rivers whose flows are significantly affected by the operation of the Snowy Scheme known as the Snowy Montane Rivers Increased Flows (SMRIF). The environmental water is released from small weirs as a passing flow, or as managed releases from Tantangara Dam. The NSW Government is responsible for determining the annual volumes and release strategy of these environmental flows.

## 1.1. Purpose of environmental releases

Since the completion of Tantangara Dam in 1960, the upper Murrumbidgee River hydrology has been significantly altered, reducing flows to about 1% of natural flows. The reduction of flows has resulted in loss of aquatic habitat and severe sedimentation of the riverbed, including infilling of riffles, pools and connected ponds and the smothering of aquatic plants.

The build-up of sediment in the upper Murrumbidgee riverbed has been recognised as one of the key limitations for the recovery of the health of the river as this reduces the quality of river habitat and directly impacts on water dependent plants and animals including native fish, frogs and platypus.

To address the effects of river regulation, since 2005 environmental water has been released into the upper Murrumbidgee from Tantangara Dam. Higher planned releases tend to be during the winter and spring months to reflect the natural hydrology of a mixed rainfall and snowmelt river. The releases encourage movement of fine sediment and inundation of lower lying connected ponds to provide habitat for water dependant species.

## 1.2. Purpose of this plan

The Safety Management Plan (the SMP) has been prepared by the Department of Planning and Environment (the department), including the Water (DPE-Water) and Environment and Heritage (DPE EHG) divisions.

This SMP details the anticipated risks associated with 'high flow' environmental releases, and outlines the actions and processes required to be undertaken by DPE-Water, DPE-EHG, SHL and other key stakeholders to mitigate or manage these risks.

Although not required by legislation, the Plan is prepared to be consistent with the SMP for the Snowy River Increased Flows program. The Snowy River SMP as a legislated requirement of the Snowy Water Licence and the SWIOID 2002. The legislation requires that an SMP be developed to address risks to public safety, third-party property, and workplace health and

safety in connection with the release of ‘flushing flows’, which are defined as a daily release greater than 5,000 megalitres per day (ML/day).<sup>1</sup>

The department takes a more conservative approach to safety and this SMP addresses all environmental releases from Tantangara Dam over 1,000 ML/day<sup>2</sup>, termed ‘high flow events’. This is the flow threshold above which inundation or inconvenience may occur to some landholders.

The objectives of the SMP are to ensure that these risks are appropriately minimised by:

- Maintaining stakeholder relationships where there is an interest in public safety along the Upper Murrumbidgee River.
- Promoting public awareness of all potential risks associated with the high flow releases into the upper Murrumbidgee River catchment from below Tantangara Dam.
- Issuing of community information and warnings during high flow events
- Working with Snowy Hydro Limited and other relevant stakeholders (including the State Emergency Service, Councils, and Bureau of Meteorology) before and during high flow events to mitigate, as far as possible, any detrimental impacts.

### 1.3. Scope of this plan

Flows from Tantangara Dam into the Upper Murrumbidgee River may be a result of the following:

1. Planned Snowy Montane Rivers Increased Flow (SMRIF) releases – These are the releases as set out in the annual SMRIF Operations Plan published on the DPE-Water website.
2. Modified planned SMRIF releases – These are modifications to the dates or volumes of the planned SMRIF releases as a result of climatic, environmental or other unforeseen circumstances that may arise closer to the time of the planned SMRIF release.
3. Unplanned SMRIF releases – These are releases made by Snowy Hydro Limited (SHL), in consultation with the department, to urgently manage storage levels in Tantangara Dam, but which are determined to be accounted as SMRIF.
4. Unplanned storage releases – These are releases such as those made by SHL in order to manage the volume of water held in nearby Lake Jindabyne, including to avoid uncontrolled spills. These are not accounted as SMRIF, but where possible may be released in consideration of environmental outcomes.
5. Uncontrolled spills – These are spills over the dam spillway when the volume of Tantangara Dam exceeds the storage capacity of the dam.

This SMP covers the safe management of high-flow (1) planned and (2) modified planned SMRIF releases, including public communications.

SHL is responsible for the safe management of (3) unplanned SMRIF releases, (4) unplanned storage releases and (5) uncontrolled spills, including public communications, and as such these are not covered by this SMP.

The SMP covers a 5 year period from May 2022 to April 2027

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<sup>1</sup> This is the flow rate above which spillway releases are required. Releases less than 5000 ML/d can be made from the Jindabyne dam cone valves.

<sup>2</sup> This flow threshold is based on current knowledge. When this SMP is reviewed annually for currency, the department will consider whether this threshold remains appropriate, subject to any improved understanding of the impacts of various flow rates.



## 1.4. Structure of this plan

This Plan outlines the risks and mitigation measures associated with all planned high flow environmental releases. It details the processes to be undertaken in managing safety.

The planned release strategy for each water year is referenced in Appendix E and is available on the department's website.

## 1.5. Policy and legislative context and responsibilities

The release of SMRIF is governed by the following key acts and agreements:

- Snowy Water Inquiry Outcomes Implementation Deed 2002 (SWIOID)
- Snowy Hydro Corporatisation Act 1997.
- Workplace Health and Safety Act 2011

SHL maintains responsibility for all planned and unplanned releases and any other actions required by all other legislation, with regards to public safety, damage to third party property and occupational health and safety.

It is acknowledged that other stakeholders also have responsibilities and roles in identifying risks associated with the higher flows and implementing actions that will reduce the risks down to an acceptable level.

## 1.6. Stakeholders

High flow events have the potential to impact a wide range of stakeholders. Stakeholder interests are reflected in designing the SMRIF release regime, through the Snowy Advisory Committee. Key stakeholder groups that are affected by, or involved in, safety management are included in the Snowy Safety Technical Advisory Group (SSTAG). The SSTAG is responsible for assessing and reviewing the adequacy of safety management arrangements for all planned high-flow environmental releases.

## 1.7. Review of Safety Management Plan

This SMP is current for the 5 year period from May 2022 to April 2027. The department will review the SMP for currency prior to the commencement of planned high-flow environmental water releases each year. Any required amendments would be made as a revision to this document.

The annual Snowy Montane Rivers Increased Flow Operations Plan is developed and published annually. See **Appendix E**.

## 2. Risk assessment

The department, in collaboration with stakeholders, has analysed the anticipated risks to public safety, property and work healthy and safety, associated with planned environmental high flow releases and flushing flows. The department has also assessed the significance of the potential consequences for each associated risk, as well as the probability of that risk being realised. A detailed table of risks is provided in **Appendix A**.

The table also includes proposed control measures required to mitigate or reduce the risks. These measures have been developed into the safety management processes outlined in **Section 3**.

### 2.1. Stakeholders

The department has taken reasonable steps to identify stakeholders likely to be affected by the releases, or who may be able to assist in ensuring the safety of staff, the public and property during the releases. These include:

- landholders along the upper Murrumbidgee River
- local businesses within the upper Murrumbidgee region
- members of the general public
- recreational fishing and water user groups
- community interest groups
- recreational campers/hikers and tourists
- Bureau of Meteorology
- Snowy Monaro Regional Council
- NSW State Emergency Service
- Local Land Services
- NSW National Parks and Wildlife Service
- NSW Roads and Maritime Services
- WaterNSW
- Snowy Hydro Limited
- Snowy Advisory Committee.
- The National Trail

The department recognises that effective management of the risks that could arise from the releases requires the support and coordination of many stakeholders. Effective working relationships with stakeholders must be maintained to ensure the high-flow events occur safely.

### 2.2. River levels at various flow release rates

In determining risks, the department has considered the impact of different flow release rates on river heights at selected key points along the length of the river. **Table 2-1** provides an indication of estimated gauge heights for various flow release rates, based on previously recorded flow events at various discharge rates or gives pre-determined flood classifications. The values do not account for external climatic influences or antecedent catchment conditions.

Table 2--1 Consequences – important river heights and flows

Location	Gauge Height	Release Flow Rate	Comment
Yaouk No. 2 WaterNSW Gauge	<0.71m	<30ML/d (Minimum SMRIF)	Normal Flow (no response required)
	1.15m	1000ML/d	Water NSW Rating Table
	1.22m	1,250ML/d	Water NSW Rating Table
	1.29m	1,500ML/d	Water NSW Rating Table
Mittagang WaterNSW gauge	<0.50m	<30ML/d (Minimum SMRIF)	Normal Flow (no response required)
	0.90m	1000ML/d	Water NSW Rating Table
	1.02m	1,250ML/d	Water NSW Rating Table
	1.11m	1,500ML/d	Water NSW Rating Table
Billilingra WaterNSW Gauge	<1.05m	<30ML/d (Minimum SMRIF)	Normal Flow (no response required)
	1.48m	1,000ML/d	(recorded 9 July 2021)
	1.67m	1,250ML/d	(recorded 26 August 2021)
	1.57m	1,500ML/d	(recorded 23 September 2021)
Lobbs Hole BoM Gauge	<2.14	<30ML/d (Minimum SMRIF)	Normal Flow (no response required)
	2.78m	1,500ML/d	(recorded 24 September)
	4.5m		Minor Flood Level
	11.00m		Moderate Flood Level
	13.00m		Major Flood Level



## 2.3. Travel times

In determining risks, the department has also considered the time taken for a flow release to travel down the river. Travel times can vary significantly from one flow event to another and can be influenced by rainfall patterns, existing antecedent catchment conditions, depth of flow and channel storage effects. If the ground is already wet, travel times are often reduced. Travel times also reduce as flow increases in the natural channel due to the declining influence of within-channel vegetation and obstructions.

In the event of floods, large volumes of water extending outside the main channel have a dampening effect on peak flows and slow the travel time

The best estimates are often based on similar historical events. Approximate travel times for flow releases between key locations along the Upper Murrumbidgee River are provided in Error! Reference source not found..

Table 2--2. Approximate travel times for high flow events for the Snowy River

Reach	Distance (km)	Travel time (hours) for initial rise in flow rate	Travel time (hours) for peak of event
Tantangara Dam to Yaouk Gauge	38	9 hours	16 hours
Tantangara Dam to Mittagang Gauge	116	27 hours	48 hours
Tantangara Dam to Billilingra Gauge (Bredbo)	147	40 hours	64 hours
Tantangara Dam to Lobbs Hole Gauge	210	41 hours	72 hours

*Note: Flow times may be less than nominated. Distances based on GIS measurements from aerial photography.*



Figure 2--1. The Murrumbidgee River catchment and the location of hydrometric stations in NSW that are used to estimate water travel times. (Source: DPE – EHG: Annual plan for the Snowy and montane rivers increased flows 2022–23)

## 2.4. Impact of climatic and catchment conditions on risk

Climatic and catchment conditions can add to or increase the extent of risks associated with flow releases. For example, inflows from tributaries below the dam wall may result in the river rising before or during a high-flow release, such that the release may contribute to increased flooding risk. Mitigation for this risk has been considered included in the safety procedures outlined in the next section.

High rainfall events that extend over the catchment area can lead to increases in the dam storage levels, resulting in an uncontrolled spill. Safety management of spills or unplanned releases to manage dam storage levels are the responsibility of SHL and are not covered by this SMP. However, in some instances a planned environmental release may be brought forward to reduce the risk of uncontrolled spill.

# 3. Roles and responsibilities in managing risks

The following procedures and protocols have been developed to mitigate the risks tabled in Appendix A-1.

## 3.1. Department of Planning and Environment responsibilities for safety management

The department is responsible for overall management of the safety of planned high releases. The department’s Chief Operating Officer has overarching responsibility for relevant decision making, including instructing SHL to make, amend or cease environmental flow releases. Should the Chief Operating Officer be unavailable, decision making is delegated to the Director Asset Management and Performance. Responsibilities within the department are depicted in Figure 2-2.

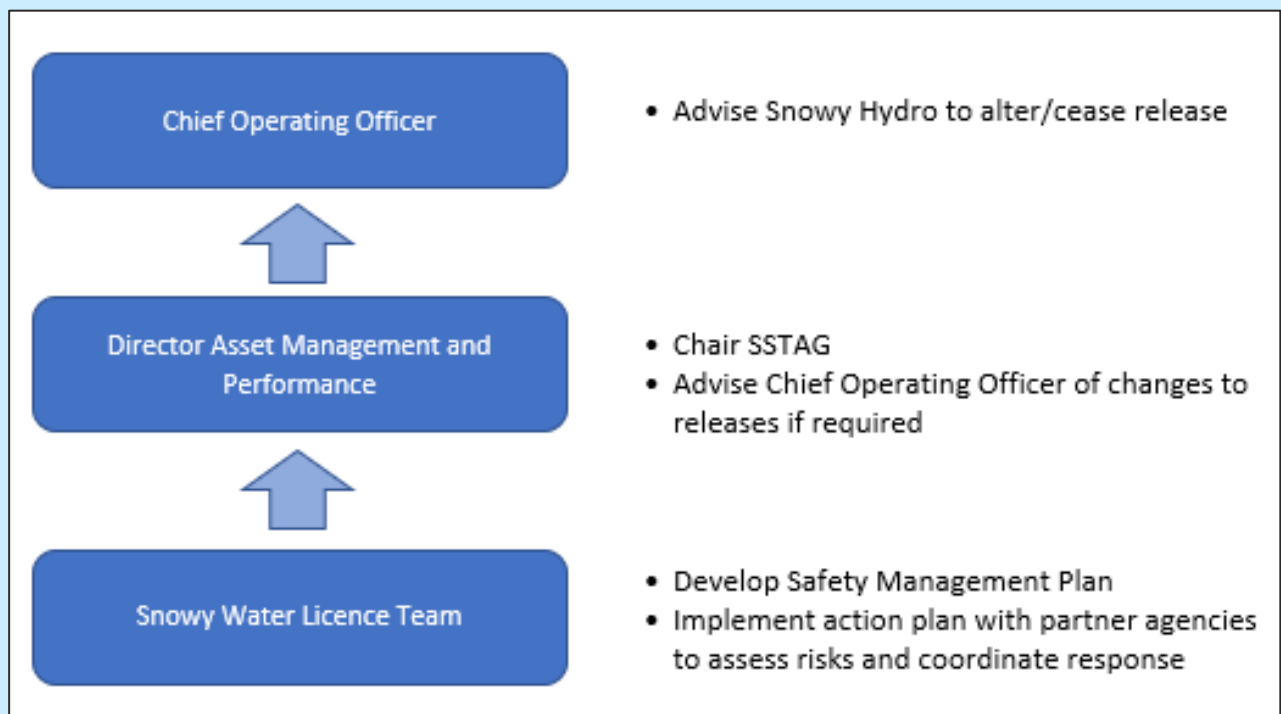


Figure 3--1 SMRIF Safety management framework within Department of Planning and Environment

### Coordination responsibilities

The department is responsible for coordination, including:

- Liaising between DPE-EHG and SHL in relation to SMRIF volumes and release patterns.
- Provide timely advice to SHL to commence, amend or cease dam releases.

- Chairing, coordinating and secretariat support to the SSTAG. DPE internal technical staff will also provide advice to the SSTAG on an as needs basis in an advisory capacity.
- Coordinating, informing and delegating to stakeholders and the responsible agencies, such as DPE-EHG, SHL, the State Emergency Service (SES), the Bureau of Meteorology (BoM), National Parks and local councils, for the management of risks.
- Alerting relevant emergency services during a flow release to activate emergency arrangements, if required. In the event of major floods or an impending disaster, legislated NSW emergency management arrangements will be activated. This would include emergency response agencies taking responsibility for provision of community safety and emergency messaging through established systems.

## Stakeholder communication responsibilities

The department recognises that effective management of the risks requires the support and coordination of many stakeholders. Effective working relationships with stakeholders must be maintained to ensure the high-flow events occur safely.

The department is responsible for coordinating communication to stakeholders and the public in relation to planned high flow releases. The department has developed an internal Communication and Engagement Plan to ensure proactive messaging to all stakeholders regarding high and flushing flow releases. The department will ensure community engagement and key messaging on the safety impacts of the releases and its related events is undertaken and continually improved.

The department currently provides information to stakeholders, downstream residents, and the community in a range of ways or channels in relation to high and flushing flow releases, including through:

- Publishing this SMP and SMRIF Operations Plan on the DPE Water website
- Up to date web-based information and frequently asked questions regarding high-flow events
- Direct communication with downstream landholders and stakeholders prior to a release (for example, via targeted mailing lists and SMS). An up-to-date list of immediate downstream residents of Tantangara Dam is maintained by Corporate Communications.
- Advice and provision of information to emergency services, local councils, National Parks, and other partner agencies who may then enact their own communication arrangements.
- Issuing of media releases and rising river alerts, including tweets.
- Availability of information on the DPE Water website.
- The department will be a voice on safety communication to the community during a high-flow event. In the event of an escalating flooding situation the department will hand over and assist the relevant emergency service agency.

A detailed list of communication actions and responsibilities is provided in **Appendix B**.

## 3.2. Responsibilities of the Snowy Safety Technical Advisory Group (SSTAG)

The Snowy Safety Technical Advisory Group (SSTAG) was established in 2021 to be responsible for assessing and reviewing the adequacy of safety management arrangements for all planned environmental high flow releases. The SSTAG consists of technical experts that provide the department with timely advice and information to make informed decisions regarding proceeding with, or the need to alter the timing, of environmental flow releases. The SSTAG has an advisory role, with final decision making, policy direction or delegating additional work to be carried out by the department.

An internal Terms of Reference is in place for the SSTAG.

### Composition of the SSTAG

The SSTAG includes organisations with knowledge and expertise relevant to management the safety of environmental flow releases. The composition is flexible and may change subject to the expertise required, however it generally comprises representatives from various Federal, State and Local Government departments / authorities / corporations and Snowy Hydro Ltd. Current membership includes representatives from:

- Department of Planning and Environment (DPE-Water)
- Department of Planning and Environment (DPE-EHG)
- Bureau of Meteorology (BoM) - Melbourne
- Snowy Hydro Limited (SHL)
- NSW National Parks and Wildlife
- NSW State Emergency Service - Region / Local Controller or nominee
- Victoria State Emergency Service - Region / Local SES Controller or nominee
- East Gippsland Catchment Authority
- Water NSW
- Snowy Monaro Council
- East Gippsland Shire Council

### Roles of key SSTAG members

The roles of key SSTAG members in relation to managing safety risks of environmental releases are summarised in **Table 3-1**

Table 3-1. SSTAG roles and responsibilities

Agency	Role
DPE-EHG	<ul style="list-style-type: none"> <li>• Development of Snowy Montane Rivers Increased Flow (SMRIF) release pattern</li> <li>• Provide technical advice as required</li> <li>• Work with Snowy Advisory Committee to ensure they consider risks in planning future SMRIF release patterns</li> <li>• Contact impacted stakeholders</li> </ul>

BoM	<ul style="list-style-type: none"> <li>• Provide weather forecasts</li> <li>• Provide technical advice as required</li> <li>• Undertake modelling of rainfall events and impacts on river flows / planned releases</li> <li>• Issues flood watch and warnings</li> </ul>
NSW SES	<ul style="list-style-type: none"> <li>• Provide technical advice as required</li> <li>• NSW SES is the legislated Combat Agency for floods and is responsible for the control of flood operations. NSW SES work with the Bureau and Councils to develop warning systems.</li> <li>• Responsible for flood consequence management</li> <li>• Advise on flood risks</li> </ul>
Snowy Hydro Limited	<ul style="list-style-type: none"> <li>• Provide technical information to the department's project team as required.</li> <li>• Operate infrastructure to make releases to the Snowy River.</li> <li>• Cease / alter releases (from this planned) when directed by DPIE Water</li> </ul>
Snowy Monaro Council	<ul style="list-style-type: none"> <li>• Provide technical information to the department's project team as required.</li> <li>• Assist in providing up to date contact details for downstream landholders</li> <li>• Advise on flood risks</li> <li>• Assist with community engagement</li> </ul>
NSW National Parks and Wildlife Service	<ul style="list-style-type: none"> <li>• Advise on flood risks within NPWS estate</li> <li>• Install signage to alert park users including campers in camping areas</li> <li>• Erect road closed signs as required</li> </ul>



# 4. Process of managing risks

The following sections out the process to be followed prior to and during high flows releases. The estimated timeframes are indicative only and may be subject to change as a result of factors such as unexpected climatic conditions, ongoing stakeholder consultation, ongoing licence review considerations, etc.

## 4.1. Start of the water year

### SMRIF planning

Prior to the start of the water year (1 May), the design of the SMRIF release pattern is undertaken by DPE-EHG in consultation with the Snowy Advisory Committee and SHL. The design considers environmental, safety, available water allocation and operational requirements.

**It is important to note that the annual release plan may change throughout the year due to climatic and other environmental conditions.**

### Safety planning

Once the SMRIF release has been determined the SSTAG may convene<sup>3</sup> to

- Discuss the planned releases for the upcoming water year.
- Review the Safety Management Plan.
- Review any new data on flow releases and water levels acquired from the previous water year.
- Determine any risks associated with the planned timing, duration, and size of planned SMRIF releases.
- Determine any risk mitigation measures that may be required for the upcoming water year.

The process of SSTAG involvement is summarised in **Appendix C**.

### Public communications

A key strategy for mitigating many of the risks identified in **Appendix A** is ensuring effective and timely stakeholder communication. At the start of the water year, the following communications activities are undertaken:

- The internal Stakeholder and Community Engagement Plan is reviewed for currency by the department's Communications team.
- The Safety Management Plan, as published on the on the department's website, will be reviewed for currency and any amendments will be made throughout the water year as required.

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<sup>3</sup> Meetings may be undertaken in person, virtually or as group emails.

- The contact lists for downstream landholders and key stakeholders is reviewed for currency by the department’s Communications team as per the process set out in the Communications and Stakeholder Engagement Plan.
- The Annual SMRIF Operations Plan is published on the DPE-Water website.
- The Annual SMRIF Operations plan is discussed with the SSTAG and other relevant stakeholder agencies and comments are sought.
- An overview list of the dates of planned high flows is published on the department’s website.
- A media release providing an overview of the high flow water releases is issued to all relevant media outlets and published on the department’s website.
- FAQs on the SMRIF release plan are published on the department’s website, emailed directly to downstream landholders and interested parties on the department’s contact list and shared directly with relevant stakeholder agencies as required.

Details of communications task and responsibilities are summarised in **Appendix B**.

## 4.2. Approximately 4 to 6 weeks before planned high-flow releases commence

Approximately 4 to 6 weeks prior to the commencement of the planned high-flow events, the department’s Communications team contact (via email or similar) downstream landholders and key stakeholders (as identified on the department’s contact list), coinciding with the issuing of the ‘overview’ media release and updates to the department’s website with information on the planned high-flow environmental water releases for the upcoming water year. In some cases this timeframe may be reduced, however; the department intends to provide the maximum notice period possible for the circumstances.

## 4.3. Approximately 1 week before planned release

### Notify BoM and review weather

During the week leading up to a release, the department notifies the Bureau of Meteorology (BoM) flood desk, and together reviews the likelihood of weather events or climatic triggers during the planned release. If the BoM advises of a climatic risk then additional action is required, as detailed in **Table 4-1**.

Table 4-1-: Potential climatic risk triggers and actions required

Climatic risk	DPE Water action required
Flood Watch issued for any part of the catchment	<ul style="list-style-type: none"> <li>• discuss probability of flooding with the BoM and possible impacts</li> <li>• advise stakeholders and SSTAG that the release may be reviewed</li> </ul>
Severe weather warning	<ul style="list-style-type: none"> <li>• discuss probability of flooding with the BoM and possible impacts</li> <li>• if there is a risk of flooding, advise stakeholders and SSTAG that the release may be reviewed</li> </ul>

Flood warning	<ul style="list-style-type: none"> <li>• discuss extent of predicted flooding with the BoM and probable impacts</li> <li>• discuss risk with SSTAG members</li> <li>• make recommendation regarding release</li> </ul>
Weather event without warning	<ul style="list-style-type: none"> <li>• discuss probability of flooding with the BoM and possible impacts</li> <li>• if there is a risk of flooding take action as required</li> </ul>

A climate risk trigger will not always result in a change to the release flows, but act to create a pause to ensure that the release would not create an unacceptable level of risk.

Triggers that will result in high risk to public safety or disruption to services, such as transport routes, will be assessed prior to continuing the SMRIF release. The SSTAG members will provide this level of technical advice, within their area of expertise, and mitigating actions will be taken if necessary.

## BoM flood forecasting

The BoM also uses a rainfall runoff model (URBS) for flood forecasting in the Upper Murrumbidgee River catchment. The BoM undertakes this modelling, using the inputs of the planned release flow rates and observed or forecast rainfall to calculate likely flood levels at key downstream locations.

## Review by SSTAG

The SSTAG reviews the planned releases, along with the BoM’s weather predictions, climatic risks and flood forecasting. The SSTAG considers risks by:

- Reviewing estimated travel times listed in **Table 2-2**
- Comparing forecasted flood levels to the documented levels in **Table 2-1**
- Reviewing the risk and mitigation measures table in **Appendix A**
- Using local knowledge or agency intelligence records to relate the forecasted data to local impacts, such as inundation to property, access routes, roads, etc.
- Using local knowledge of upcoming events that may be impacted
- Or any other appropriate means

If a potential risk is identified, a SSTAG meeting will be convened for the purpose of seeking advice on both the risk and relevant mitigation measures.

For example, relevant advice on professional emergency management could be sought from the State Emergency Service to inform decision making on whether to proceed with the planned release.

The SSTAG is established to review safety matters associated with high-flow releases. It provides advice/recommendation as requested by DPE-Water to assist the safety management process. The SSTAG has an advisory role, with final decision making, policy direction or delegating additional work to be carried out by DPE-Water. The SSTAG makes recommendations as to whether the release will proceed, be modified or cancelled. The decision making process to be undertaken is outlined in the flow chart in **Figure 4-1**.

It is important to note that decisions to proceed with the release is based on all members of the SSTAG being comfortable that risks are known and mitigated against or reduced to an acceptable level.

The process of SSTAG involvement is summarised in **Appendix C**.

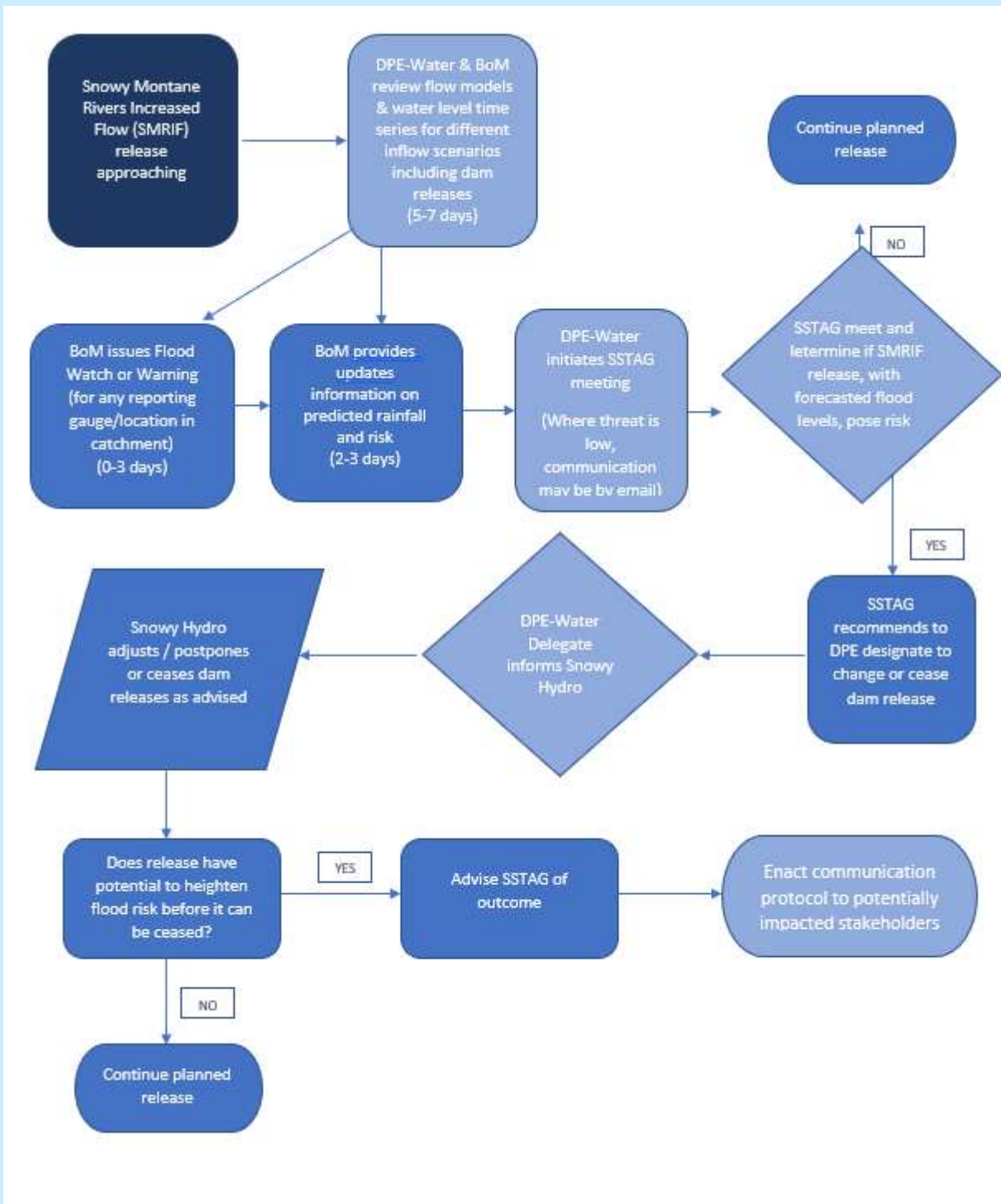


Figure 4--1 Decision making flow chart

## Public communications

A 'Rising river alert' media release is issued by the department approximately seven days before each planned high-flow or flushing flow release to inform affected communities/general public of the upcoming event. The alert is published on the department's website and a Tweet is also issued on the same day. (See Appendix B)

## 4.4. Approximately 3 days before releases

### Review weather

In the days leading up to the high-flow and flushing flow releases, the department and SHL closely monitor weather forecasts and flows in the Upper Murrumbidgee River and the tributaries downstream of Tantangara Dam.

### Final BoM flood forecasting

The department continues to liaise with the BoM and undertake a final assessment of weather events based on the most recent climate data, and update flood forecasting where required. Approximate river flows can be forecast by the BoM up to several days in advance. If natural flows, combined with Tantangara Dam releases, are likely to cause downstream flooding the department will consult with the SSTAG, prior to discussions with SHL to modify or cease releases from the dam.

### Final review by SSTAG

The SSTAG undertakes a final review of the planned releases, flood predictions, and any final safety issues or actions required in order to confirm that they are comfortable that the risks of the impending flow event are known and have been mitigated to an acceptable level. The SSTAG again undertakes recommendations in line with the previous flow chart in Figure 4-1 and the department instructs SHL based on the outcome.

Where there is a level of uncertainty with the forecasts the SSTAG may determine to reconvene 1 day prior to the high flow release and reconsider available data.

The process of SSTAG involvement is summarised in **Appendix C**.

## Public communications

If the release is determined safe to proceed, approximately 2-3 days prior to release an SMS is sent to those that have added their details to the distribution list.

A Tweet will also be issued the day before each respective high-flow event (See Appendix B)

## 4.5. During release

During the release, the department monitors information constantly through liaison with the BoM, SSTAG, SHL and DPE-EHG, particularly if forecasts indicate that rain is likely or a Flood Watch is issued for any part of the Upper Murrumbidgee River catchment.

The department seeks advice from SHL daily about storage levels and inflows to Tantangara Dam.

Where any climatic risks are forecast during the duration of the event, BoM reviews flood forecasts. Where risks are determined, DPE-Water advises the SSTAG and the SSTAG provides recommendations on continuing, ceasing or modifying the release to DPE-Water.

In addition to a flood mitigation directive from the department, SHL will cease releases if:

- a) Directed to by NSW Police or the State Emergency Service.
- b) Low inflows prevent release of the release.
- c) Deemed necessary to manage public safety or environmental health risks.
- d) Equipment failure prevents safe delivery of the flows.

## 4.6. Modified SMRIF releases

Modifications to the planned SMRIFs may occur throughout the year as a result of climatic, environmental or other unforeseen circumstances that may arise closer to the time of the planned SMRIF release.

For example, prolonged climatic conditions in wet years may result in Tantangara Dam approaching or realising spill level, such as occurred with Lake Jindabyne in December 2021 – March 2022. At these times, modifications to the volume, timing or flow rate of SMRIF releases may be required to prevent uncontrolled spills and ensure that water levels can be reduced in a safe manner. Changes to the planned SMRIF regime may be made rapidly.

As another example, where SMRIF accounting is not finalised at the commencement of the water year, an interim SMRIF regime will be designed and modified once accounting arrangements are resolved.

In these rare occurrences, a condensed approach to that described in Section 3 would be undertaken within the available timeframe. Warnings would be provided to stakeholders with as much time as practically available. The timeframes may be less than outlined Section 3, and in some extreme instances may be limited to less than 24 hours notice.

During unplanned SMRIF releases, unplanned storages releases or uncontrolled spills (See Section 3), SHL is responsible for safety management, stakeholder coordination and public communication. The department would assist SHL as requested.

## 4.7. Workplace health & safety

All agencies, corporations and stakeholders are responsible for their actions with regards to Workplace Health and Safety (WHS) legislation and must follow their organisation's WHS policies and procedures.

Departmental employees must follow the Department of Planning and Environment WHS Policy and related procedures. Prior to any field work, departmental employees must consider



relevant risks and follow all relevant departmental procedures. This may include, but is not limited to, the department's WHS procedures and critical risk controls in place for:

- Driving (WHS CRC 007)
- Remote or isolated work (WHS CRC 014)
- Working on or near water (WHS CRC 017)
- Dealing with aggressive stakeholders (WHS CRC 020)

## 5. Further information

Register for Rising River Alert notifications or to receive information about the Upper Murrumbidgee or Snowy Water for the Environment programs here:

[www.environment.nsw.gov.au/topics/water/water-for-the-environment/snowy-and-montane/snowy-and-upper-murrumbidgee-landholder-survey-and-contact-information](http://www.environment.nsw.gov.au/topics/water/water-for-the-environment/snowy-and-montane/snowy-and-upper-murrumbidgee-landholder-survey-and-contact-information)

Further information on the Snowy Water Initiative and Snowy Montane Rivers Increased Flows is available on the DPE-Water website.

- Snowy Water Initiative:  
[www.industry.nsw.gov.au/water/basins-catchments/snowy-river/initiative](http://www.industry.nsw.gov.au/water/basins-catchments/snowy-river/initiative)
- Snowy Montane Rivers Increased Flows:  
[www.industry.nsw.gov.au/water/basins-catchments/snowy-river/initiative/snowy-montane-rivers](http://www.industry.nsw.gov.au/water/basins-catchments/snowy-river/initiative/snowy-montane-rivers)

Further information on the environmental management of Snowy and Montane Rivers is available on the DPE -EHG website:

[www.environment.nsw.gov.au/topics/water/water-for-the-environment/snowy-and-montane](http://www.environment.nsw.gov.au/topics/water/water-for-the-environment/snowy-and-montane)

# Appendix A: Risk analysis and mitigation measures

Table A- 1 Risks and mitigation measures associated with high and flushing flow releases of SMRIF

Ref no.	Hazard description (i.e. wet floor)	Risk description (i.e. slip on floor)	Initial risk rating	Proposed risk controls (i.e. mop the floor and place wet floor hazard signage)	Type of risk control (Hierarchy on controls) <sup>4</sup>	Residual risk rating
1	Rapid rise in water level	The community being 'caught out' by the higher degree of flow variability. Potential damage to owner's assets and injuries to individuals accessing the river during the event  High flow releases are not common in this area so people in the area could be caught unprepared	High	Communications and Engagement Plan developed. Regular and targeted communication provided to community.	Reduce exposure to the hazard using administrative actions	Medium
2	Flooded public roads or causeways	Rising water may inundate public roads and causeways restricting safe transportation movements	Medium	Potential roads / causeways impacted will be identified through local knowledge of SSTAG members.  Identified road closures will be included in messaging to the community.  Where public roadways are cut by flood water, Councils or other relevant authority will erect road closure signage	Isolate hazard from people	Medium

<sup>4</sup> Based on DPE-Water risk management process hierarchy of controls

3	Management of releases up to and during peak flow period	Increases in tributary inflows downstream of Tantangara Dam combining with dam releases to cause/ exacerbate flooding dependent on magnitude of increases in downstream tributary inflows	High	Regular monitoring of flows and close liaison between the Department of Planning and Environment (DPE), the BoM and Snowy Hydro Limited (SHL). SHL will cease releases if requested to do so by DPE, the State Emergency Service (SES) or NSW Police.  The BoM to undertake forecast modelling. Releases will be cut back if required to minimise the risk of targeted flows being exceeded.	Reduce the risk by quickly ceasing the dam releases.	Medium
4	Rising water levels at campsites and picnic areas, including The National Trail	Risks to holiday makers/travellers/hikers, campers and the general public using these areas. Potential damage to owner's assets (camping gear, vehicles, etc.) and injuries to individuals accessing the sites during the event	High	Working collaboratively to address flooding issues with the National Parks and Wildlife Service by updating high event release alerts on their website and install temporary and/or permanent signage at vulnerable locations identified.	Reduce exposure to the hazard using administrative actions	Medium
5	Climatic conditions coinciding with release	Risk of high-flow leaves exceeding flood levels and impacting properties adjacent to the river	High	Climatic conditions are reviewed by the BoM prior to a release and discussed by the SSTAG to determine any mitigation necessary to maintain river heights below minor flood levels and at an acceptable level of risk	Reduce exposure to the hazard using administrative actions	Medium
6	Property access	River crossings will be inundated and will be inoperable during the event(s). Loss of vehicular access	Medium	Communications and Engagement Plan developed.  Information materials, such as FAQs and 'Rising River Alerts' will be made publicly	Reduce exposure to the hazard using	Medium

				<p>available via the web and emailed directly to downstream landholders.</p> <p>Property owners were previously identified and contacted individually. These owners will be emailed and contacted through phone/SMS to prepare for potential risks.</p> <p>Additionally, the public will be informed via 'Rising River Alerts' issued to all relevant local media and Tweets will be issued for each alert.</p>	administrative actions	
7	People on Dam Wall	Someone going over spillway or someone going into plunge pool	Medium	<p>The area around the dam wall will be fenced off by SHL.</p> <p>Buoy line around spillway in the storage; SHL will cease releases if notified of a person or watercraft in the plunge pool or if a person or watercraft enters the area of the Dam between the buoy line and the spillway.</p>	<p>Isolate hazard from people</p> <p>Reduce the risk through engineering controls</p>	Medium
8	Personnel on Dam Wall	Injury to Snowy Hydro Limited employees in making the releases	Medium	Snowy Hydro Limited is required to have work health and safety procedures in place for its employees and worksites and is required to comply with them.	Reduce exposure to the hazard using administrative actions	Medium
9	People at sites below Dam wall	Injury to DPE staff monitoring releases.	Medium	DPE is required to have work, health and safety procedures in place for its staff and worksites and is required to comply with them.	Reduce exposure to the hazard using administrative actions	Medium

11	Bridges	Bridges subject to gathering of debris, such as tree branches/logs.	Low	RMS are notified of releases as part of the stakeholder engagement process.	Reduce the risk through RMS standard maintenance inspection	Low
12	Buildings	Various infrastructure located within 50 metres of the inundation zone has the potential to be impacted.  Potential damage to property, stock and equipment. Although the infrastructure is close to the river, most items are located on the high bank and are unlikely to be inundated.	Medium	Communications and Engagement Plan developed. These landholders have elected to receive notification via email or SMS and be advised to prepare for potential risks.  Additionally, the public will be informed via 'Rising River Alerts' issued to all relevant local media and Tweets will be issued for each alert.  Regular monitoring of the flows to ensure that operational limits are not exceeded.	Reduce exposure to the hazard using administrative actions	Low
13	Damage to pumps	Various, including Snowy Monaro Regional Council	Medium	Communications and Engagement Plan developed. Pump owners were previously identified and contacted individually. These owners will receive notification via email/SMS and direct contact and be advised to prepare for potential risks by either securing pumps or removing associated motors, pipes, etc.  Additionally, the public will be informed via 'Rising River Alerts' issued to all relevant local media and Tweets will be issued for each alert.	Reduce exposure to the hazard using administrative actions	Low
14	Landholders - All properties located	Risks to landholders' property, equipment and own wellbeing. Potential damage to	Low	Communication and Engagement Plan developed. Provision of timely email and/or	Reduce exposure to the hazard	Low



	along the Upper Murrumbidgee River.	property, stock and equipment if located within 50 metres of the expected inundation zone.		<p>SMS notification of intended flow release and updates of any significant flow revision to previously identified landholders.</p> <p>Additionally, the public will be informed via 'Rising River Alerts' issued to all relevant local media and Tweets will be issued for each alert.</p>	using administrative actions	
16	Modified planned SMRIF releases	Risk to river uses and landholders with limited time to prepare	Medium	<p>Coordinated stakeholder communication between DPE and SHL prior to release. Advisory messaging.</p> <p>Communications and Engagement Plan developed. Provision of timely email and/or SMS notification of intended flow release and updates of any significant flow revision to previously identified landholders.</p> <p>Additionally, the public will be informed via 'Rising River Alerts' issued to all relevant local media and Tweets will be issued for each alert.</p>	Reduce exposure to the hazard using administrative actions	Low

# Appendix B: Communication actions and responsibilities

One of the main strategies to address many of these risks is effective and timely communication with stakeholders. **Table B-1** outlines the key actions and responsibilities to ensure that target groups are well prepared and appropriate wider publicity is provided for high and flushing flow releases.

Table B- 1 Communication actions and responsibilities

Action item	Responsibility	Comment
Provide FAQ's factsheet	DPE Communications team	The factsheet will be made publicly available via the department's website, emailed directly to downstream landholders (those with listed contact details) and via the working group.
Provide updates on the down-stream landholder and key stakeholders contact list to DPE	All	Ongoing
Advise Local Police and SES of the planned high-flows and seek comment on any issues they perceive	DPE Communications team	Act on any issues identified.
Email landholders below Tantangara Dam along the Upper Murrumbidgee River (those with listed contact details) and key stakeholders advising of the timing and magnitude of the flows	DPE Communications team	The department to make direct contact with downstream landholders (those with listed contact details) and key stakeholders approximately 4 to 6 weeks prior to first high-flow event – then ongoing as required.
Distribute 2022 Snowy Montane River high-flows FAQs to Cooma Visitors Information Centre and relevant SES offices for display	DPE Communications team	The department to prepare FAQs in PDF format and distribute to working group members and appropriate stakeholders – further copies will be emailed to external contacts as required.
Issue separate media releases/notices including rising river alerts approximately seven days prior to the respective flow release to inform the affected communities  Media outlets to be targeted: Snowy Shire Council – e-news Shire Wire Snowy Magazine Jindabyne Summit Sun Monaro Post	DPE Communications team	

Action item	Responsibility	Comment
XL FM Snow FM ABC Radio South East		
Issue a series of 'Tweets' to coincide with the issuing of the 'overview' media release and each of the 'Rising river alerts'. Issue 'Tweets' the day before each of the planned high-flow water releases as a reminder for down-stream landholders	DPE Communications team	Tweet once the 'overview' media release is issued.  Tweets regarding the 'Rising river alerts' will be issued
Issue series of SMS with the issuing of each rising river alert. Issue SMS 2-3 days before the planned high flow water release as a reminder for down-stream landholders	DPE Communications team	SMS regarding the 'Rising river alerts' will be issued
Advise Minister for Water of planned flows.	DPE Communications team	Minister's Office to be advised of the timing of the flows prior to issuing of 'overview' media release
Provide Department of Industry 'Customer Experience' staff with all up-to-date information to answer any requests received.	DPE Communications team	'Customer Experience' staff to be provided with all relevant information – May
'SMRIF Operations Plan' – to be placed on the department's website and sent to members of the inter-agency working group, if changes required.	DPE Communications team	Updated 'SMRIF Operations Plan' provided to interagency working group members – May.
Update the department's website to ensure it contains the latest information on the environmental releases – 'Snowy Montane Rivers Increased Flows' website page.	DPE Communications team	'Snowy Montane Rivers Increased Flows' website page to be updated to coincide with the issuing of the 'overview' media release.

# Appendix C: Process of SSTAG involvement

The department may convene a regular briefing (written and via teleconference) with the SSTAG in the pre-release stage, before and during high-flow operations and other incidents to enable the rapid exchange of information between agencies, if necessary, as described below. The process is summarised below in **Table C-1**.

Table C- 1 Process of involvement of the SSTAG

Timing	Process
When Snowy Montane Rivers Increased Flows (SMRIF) flow plan for the coming year is released	<p>Snowy Safety Technical Advisory Group (SSTAG) may meet to:</p> <ol style="list-style-type: none"> <li>1) discuss the coming years planned releases</li> <li>2) Review the Safety Management Plan, including any climatic triggers that would cause SMRIF to be ceased</li> <li>3) Review the SSTAG ToR</li> <li>4) Determine any safety issues with the planned timing, duration, and size of planned SMRIF releases</li> </ol>
Approximately 5-7 days prior to commencement of SMRIF release	<ol style="list-style-type: none"> <li>1) DPE-Water notifies BoM flood desk of upcoming release. BoM and DPE-Water review any likely weather event or climatic triggers during the planned release</li> <li>2) BoM / DPE-Water undertake flood modelling to determine impact</li> <li>3) DPE-Water informs SSTAG of upcoming planned release and makes any required meeting arrangements</li> <li>4) SSTAG reviews planned releases along with the BoM's weather predictions, climatic risks and flood forecasting. SSTAG reviews risks and mitigation measures and determines whether the release will be recommended to proceed.</li> <li>5) Decision-making process in flow chart followed</li> </ol>
Approximately 2-3 days prior to commencement of each SMRIF release	<ol style="list-style-type: none"> <li>1) BoM and DPE Water undertake final assessment of weather events</li> <li>2) Decision made if SSTAG requires face to face meeting</li> <li>3) SSTAG considers updated flood forecasting and any final safety issues/actions required</li> <li>4) Review planned releases, risk and proposed mitigation/communication</li> <li>5) SSTAG members confirm that they are comfortable that the risks of the impending flow event are known and have been mitigated to an acceptable level</li> <li>6) Where there determined to be a high risk the SSTAG may reconvene 1 day prior to release and review</li> </ol>
During release	<ol style="list-style-type: none"> <li>1) DPE-Water maintains contact with BoM. BoM monitors weather and advises DPE-Water of any likely event that coincides with the full duration of the</li> </ol>

	<p>current release (takes approx. 3 days for flows to move down catchment towards ACT)</p> <ol style="list-style-type: none"><li>2) If necessary, BoM / DPE-Water undertake flood forecasting to determine any potential impacts from the any forecasted weather events</li><li>3) If a risk arises, DPE-Water advises the SSTAG, and may call a SSTAG meeting</li><li>4) Flow chart decision making process followed</li></ol>
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# Appendix D: Enquiries and emergency contacts

Table D- 1 Contacts (current as at March 2022)

Contact	Telephone Number
DPE-Water	1300 081 047
Police/Ambulance	000
State Emergency Service	132 500
RMS Transport Management Centre Incident Reporting Line	131 700
Snowy Monaro Regional Council	1300 345 345
Snowy Hydro Limited	<a href="https://www.snowyhydro.com.au/contact/">https://www.snowyhydro.com.au/contact/</a>



# Appendix E: SMRIF Operations Plan

The annual Snowy Montane Rivers Increased Flows Operations Plan details the release strategy for each water year, and is published on the DPE-Water website:

[www.industry.nsw.gov.au/water/basins-catchments/snowy-river/initiative/increased-flows](http://www.industry.nsw.gov.au/water/basins-catchments/snowy-river/initiative/increased-flows)