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Community
Update

NSW GOVERNMENT

Floodwaters at Yarramundi 2012 (Photo: NSW SES)

Flood Strategy

HAWKESBURY-NEPEAN VALLEY FLOOD RISK MANAGEMENT STRATEGY

Managing flooding in the valley

Floods in the Hawkesbury-Nepean Valley pose a significant risk to people's lives, livelihoods and homes because of the valley's unique landscape and the size of its population.

The Hawkesbury-Nepean floodplain was formed by flooding over millions of years. There have been about 130 moderate to major floods in the valley since records began in the 1790s.

In May 2017, the NSW Government released Resilient Valley, Resilient Communities – Hawkesbury-Nepean Valley Flood Risk Management Strategy (Flood Strategy) to reduce and manage this significant risk.

The Flood Strategy covers regional flooding from Bents Basin near Wallacia to the Brooklyn Bridge. This is around 425 square kilometres of floodplain mainly in Penrith, Hawkesbury, The Hills and Blacktown council areas.

When floods happen

Floods are random, naturally occurring events. It's impossible to say when the next flood will come.

History has shown that major floods can happen several times within a single decade, or they may be many years apart. Periods of drought are often followed by periods of high rainfall and flooding.

The largest flood in the valley since European settlement happened in June 1867. The flood was described as a huge inland sea with waves up to two metres high. At its peak, floodwaters reached around 19 metres above normal river height at Windsor. Thirteen people lost their lives during the flood.

The valley experienced its largest flood in living memory in 1961, soon after Warragamba Dam was built. The last significant floods in the valley were in the early 1990s.

The absence of major floods since 1992 in no way suggests that this relatively flood-free period will last. It's not a matter of if another major flood will happen in the valley, it's a matter of when.

If these floods happened now (2016)

In a flood similar to the Brisbane 2011 floods (1 in 100 chance per year):

5,000
homes impacted

$2 bn
in damages

64,000
people need to evacuate

In a flood similar to the largest flood in European history (1867 flood):

12,000
homes impacted

$5 bn
in damages

90,000
people need to evacuate

The 'bathtub' effect

Most river valleys widen as they approach the sea. The opposite is the case with the Hawkesbury-Nepean.

Narrow sandstone gorges between Sackville and Brooklyn create natural choke points. When it floods, the valley acts like a massive bathtub – with five taps (the main tributaries) pouring in floodwaters, but only one plug hole to let the water out through the Sackville Gorge.

As a result, floodwaters back up and rise rapidly, causing wide, deep and dangerous floods.

Investigating the options

The Flood Strategy is the result of years of investigation into the best ways to reduce the flood risk in the Hawkesbury-Nepean Valley.

These investigations found that raising Warragamba Dam by around 14 metres has the highest benefit – significantly reducing the risk to life downstream, and reducing flood damages by around 75% on average. There are no other flood mitigation measures that can achieve the same risk reduction.

Some of the infrastructure and non-infrastructure options investigated but not progressed include:

Lowering the permanent water supply level of Warragamba Dam by 5 metres

This option was found to have limited potential benefits for managing flood sizes that result in the greatest risk to people's lives and property.

Lowering the permanent water supply level by 12 metres (the maximum possible)

This option would reduce the Warragamba Dam water storage by nearly 40% — or one and a half years of water supply to Sydney.

New sources of water supply would need to be built and the existing Sydney desalination plant would need operate continuously to maintain water security to Sydney. Any new water supply options would have significant costs as well as environmental impacts.

Stopping all development in potentially flood affected areas

Over 25,000 residential properties and two million square metres of commercial space are currently subject to flood risk in the valley.

Preventing future development in these areas will not address the risk to existing properties. However, the Flood Strategy is implementing a new coordinated approach to better manage regional land use and emergency planning into the future.

River diversion channels

Three possible diversion channels to improve the flow of floodwaters out of the floodplain were investigated. The options would involve significant construction works including blasting and cutting to create a channel that spanned a significant length of the valley.

These options would have high construction costs, limited capacity to provide regional flood mitigation benefits, and very significant environmental impacts.

Dredging the Hawkesbury-Nepean River

Dredging the Hawkesbury-Nepean River for flood mitigation would involve continuously removing sediment to reach 10 metres below the current bed level for a distance of 66 kilometres.

This option would have construction costs similar to those of raising Warragamba Dam without the regional flood risk mitigation benefits. It would also have very significant environmental impacts.

Levee banks

Levee banks are artificial embankments that hold back floodwaters in a local area.

Levee banks at Peachtree Creek at Penrith, McGraths Hill and Pitt Town were investigated as options, but had limited capacity to provide regional flood mitigation. However, Peachtree Creek levee could be considered as a local measure.

Voluntary house re-purchase in flood risk areas

There are currently around 12,000 thousand homes located in the area up to the 1 in 500 chance per year flood levels — the areas that contribute most to flood risk.

Repurchasing these homes to reduce the flood risk would cost billions of dollars, cause massive social upheaval for tens of thousands of people, and new housing areas would need to be developed outside the floodplain.

What is the Flood Strategy?

There is no simple solution to reduce flood risk. A mix of actions is needed to reduce risk now and into the future.

The Flood Strategy sets out how the NSW Government, local councils, businesses and the community need to work together to deliver a coordinated approach across the floodplain.

Phase One of the Flood Strategy is being delivered over four years from 2016 to 2020. It includes a business case for the proposal to raise Warragamba Dam for flood mitigation as well as a range of other important actions.

Flood strategy actions at a glance

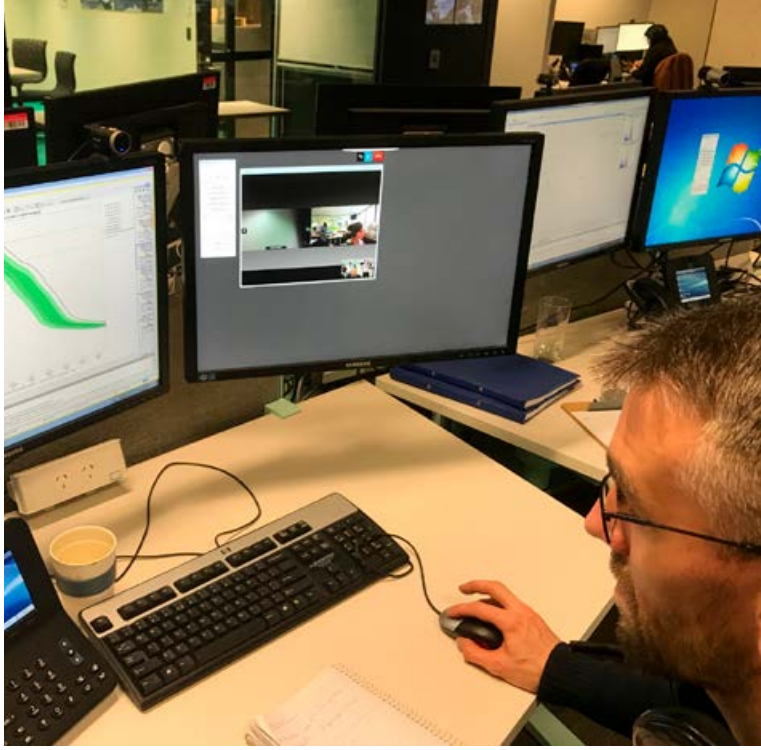
	Action	Timeline
	**Warragamba Dam Raising proposal – EIS and detailed concept design**	2016-2020
	**Coordinated flood risk management**	2016-2020
	**Community awareness and education**	2017-2020
	**Improved weather predictions and flood forecasting**	2018-2019
	**New flood evacuation signage**	2018-2019
	**Regional land use and road planning framework**	2018-2019
	**Detailed planning for local road upgrades**	2018-2019
	**Better flood maps and information for the community**	2018-2019
	**Flood emergency response and recovery exercises**	2018-2019

For more information visit
www.insw.com/flood-strategy

Did you know?

The Insurance Council of Australia considers the Hawkesbury-Nepean Valley to have the highest single flood exposure in NSW, if not Australia.

Floodplain residents tested the new flood evacuation signage system using a driving simulator (Photo: INSW)



The Bureau of Meteorology is developing new flood forecasting tools for the valley (Photo: BoM)

Improving evacuation during floods

NSW government agencies, including Roads and Maritime Services, Infrastructure NSW and the NSW SES are working together to improve evacuation planning and response.

The safe evacuation of the Hawkesbury-Nepean relies on people using their private vehicles to leave before the floodwaters arrive. The depth and extent of flooding means that sheltering in place during flood events is not safe or feasible. Weather conditions can also prevent the use of boats and helicopters for rescue.

A key part of this work is a $1.8 million signage project to help guide people along evacuation routes and out of the floodplain. The rollout of the new signage across the valley is scheduled to start later this year.

Better flood forecasting

To safely evacuate people in a flood emergency the NSW SES relies on forecasting and flood predictions from the Bureau of Meteorology.

If evacuation later proves unnecessary, people may be reluctant to follow orders the next time it floods, putting their lives at risk.

The Bureau is working to enhance the flood forecasting capability for the Hawkesbury-Nepean Valley using the latest knowledge and techniques to improve accuracy and timeliness.

Improved rainfall and flood forecasts, new modelling, and new decision-making tools for the NSW SES will provide greater clarity about the timing, behaviour and heights of floods. This will support improved emergency response.

The project is on track to start trialling the new flood forecasting tools in 2019.

The latest flood information

A new regional flood study for the Hawkesbury-Nepean Valley is currently being finalised. It will be the first since the mid 1990s and will include an atlas of maps that show flood extent, depth and likelihood. This will help people understand their flood risk. The mapping will be available to the public when it is complete.

Raising Warragamba Dam for flood mitigation

Raising the height of Warragamba Dam by around 14 metres to temporarily hold back floodwaters would significantly reduce risk to people's lives and property, and provide more time for evacuation.

The large Warragamba Catchment contributes the majority of flows during the most damaging and dangerous floods in the valley. These floodwaters funnel through the narrow sandstone gorge at Warragamba Dam.

Raising the dam would create 'airspace' for these floodwaters to be held back behind the dam wall, and then released in a controlled way after the flood peak has passed.

While protecting lives is the first priority, raising Warragamba Dam for flood mitigation would also reduce flood damages by about 75% on average per annum.

Due to its unique geography, nothing can eliminate all flooding in the valley. Raising the dam would significantly reduce the risks, but people will always need to evacuate when directed in a major flood emergency.

Did you know?

In assessing flood insurance, insurers take account of how often a property is expected to flood, how severe the flooding may be, and how deep the flood can get.

Should the Warragamba Dam raising be approved and built, any reductions in flood risk at each individual property will be considered by insurers, and will typically result in reduced premiums.

(Source: Insurance Council of Australia)

Warragamba Dam spilling (Photo: WaterNSW)

About the environmental assessment

WaterNSW, the owner and operator of Warragamba Dam, is currently preparing detailed concept designs, and a comprehensive environmental impact statement (EIS) for the dam raising proposal. It will be assessed by both the NSW and Australian governments.

In rain events that result in Warragamba Dam spilling, areas upstream of the dam in the National Park and Greater Blue Mountains World Heritage Area are inundated now. With flood mitigation, they may be temporarily flooded for a longer period from days up to around two weeks. The extent of this increase in temporary inundation would depend on the size of the flood.

A range of surveys and assessments is under way to provide important information for the EIS. These include Aboriginal cultural heritage surveys, surveys of plant and animal species, river channel and bank studies, and assessment of the social impacts and benefits.

Community and stakeholder consultation is an important part of the EIS process and is under way. The EIS will be exhibited for public comment in 2019. Construction, which is estimated to take four years to complete, can only begin if, and when, environmental and planning approvals are granted.

For more information about the environmental assessment process, visit waternsw.com.au/wdr

Raising awareness at the 2018 Hawkesbury Show

Did you know?

Raising Warragamba Dam for flood mitigation would not change the full supply level or lead to permanent upstream inundation.

Timeline for Warragamba Dam Raising proposal

2016-2017

- Preliminary Environment Assessment
- Application under NSW and Australian government legislation
- Secretary's Environmental Assessment Requirements Issued

2017-2019

- Environmental Impact Statement
- Engagement
- Concept Design
- Public Exhibition

2019

- Environmental Planning Consideration

2020

- Business Case for NSW Government Consideration

2020-2024

- Construction (Pending Approvals)

Getting ready for flood

The community has an important role to play in getting ready for flood.

The risk to life in a flood emergency increases if people aren't aware of, or understand their flood risk, delay or refuse to evacuate, drive through floodwaters, or sightsee in flooded areas.

Evacuating when directed by the emergency services is essential to ensure lives are not lost.

Flood-ready households are more prepared and ready for flooding. They are more likely to raise or relocate movable items, invest in flood-compatible building materials, and take out flood insurance.

The NSW Government is working with the NSW SES, local councils and other agencies to provide better flood information and help people prepare for floods.

From our Emergency Services

If you live or work in the valley, know your flood risk and be prepared.

The NSW SES recommends these key steps to get ready for floods now:

1. Know your risk
2. Know where to go
3. Know who to call
4. Know your plan
5. Get your kit together
6. Prepare now to act early
7. Check your insurance
8. Listen to local radio

Visit the NSW SES website to find out more about how to prepare for a flood www.ses.nsw.gov.au


(Photo: NSW SES)

(Photo: NSW SES)

More information

Check out our website for updates and upcoming events.

www.insw.com/flood-strategy **floodstrategy@insw.com**