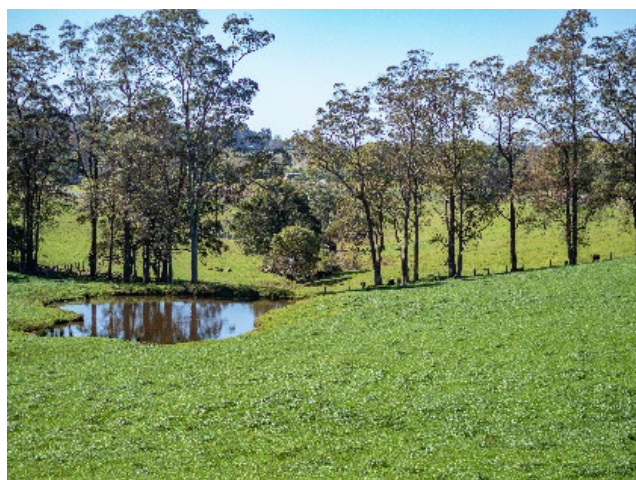

Dams Safety NSW

www.damsafety.nsw.gov.au



Small dam safety: a guide for owners

September 2023





Acknowledgement of Country

Dams Safety NSW 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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Small dam safety: a guide for owners

There are tens of thousands of small water dams throughout New South Wales. Many of these dams are on private properties and play a vital role in providing water for farming, livestock and natural resource industries, such as quarries. Small dams are made and operated in many different ways. Although there are risks associated with every dam, not all dams in NSW are regulated by Dams Safety NSW.

This guide has been prepared to help small dam owners (whose dams are **not** declared by Dams Safety NSW) understand their obligations in managing their dams safely.

For the purposes of this guide:

- a small dam with a wall less than 10 metres in height and stores less than 1500 megalitres.
- the term 'dam safety' refers to the risk of failure or uncontrolled releases from a dam, rather than risks associated with drowning by falling into a dam.

Who is responsible for dam safety?

As a dam owner, you are responsible for ensuring the safety of your dam.

You are responsible for appropriately operating, inspecting and maintaining your dam at all times - even during times of drought when it may be empty. If you neglect your dam, substantial repair work may be required before you can reliably use it again.

Dam owners are also responsible for the consequences of dam failure. The uncontrolled release of water when a dam fails can impact people, places and the environment that are downstream of the dam. It can also impact the dam owner.

Who is Dams Safety NSW?

Dams Safety NSW is the independent government regulator responsible for ensuring dam owners manage the safety of their declared dams. We do this by auditing declared dam owners' policies, processes and procedures to check their compliance with dams safety laws.

Dams Safety NSW only regulates dams that are declared under the *Dams Safety Act 2015*. Most small dams or dams on farms or private property do not meet the requirements to be declared. This means that these dams are not regulated by Dams Safety NSW. Nonetheless, owners of **all** dams have a responsibility to the community to ensure their dams are safe.

Declared dams and dam safety legislation in NSW

Dams Safety NSW 'declares' dams that can potentially endanger life downstream, cause major damage or loss to infrastructure, the environment or have major health and social impacts (such as loss of essential services to the community, or people being made homeless). Each dam is given a consequence category that reflects this potential.

According to [Part 2 Section 4 of the Dams Safety Regulation 2019](#) this includes:

- a dam with a wall that is more than 15 metres high
- an existing or proposed dam that Dams Safety NSW is reasonably satisfied would endanger the life of a person, or result in a major or catastrophic level of severity of damage or loss if it failed
- dams that were 'prescribed' under the old *Dams Safety Act (1978)* became declared dams under the new Act.

Once a dam is declared by Dams Safety NSW, the dam owner must comply with dams safety legislation.

What is a dam?

A dam is a wall-like structure that is often built across a creek or river, to block the flow of water. When it rains, water builds up creating a water body. Some dams have other purposes. The water in dams may be used to grow food, provide water for animals or for aesthetic reasons. Most small dams are made from earth or rock. The material is compacted to minimise water seepage.

Dams have some key features, and it is important to understand what they do and what they are called.

- Spillway/Bywash - an open channel, weir, conduit, tunnel or other structure designed to allow discharges from the dam when water levels rise above the full supply level directing flow downstream of the dam. The spillway is principally to discharge flood flows safely past a dam without overtopping the dam wall.
- Crest - top of the dam wall and is not designed to allow water to flow over it.
- Toe - where the embankment or dam wall joins the ground surface.
- Embankment - an earth structure (also called the wall of the dam) built across a waterway to either protect adjacent land from inundation by flooding or to store water.
- Abutment - side of the valley, where the dam is constructed. Left and right abutments are defined by looking downstream.
- Inlet - the point of water entry to the dam

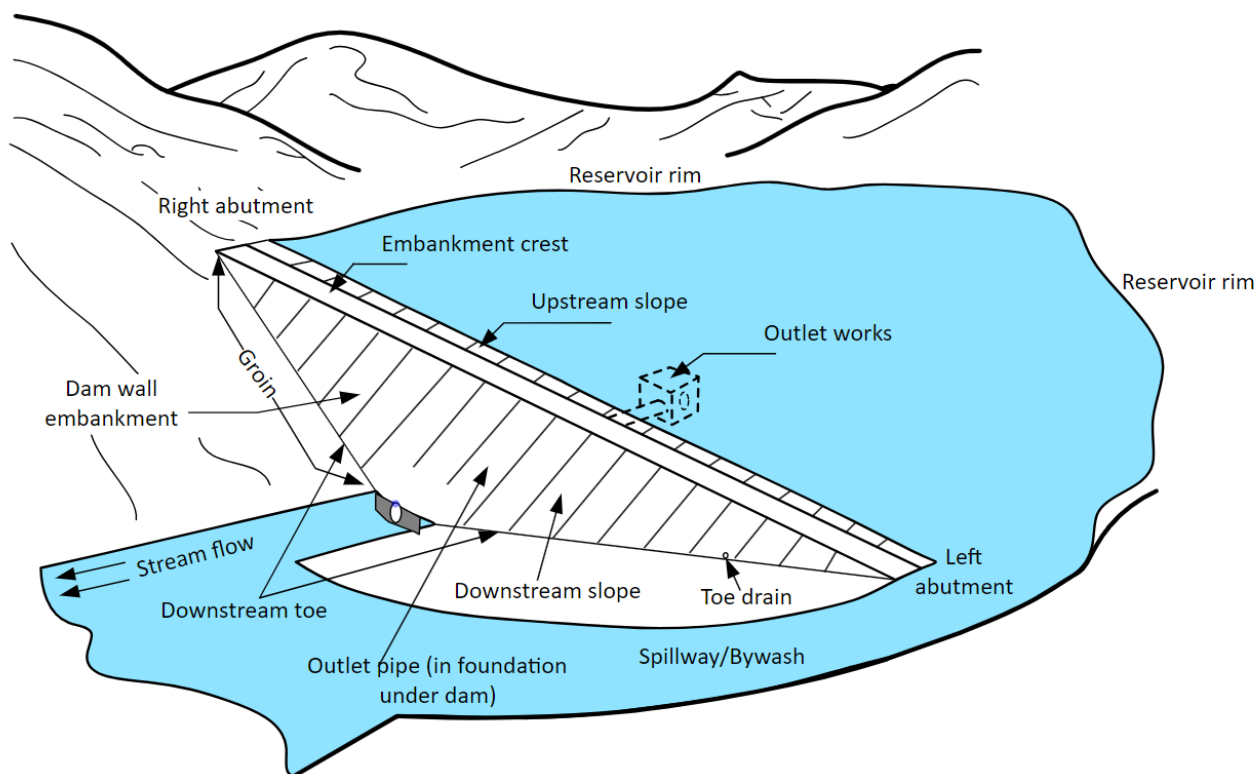


Figure 1 Simple embankment dam. Credit: Dams Safety NSW

Should your dam be declared?

If people would be at risk if your dam failed, it needs to be referred to Dams Safety NSW to be considered for declaration - even if it is only a small dam or retarding basin. It should also be referred if dam failure would cause major damage to the environment or an asset.

Additionally, all dams that are more than 15 metres high must be referred to Dams Safety NSW to be considered for declaration.

If you think these factors may apply to your dam, email Dams Safety NSW at info@damsafety.nsw.gov.au to discuss the next steps. Our engineers will assess whether your dam meets the criteria to be declared. They may need you to carry out a preliminary assessment of the dam.

Building or upgrading a dam: what should you consider?

A new dam, or an upgrade to an existing dam, may need approval from your local council, and may also have to comply with requirements under the *Water Management Act 2000*. Start by talking to your local council and WaterNSW. Rural landholders in NSW are entitled to build and maintain dams up to a certain size without an approval or licence. Those not requiring any licences include:

- harvestable rights dams (i.e. small dams to collect rainfall runoff)
- dams built before 1999 on minor streams used only for stock and domestic purposes
- dams up to one megalitre on small properties where the property was approved for subdivision before 1 January 1999.

Any other types of dams may require a licence. The type of licence required depends on whether the water comes from a source governed by a water-sharing plan. Water-sharing plans have rules for sharing water between environmental needs and the users.

WaterNSW issues licences and approvals for private rural landholders and rural industries.

The NSW Department of Planning and Environment – Water (NSW DPE) provides licences and approvals for many larger commercial and all government entities.

The NSW Department of Primary Industries (NSW DPI) has a range of useful information about building dams in NSW. Download them from the NSW DPI website [here](#).

Harvestable rights dams

Harvestable rights allow landholders to capture and store a proportion of the rainfall runoff from their landholding in one or more harvestable rights dams without a water access licence, water supply work approval or water use approval.

Each landholding has a maximum harvestable right dam capacity, which depends upon the location and size of the landholding. Find more information at [Harvestable rights | Water \(nsw.gov.au\)](#). WaterNSW has a calculator: [Maximum Harvestable Rights Calculator](#).

Consult your neighbours

It is essential to consider those who may be affected by your dam. Dams are a common source of disputes between neighbours. To reduce the chance of a complaint, talk to your neighbours and others who may be impacted by changes in flow or the construction of the dam.

A suitably qualified person should design and construct your dam. This may ensure that your dam is safe and reliable.

How can small dams fail?

Small dams can fail in different ways. Failure can happen during periods of rainfall when dams ‘overtop’ or at other times, called ‘sunny day’ failures. When dams fail and their contents escape, it can impact on people, animals and places downstream of the dam as well as the dam users themselves.

For emergencies regarding a dam failing where people may be in immediate danger, call emergency services immediately on 000. Where possible and safe to do so, warn any neighbours who may be impacted.

Overtopping failure

Overtopping failure can occur when there is too much water in the dam. It may be during a flood event when the dam is full and the capacity of the spillway is exceeded. Many small dams are made of earth or rock which can erode or fail if water goes over the dam wall. Dams can also fail if the spillway erodes during high flows. This may also lead to erosion of the downstream dam wall.

Sunny day failures

Sunny day failures can occur at any time without warning or a wet weather event. They are usually caused by water finding its way into voids in the dam wall leading to material being washed out. Eventually the wall, or part of it, may collapse. The voids can be from poor construction, from tree roots growing in the dam wall or from animals burrowing.

What do I need to do to keep my small dam safe?

Keeping your dam safe starts at the planning stage. A good place to start is to consider the impact of your dam on others around you, the environment and on any nearby infrastructure or assets.

Small dams need to be checked and maintained regularly to minimise the loss of water or potential failure.

Summary of things to regularly check about your dam

Dam failure or unexpected water release

- Who lives downstream of your dam and could they be at risk? Make sure you have their contact details so you can warn them in case of an emergency.
- If your dam is declared, make sure your emergency plan is up-to-date and that the NSW State Emergency Service has a copy.

Dam overtopping

- Know the safe operating level of your dam. How much time do you have before it overtops? Can you get water out to reduce the level if you need to do so in a hurry?
- If your dam was to overtop, how and where would that occur? Who or what would be impacted?
- Make sure your dam has a bywash or spillway that is large enough to pass flood flows.
- Is the spillway clear of debris and vegetation? Can it pass flood inflows to its full capacity?
- Is your dam crest, wall and spillway adequately protected so that the material will not erode during rainfall events?

Safety and maintenance

- Manage livestock access to your dam by putting up fences and providing alternative water (where required) or by designing suitable access points. This is important to keep the water clean and minimise erosion from hard hooves and other damage to the dam.
- Don't plant trees and deep-rooted shrubs on the dam wall as these can cause it to seep, leak or even collapse. Plant mat-forming perennial species with outward-extending fibrous roots to keep the wall stable.
- Plant mat-forming water-tolerant grasses on the up-stream side of the dam wall to help reduce wave erosion.
- Regularly check the dam wall for damage from burrowing animals. Repair the wall and control burrowing animals as necessary.
- Regularly check trickle pipes in the dam wall to ensure they remain unblocked.
- Ensure that the spillway area has 100 percent pasture cover with mostly perennial species. Don't plant trees or shrubs on the spillway.
- If you do plant trees and shrubs near the dam, choose small to medium, slow-growing species. Plant them away from the dam edge and downslope from the dam. Avoid planting trees and shrubs in the inflow area, or on the dam wall and spillway.
- If you are unsure, consider engaging an appropriately qualified person to discuss and inspect your dam.

How do I inspect my dam?

Inspecting your dam regularly can help you identify issues early. Inspections should include monitoring the water level, checking the dam inlet and waterline, looking for seepage, sink holes or lush growth, checking for settlement (evidenced by an uneven surface on the wall or crest of the dam), or cracking.

THINGS TO LOOK FOR WHEN INSPECTING YOUR DAM

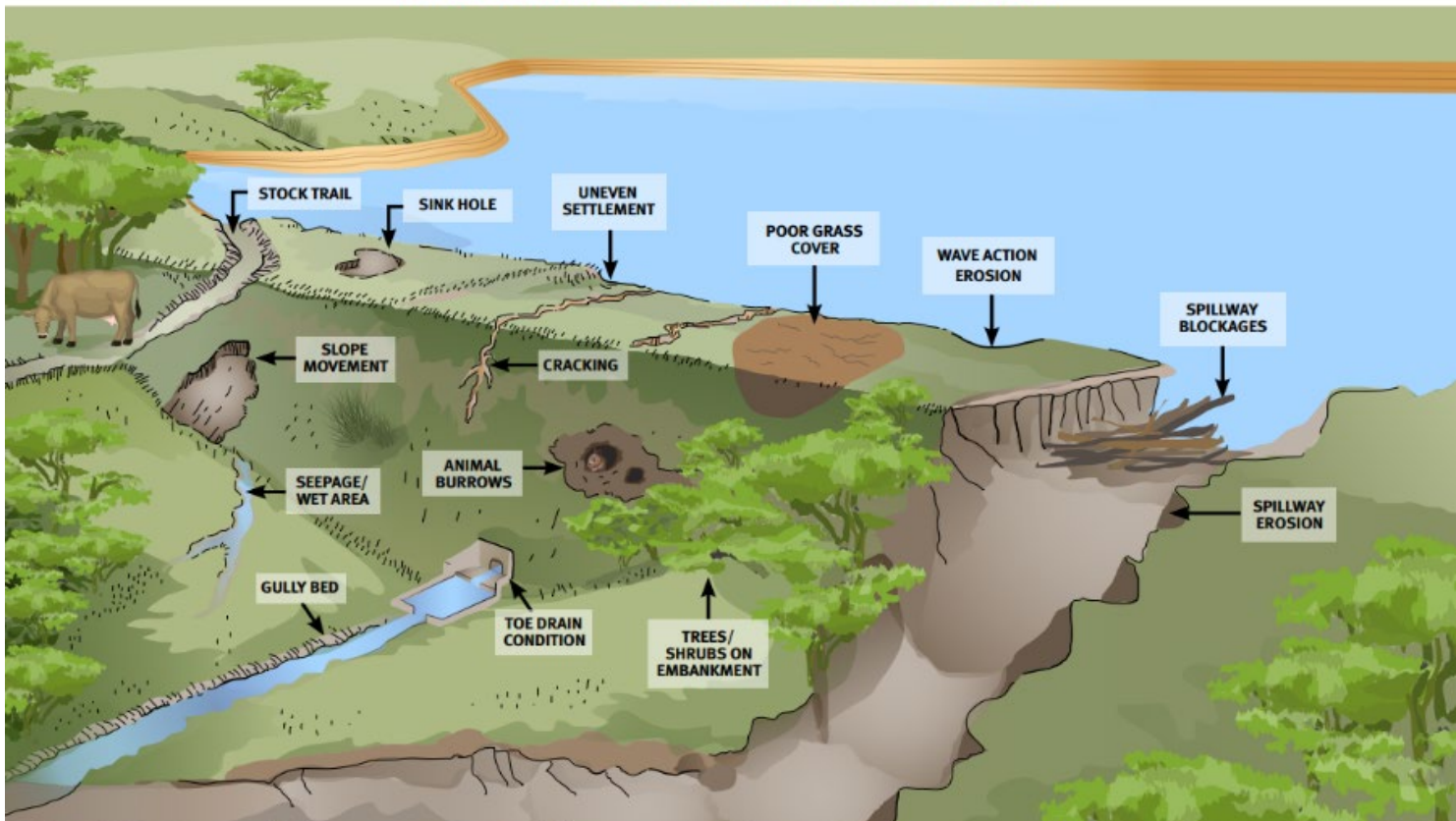


Figure 2 Things to look out for when inspecting your dam. Credit: State of Queensland 2020

Simple dam inspection checklist

Start at the dam inlet

(The dam inlet is where a concentration of water flow comes into the dam. Typically, this is the upstream section of a stream or creek bed from where the dam is collecting water)

Walk slowly around the waterline looking for signs of damage.

Check the water. Look for:

- signs of discolouration
- small whirlpools

Check the dam wall

Walk slowly across the crest and face. Look for:

- a well rounded top (avoid ponding)
- at least one metre above the dam's full water level
- gentle slopes - to allow water to spread across the surface at a slow pace to minimise the risk of erosion during rain events
- erosion
- good cover of topsoil
- good grass cover

Check the spillway. Look for:

- a level and stable surface
- erosion
- large plants
- debris

Check immediately downstream of the dam. Look for:

- seepage, wet or boggy areas
- tunnelling
- erosion
- excessive vegetation

Impact of aquatic weeds on dams

It is important for landholders with dams to report aquatic weeds and remove those that are prohibited or under control orders. Control orders are dependent on the regional weed plan of your area. Certain aquatic weeds, for example giant reed (*Arundo donax*), may destabilise a dam wall. Others, like water hyacinth (*Pontederia crassipes*), salvinia (*Salvinia molesta*), water lettuce (*Pistia stratiotes*), Saggitaria (*Sagittaria platyphylla* or *Sagittaria calycina*), may impede flow or block spillways.

For more information on biosecurity and weeds visit the [NSW Department of Primary Industries website](#). Information about regional strategic weed management plans can be found on the [NSW Local Land Services website](#).

Enrol in the Dams Safety NSW online dam surveillance courses

Dams Safety NSW has developed an online training course, '[Surveillance of embankment dams - routine inspections](#)'. The course is designed to help NSW dam owners understand the activities involved in conducting routine visual inspections of an embankment dam.

You'll learn about embankment dams and how to inspect and assess them. You'll find out about the equipment and records you need, and what to do in the unlikely event that you find signs of problems.

It is recommended that participants have at least six months' experience inspecting dams before attempting the course.

NOTE: successfully completing these courses does not mean you are a 'competent person'.

Concerned about your dam?

For emergencies regarding a dam failing where people may be in danger, call emergency services immediately on **000**. Where possible and safe to do so, warn any neighbours who may be impacted.

For general dam safety concerns and questions, email Dams Safety NSW at info@damsafety.nsw.gov.au with the following information:

- description of the issue
- location or address
- nearby watercourses
- approximate height of the wall and volume of the dam
- distance to the nearest property
- available photos that will help to illustrate the issue to us.

Please note: Dams Safety NSW is the regulator responsible for declared dams only.

For more information

[Dams Safety NSW](#)

Phone: (02) 9842 8073; email: info@damsafety.nsw.gov.au

[NSW Department of Primary Industries](#)

Phone: (02) 6391 3100

[NSW Local Land Services](#)

Phone: 1300 795 299

[Natural Resources Access Regulator](#)

Phone: 1800 633 362; email: nrar.enquiries@nrar.nsw.gov.au

[WaterNSW](#)

Phone: 1300 662 077; email: customer.helpdesk@waternsw.com.au