

Confirming groundwater dependence for mapped high-priority, groundwater-dependent ecosystems

Our process for confirming to a high probability the groundwater dependence of high-priority, groundwater-dependent ecosystems mapped in water sharing plans so that they can be protected according to the plan's rules

Groundwater-dependent ecosystems in water sharing plans

What are groundwater-dependent ecosystems?

There are many different types of ecosystems that depend on groundwater to survive. These include wetlands, streams, lakes, swamps, aquifers, springs, caves and some vegetation communities.

Groundwater-dependent ecosystems (GDEs) need access to groundwater to meet all or some of their water requirements to maintain their communities of plants and animals. Groundwater dependence can vary over time. When large amounts of groundwater are extracted, less water may be available for these ecosystems.

We must be able to identify ecosystems that are dependent on groundwater so that we can meet our legislative and management outcomes for them in NSW.

You can find more information on GDEs on the [Groundwater and the environment and Environmental Outcomes Monitoring and Research Program](#) pages of the department's website. Typical groundwater terms are described in our [Groundwater and drought factsheet \(PDF 270 KB\)](#).

GDEs and water sharing plans

Each water sharing plan for groundwater includes a map that locates potential high-priority GDEs. These mapped GDEs have been identified using the methods detailed in [Methods for the identification of high probability groundwater dependent vegetation ecosystems \(PDF 8.6 MB\)](#). Their ecological value is then determined using the High Ecological Value Aquatic Ecosystems (HEVAE) framework detailed in the research article [A new approach to prioritising groundwater dependent vegetation communities to inform groundwater management in New South Wales, Australia](#). Those determined to have 'very high' and 'high' ecological value are recorded as high-priority GDEs on the maps included in water sharing plans.

Water sharing plans contain distance rules that govern the location of groundwater works to minimise the risk of water extraction adversely affecting GDEs. To apply these rules, we must confirm to a high probability the groundwater dependence for the mapped high-priority GDEs.

It is only necessary to confirm groundwater dependence for the mapped high-priority GDEs. Other GDEs, such as karsts (areas of land formed from rock such as limestone that is worn away by water to make caves and other formations) and springs that are listed in water sharing plan schedules, do not require confirmation.

The confirmation process

We confirm the high probability of groundwater dependence for mapped high-priority GDEs at one of 2 levels:

Level 1 Confirming a high probability of groundwater dependence of mapped high priority GDEs at a groundwater source scale. Where we can, we will confirm the high probability of groundwater dependence of mapped high priority GDEs at the groundwater source scale. Subsequently, all applications for groundwater works or dealings (trade) within restricted distances of the mapped high priority GDEs in these groundwater sources will be assessed based on the groundwater levels determined for the entire groundwater water source.

Level 2 Confirming a high probability of groundwater dependence during a groundwater assessment. Where we can't confirm a high probability of groundwater dependence at the groundwater source scale, we will confirm it on a case-by-case basis, as part of completing the impact assessment that we undertake for any new or amended groundwater work or permanent groundwater dealing¹ application.

Level 1 – Confirming groundwater dependence at a groundwater source scale

We can confirm the high probability of groundwater dependence for mapped high-priority GDEs in an entire groundwater source:

- when information on the groundwater source is well documented
- where the groundwater table is less than 20 metres in depth
- where the entire groundwater source is buried (fully confined) – vegetation is unable to access groundwater in such cases due to its depth.

Dependence cannot be confirmed at the groundwater source scale if:

- parts of the groundwater source are confined or partly confined
- the groundwater table across the water source is not well known
- the groundwater table varies significantly and can be more than 20 metres in depth
- the salinity of the groundwater source is more than 40,000 $\mu\text{S}/\text{cm}$.

Figure 1 shows the groundwater source scale confirmation process.

A confined groundwater source is one where there are layers of impermeable material both above and below the source, meaning water in the groundwater source cannot pass through the sediment which surrounds it.

¹ We are adopting a risk -based approach for temporary dealing applications and will not undertake the level 2 process during any impact assessment for temporary dealing applications. They present less risk to a GDE because any extraction is approved for a short period of time only.

The groundwater table is the uppermost limit of the shallowest groundwater source and can be described as the boundary between aerated surface sediment and saturated sediment below.

Level 2 – Confirming groundwater dependence during a groundwater assessment

For new or amended groundwater works or permanent groundwater dealings, we complete a groundwater assessment to make sure the proposal will not affect connected surface water sources, culturally significant sites, neighbouring water supply works, groundwater quality and high-priority GDEs.

Once we receive an application, we check whether it is in a groundwater source where a high probability of groundwater dependence has been confirmed at a groundwater source scale. If it isn't, we determine groundwater levels for the mapped high-priority GDEs at the location of the application during the groundwater assessment process.

To confirm a high probability of groundwater dependence at a local scale, a hydrogeologist completes a hydrogeological assessment at the site of proposed extraction to gather information about local groundwater settings, including the groundwater source formation (for example, whether it is alluvium, porous or fractured rock), groundwater depth, aquifer type and salinity. The assessment also considers whether the proposal would cause an actual impact to a nearby high-priority GDE.

If a high probability of groundwater dependence of a mapped high-priority GDE is confirmed through the groundwater assessment process, the distance provisions in the relevant water sharing plan will be applied to the proposal. If it is not confirmed, a condition may be applied to the proposal as a precaution. For example, we may impose a condition that a bore must be constructed with a screen depth of 20 metres that is completely sealed to avoid extraction of shallower water, which may be accessed by vegetation.

The process for confirming groundwater dependence during a groundwater assessment is shown in Figure 2.

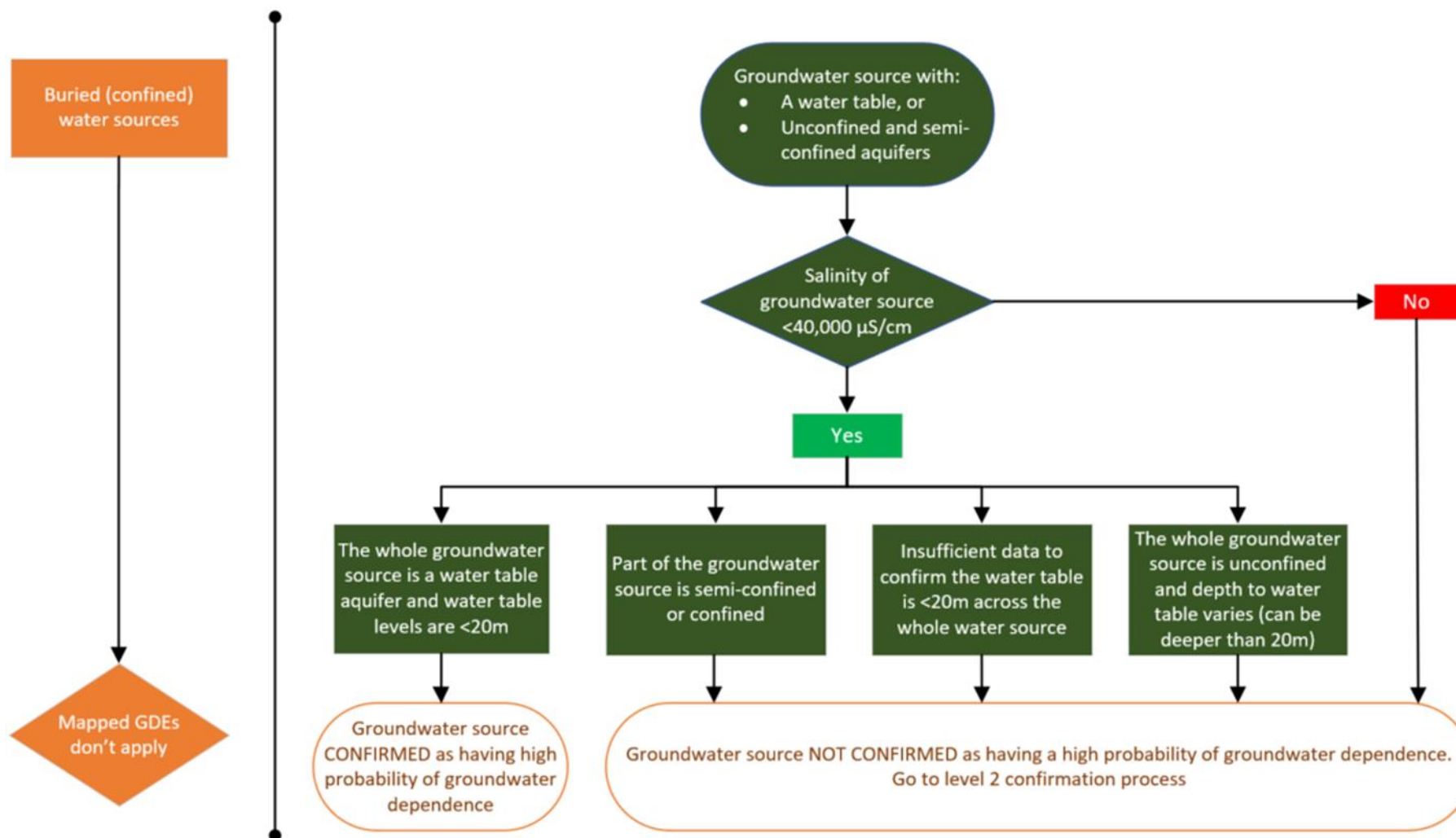
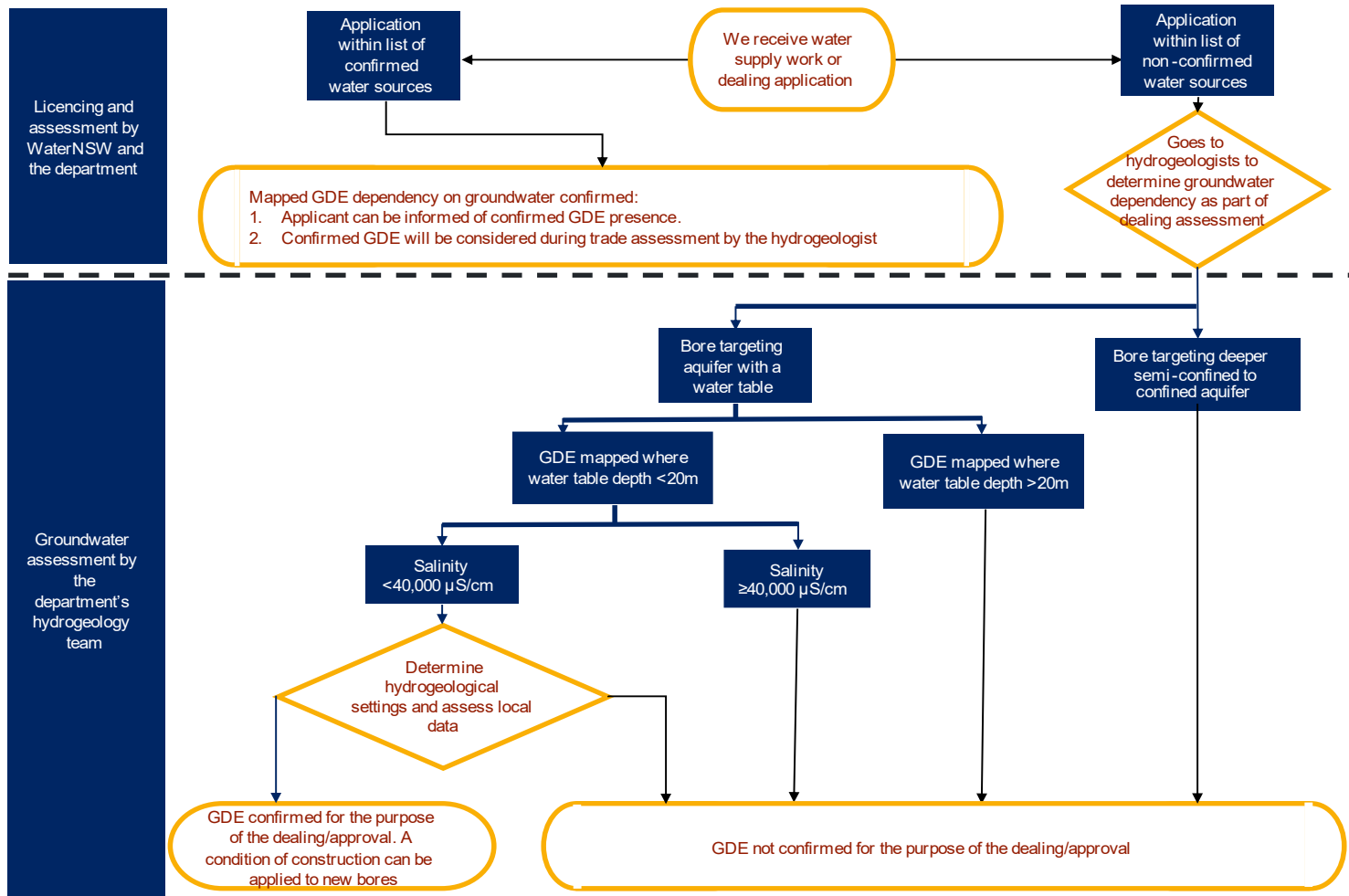


Figure 1. Level 1 process – confirming a high probability of groundwater dependence at a groundwater source scale



Level 2 confirmation process for confirming groundwater dependence of mapped potential GDEs at the individual assessment scale

Figure 2. Level 2 process – confirming a high probability of groundwater dependence during a groundwater assessment