

Bore Risk Assessment Tool – Desktop Assessment

Guidance Manual



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Acronyms	Full form
NT	Northern Territory
RN	Registered Number

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1. Purpose of the Tool

Many Homelands rely on groundwater bores to supply their drinking water. These bores are essential for daily life, but in many cases, we don't have a clear picture of how secure or safe these water sources are. Important details like how many bores are working, how much water is being used, or whether there are any nearby contamination risks—such as septic systems—are often missing or not well recorded. These gaps in information can lead to unexpected bore failures, which are stressful for Homeland residents and expensive for service providers to fix.

To help address this, the NTG Homelands Services Group determined to create practical tools that make it easier to manage and protect water supplies. One of these is the Bore Risk Assessment Tool, designed by Water Technology. This Tool helps people working on the ground, especially those who aren't water experts, quickly assess the risks to Homeland bores and take early action to prevent problems.

The Tool follows a standard risk assessment process. It helps users think through key risk areas, such as:

- Whether the bore water source (aquifer) can keep supplying enough water,
- Whether the bore infrastructure is in good condition, and
- Whether there are any contamination risks nearby.

This guide is a simple companion to the Tool. It shows you how to use the Tool step-by-step and how to collect extra information in the field when needed. You don't need to be a hydrogeologist to use it—but if serious risks are found, the guide explains when it's time to call in a specialist.

1.1. Overview of the Assessment Process

The risk assessment is a **stepwise process**:

Step 1: Desktop Assessment

Use available information (e.g. bore register, maps, reports, photos) to complete the initial risk assessment in the Tool.

Who can do this step? Service Providers, Homelands Managers, Non-technical staff

Step 2: On-Site Verification

Visit the bore to collect missing or uncertain information (e.g. measure distance to septic systems, inspect headworks, confirm fencing). Update the Tool with this new data.

Who can do this step? Service Providers, Homelands Managers

Step 3: Advanced Assessment (If needed)

If the risk rating remains high or uncertain, the Tool will prompt you to consider an **advanced assessment** by a hydrogeologist or technical specialist. A separate summary template is provided to document site-specific data and updated risk evaluation.

Who can do this step? Groundwater Specialists, Hydrogeologists

2. Opening the Tool

The Bore Risk Assessment Tool is provided as an Excel file. This Excel spreadsheet automatically generates reports and data using macros.

Enable macros before using the Tool otherwise it won't work. This spreadsheet is safe to use macros.

The Tool is structured across several tabs to guide users through the assessment process in a logical and easy-to-follow sequence. Each tab has a specific purpose – from providing introductory information, to entering data, viewing results, and documenting advanced assessments.

Most data entry fields in this tool are designed to be flexible and easy to use:

- **Dropdown Lists:** Where possible, you can select an answer from a dropdown menu. This helps keep inputs consistent (e.g. "Yes", "No", "Unknown").
- **Free Text Entry:** In some cases, if the dropdown doesn't suit your situation, you can also **type directly into the same cell**. This allows you to include extra details or site-specific notes where needed.

This approach means you can use the Tool even when some information is uncertain. The diagram below (Figure 1) shows the typical layout of the Tool's tabs, along with a brief description of what each one is used for:

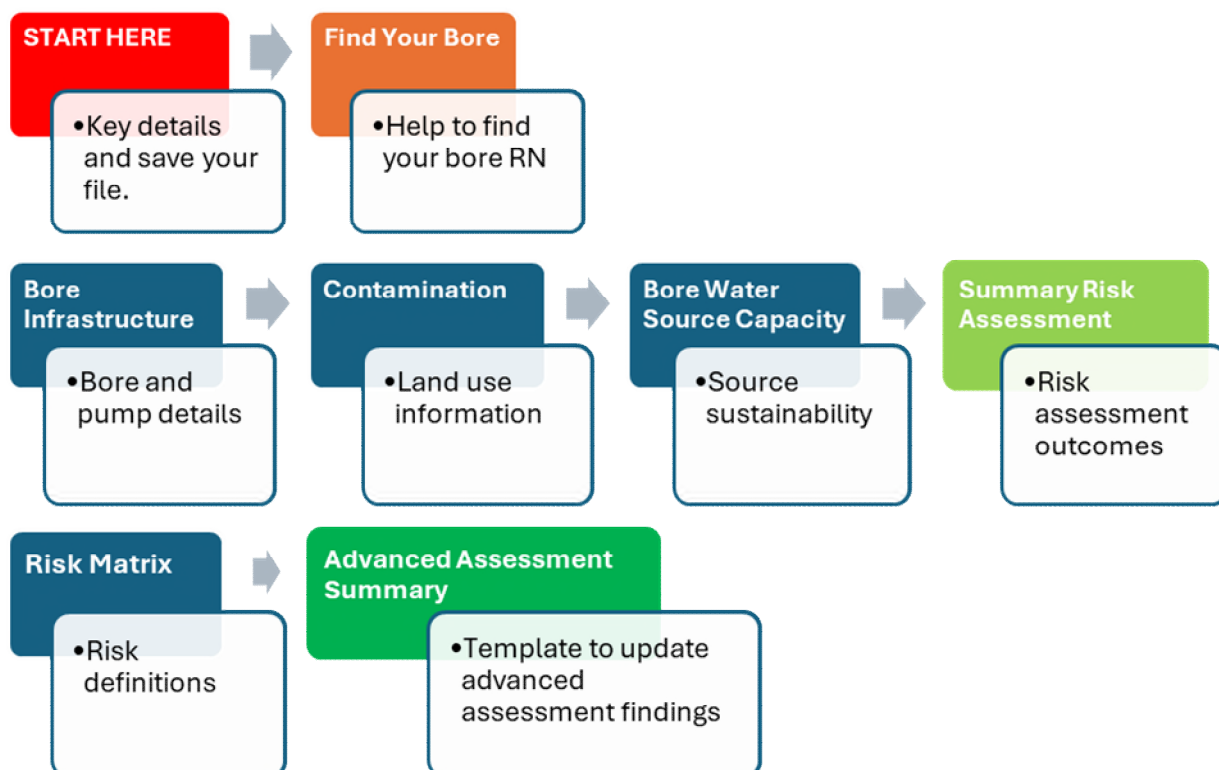


Figure 1 Diagram of Excel tool structure and sheet naming.

3. Using the Tool

Step 1 – START HERE

This tab captures the key information about your Homeland and prompts you to save a working copy of the file.

It also captures the level of assessment, the initial desktop review or the follow-up after on-site verification.

After answering the key questions, toggle the “Click here to save a copy!” button.

Save a copy of the file using the “Click here to save a copy!” button. This will open a ‘save as window’ with the file name pre-filled with your Homeland and bore information. Navigate to your save location to keep a copy of the spreadsheet. Remember to save again once you have filled in all the other tabs and this file can then be shared with others.

Bore Risk Assessment Tool		 WATER TECHNOLOGY WATER, COASTAL & ENVIRONMENTAL CONSULTANTS
Version 1.0 published June 2025		
Question	Answer	Description
What is the name of the Homeland?	Wudapuli	For your records please save a copy of this spreadsheet and answer the questions by filling in the grey boxes. Click here to save a copy! Please click the button below to continue the assessment
What is your name?	D'Arcy Flowman	
What is the date today?	10/06/2025	
Does the Homeland use groundwater?	Yes	
What is the level of this assessment?	Desktop assessment with historical information only	
		Click here to continue

Figure 2 “START HERE” page of the Bore Risk Assessment Tool.

Step 2 – Find Your Bore

Knowing the registered number (RN) of your target bore is critical for finding information about its construction and potential risks.

The best way to find your bore RN (if you don't already know it) is via the Northern Territory Governments "Know Your Bore" application. This can be accessed directly through the Tool or at https://nrmaps.nt.gov.au/knowyourbore_desktop.html

Bore Registration Information



In this section, you will need to locate and enter the Registered Number (RN) for the production bore in your Homeland.

The easiest way to find the RN is by using the "Know Your Bore" website:

1. Go to the website by clicking the button below.
2. Search for the name of your Homeland or the address.
3. Use the map to navigate and identify the production bore(s).
4. Note the Bore Registered Number (RN) shown on the map.

Enter the RN in the field provided below. If there are multiple bores, complete a separate copy of the assessment for each one. If the button doesn't work copy and paste this address into your web browser
["https://nrmaps.nt.gov.au/knowyourbore_desktop.html"](https://nrmaps.nt.gov.au/knowyourbore_desktop.html)

[Click Here to Visit Know Your Bore!](https://nrmaps.nt.gov.au/knowyourbore_desktop.html)

Question	Answer	Description
What is the Bore Registered Number?	RN000001	This is the Registered Number or RN from Know Your Bore - For example RN020371.

Please click the button below to open the bore report in your web browser.
 This will be required in subsequent steps of the assessment, so please keep this webpage open.

[Click Here to View Bore Report](#)

Keep the bore report open in your web browser and click below to proceed to the next step!

Go back

Click here to continue

Figure 3 "Find Your Bore" page of the Bore Risk Assessment Tool.

“Know your bore” allows you to search for bores near a provided address/ community. Generally, a list of bores will be provided that may be used to narrow down the search, however, sometimes Homelands bores are not adequately named, and you will need to manually navigate to your community.

- A search box is in the top left of the window. A specific known address can be inserted, and the map will zoom to the location. If no detailed address is available, inserting the name of the Homeland or nearby community may provide a list of bores to choose from that can assist with navigating.
- If you have no address and cannot find a bore named in accordance with your Homeland, you will need to manually navigate to your location by clicking and dragging on the map. It can help to navigate to the nearest known large community first and then following roads to where you know the Homeland to be.
- Once the Homeland community is located, you can navigate by clicking and dragging on the map. All nearby registered bores will be visible.
- Using your knowledge of the site, identify which bore (or bores) have pumps installed and are used for water supply. These are the bore RNs you will use in the Bore Risk Assessment Tool.

Once you have located your bore RN and entered it into the Tool, several fields on subsequent tabs should pre-populate with data known about that bore. However, in some cases, that may not have been entered into the Northern Territory government database that is linked to the Tool, and you will need to manually enter the information.

This information is often found on the Bore Report for your bore and a link will be active on the Find Your Bore tab once a RN number has been entered.

- The bore report will contain a lot of information about the bore including the date it was drilled, the total depth and screen depths, a description of the rock types encountered, and details of construction materials used to case the bore.

“There are no registered bores near my Homeland, but I know we use bore water for water supply.”

The Tool works by drawing information from a background database linked to the bores RN. If there are no registered bores located near your Homeland, it may be because the bore is un-registered, or it has been loaded to “Know Your Bore” in the wrong location. You will not be able to continue the Risk Assessment and will need a site visit to confirm bore details.

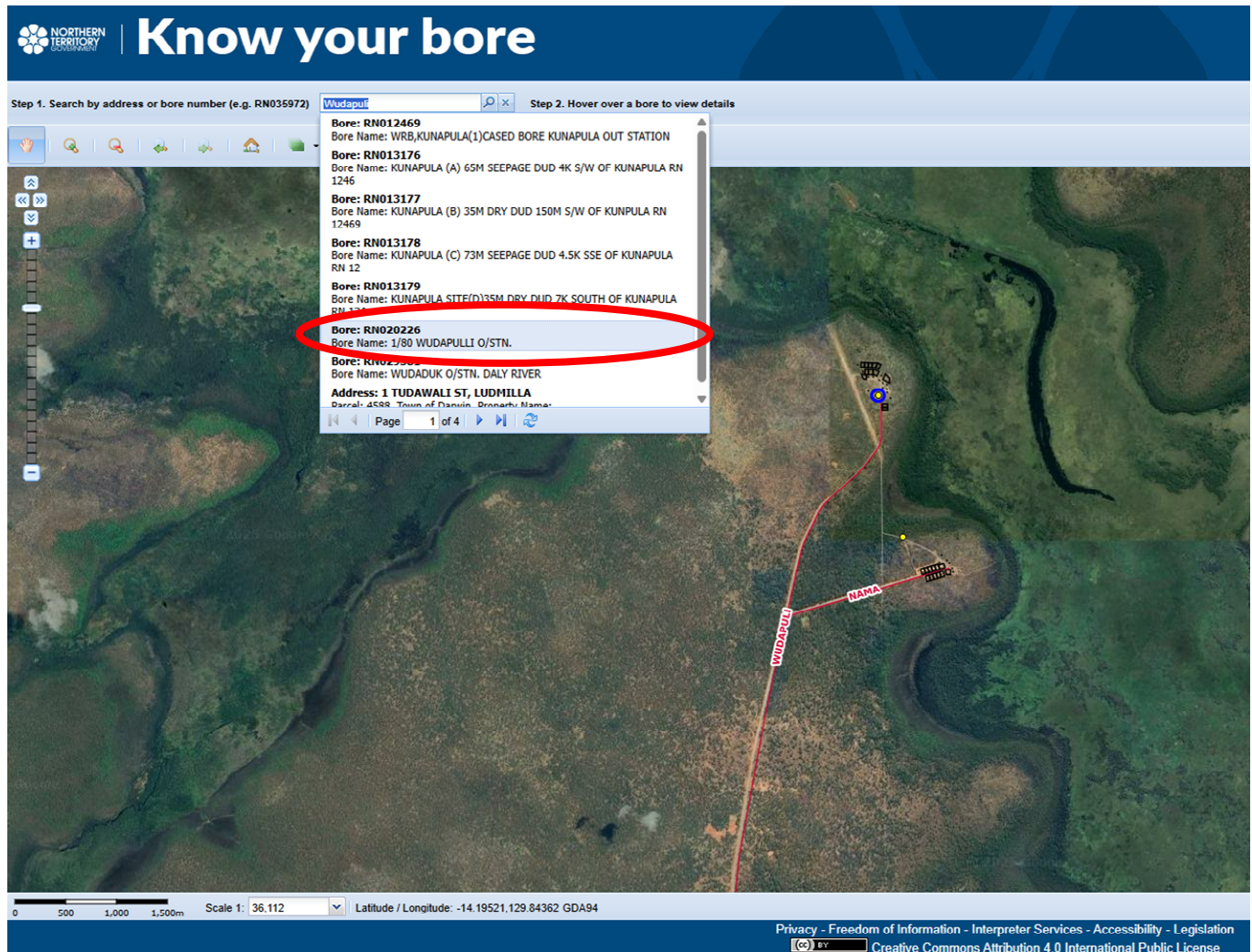


Figure 4 The example above shows 'Wudapuli' as the search input and a list of bores which may be relevant. The search returned a bore with the name Wudapuli Outstation. Selecting this bore will zoom the map to the chosen location. The RN for the 'Wudapuli Outstation' bore is RN020226 and is entered into the tool.

Step 3 – Bore Infrastructure

This page captures key details about the bore and water infrastructure for the selected Homeland. It combines **auto-filled data**, **dropdown options**, and **free-text fields** to help you complete the assessment with the information you have.

Review and edit the 'Answer' column

- Some answers are **auto filled** from available datasets (like bore age and depth to water).
- You can **override these** by typing into the green-shaded cells if the information is incorrect or missing.
- Many cells include **dropdown menus** – click the arrow to select an answer.

Use the 'Comments' column

- This information will not be used in the initial risk calculation but allows a space to make notes which may be relevant if further assessment (either Step 2: On-site Verification or Step 3: Advanced Assessment) is required.
- Add **notes or observations** from personal knowledge or the site visit, such as:
 - o “Fence is damaged”
 - o “Pump makes loud noise”
 - o “Unable to access bore – locked gate”

Watch for Colour Cues

- **Red text** = auto-filled from an external source (e.g. NR Maps).
- **Green-shaded cells** = optional override areas – use if you have more accurate info.
- **Grey cells** = editable text/dropdown inputs.

Not Sure What to Enter?

- It's okay to leave a cell as **“Unknown”** if the information isn't available. The Tool will still work and flag high-risk gaps automatically. This will inform what information needs to be collected during Step 2: On-site Verification.

Saving Your Progress

- You can save your file at any time using the "Save a copy" button on the home page simply click the small **save icon** () at the very top left of the Excel window.
- After completing this page, click the green **“Click here to continue”** button to move to the next section.

Step 4 – Contamination

This page collects information about how the bore might be affected by contamination sources or land uses nearby. Use it to record any known or observed risks that could impact bore water quality.

Review and edit the 'Answer' column

- Use dropdowns – click the arrow to select an answer.
- Directly type answer into the cell where appropriate.

Use the 'Comments' column

- This information will not be used in the initial risk calculation but allows a space to make notes which may be relevant if further assessment (either Step 2: On-site Verification or Step 3: Advanced Assessment) is required.
- Add context or field observations, such as:
 - o “Septic tank visible ~400 m downhill”
 - o “No monitoring conducted in last 12 months”
 - o “Animal pens located ~200 m north of bore”
- This is particularly useful where the answer is “Unknown”, or the situation is unclear.

If You Don't Know the Answer

- Write or select “Unknown” in the cell.
- These unknowns will help highlight data gaps and trigger a recommendation for further investigation if needed.

Saving Your Progress

- You can save your file at any time using the “Save a copy” button on the home page simply click the small **save icon** () at the very top left of the Excel window.
- After completing this page, click the green **“Click here to continue”** button to move to the next section.

Step 5 – Bore Water Source Capacity

This page collects information about the bore water source capacity. This allows an assessment of whether the pumping rate is sustainable in the long-term.

Review and edit the 'Answer' column

- The first answer is **auto filled** from available datasets (1:2M aquifer mapping)
- You can **override this** by typing into the green-shaded cells if the information is missing or an updated value is available.

Pumping test results are sometimes included in the bore report. These results will give a more accurate source yield than the pre-filled mapping.

Use the 'Comments' column

- This information will not be used in the initial risk calculation but allows a space to make notes which may be relevant if further assessment (either Step 2: On-site verification or Step 3: Advanced Assessment) is required.
- Add context or field observations, such as:
 - o “Pumping test data available in bore report from 1987”

Saving Your Progress

- You can save your file at any time using the "Save a copy" button on the home page simply click the small **save icon** () at the very top left of the Excel window.
- After completing this page, click the green **“Click here to continue”** button to move to the next section.

Step 6 - Reviewing the Risk Ratings

This page shows the automatically generated risk ratings for your selected Homeland bore, based on the data you've entered and pre-calculated information for your Homeland. It also summarises your inputs, under the likelihood and consequence headings, to assist with understanding the drivers for the risk ratings.

Each row represents a specific risk scenario, such as bore water source failure or infrastructure breakdown, and includes:

- The risk statement (what could go wrong).
- A summary of the consequence and likelihood criteria based on local conditions and entered data.
- The overall risk rating.
- Suggested management actions to reduce or prepare for that risk.

Understanding the Colour Coded Risk Matrix

The Risk Rating column uses colour to help you quickly identify priorities:

Colour	Risk Level	What it means
Red	Severe	Immediate attention required. High likelihood and/or severe consequence. Plan urgent mitigation or further assessment.
Orange	High	High priority. Should be addressed in the short-term with mitigation, additional monitoring, or contingency planning.
Yellow	Moderate	Medium risk. May be acceptable short-term but should be monitored or improved when possible.
Green	Low	Low or unlikely risk. Continue routine monitoring and maintenance

Additional information about the scoring and calculations can be found in the accompanying report, **"Water for Homelands – Bore Risk Assessment Tool: Technical Report"** (Water Technology, 2025b).

What You Should Do

- Read each row carefully to understand which risks are driving your results.
- Pay close attention to red and orange rows – these are your highest risks.
- Review the suggested management actions to guide next steps.

Saving Your Progress

- You can save your Excel file at any time using the "Save a copy" button on the home page or the simply click the small **save icon** () at the very top left of the Excel window.
- At the bottom of the "Results" page is the option to save the summary as a PDF document. This allows you to easily share the outcome of the risk assessment with other stakeholders.

4. What to Do with the Results

Once you've reviewed the risk assessment table, you can use the management actions column to decide your next steps.

If You Used Historical/Desktop Information Only

If this is the first time you are using the Tool and you've only entered desktop or historical data, the suggested management actions will often recommend a site assessment. This is because:

- Some risks cannot be properly evaluated without inspecting the bore and surrounding area.
- Key information like fence condition, pump type, or proximity to contamination may be missing.

The Tool will highlight data gaps and recommend on-site verification where needed.

In these cases, you should refer to the companion document: **"Bore Risk Assessment Tool – On-site Data Collection Procedures"** (Water Technology, 2025a). This guide explains how to collect relevant information in the field, including measurements, observations, and photos.

If This is the Second Assessment (After Site Visit)

After you return from the field and re-enter updated information, the Tool will automatically recalculate the risk. At this point:

- The suggested management actions will become more specific, based on the full dataset.
- Some risks may drop to a lower category.
- Where risks remain high, you'll get clearer guidance about what additional actions may be required to minimise or reduce the risk of sudden / unexpected water source failure.

If Risks Are Still High or Can't Be Addressed

If either the risks remain high or severe even after site information is added, or the suggested actions (e.g. bore upgrades, fencing, emergency supply) cannot be implemented for some reason then you should raise this with your funder and consider progressing to an Advanced Hydrogeological Assessment.

This should be completed by a qualified professional, who will:

- Analyse site-specific hydrogeological data (e.g. aquifer conditions, water levels, gradients).
- Re-assess the risk using expert knowledge.
- Complete the Advanced Assessment Summary Template provided with the Tool.

5. Advanced Assessment Trigger

While the Bore Risk Assessment Tool is designed to support early decision-making, there are situations where it cannot provide a definitive answer. This is usually due to:

- **Limited or uncertain information** (e.g. bore construction is unknown, aquifer type not confirmed).
- **Complex site conditions** that cannot be captured by simple inputs.
- **Interactions between multiple risks** (e.g. contamination and infrastructure failure).

The Tool is intentionally simplified to allow consistent use across multiple sites by non-expert users. It does not model factors like hydraulic gradient, aquifer confinement, or contaminant transport, which require professional judgment and site-specific data.

Example Situations That May Require Advanced Assessment

- A bore is located 100 m from a septic tank but is upgradient and separated by low-permeability clays – the Tool may still flag this as high risk.
- A bore has very low yield and intermittent supply issues, but the aquifer system is not well understood – the Tool can't evaluate long-term sustainability.
- Several critical data points remain “unknown” even after a site visit – the risk may remain high simply due to uncertainty.

In these cases, a more detailed hydrogeological investigation is needed to refine the risk rating and inform appropriate action.

Tools and Techniques Used in an Advanced Assessment

When an Advanced Hydrogeological Assessment is required, a groundwater (bore water) professional will use specialised tools and methods to better understand the risks to a bore and/or water source and determine if management actions need to change. These assessments are tailored to site-specific conditions and often involve:

In-Depth Literature Review and Background Research

- Involves reviewing existing reports, bore logs, geological maps, groundwater studies, and regulatory datasets relevant to the site.
- Helps to fill data gaps when site-specific fieldwork isn't feasible, or to contextualise findings within broader aquifer or catchment knowledge.
- May include analysis of previous drilling programs, historical water quality trends, remote sensing, or land use change over time.

Geological and Lithological Interpretation

- Based on drilling logs, core samples, or site observations.
- Identifies aquifer confinement, permeability barriers, and likely contaminant transport pathways.

Downhole Camera Inspections or other downhole tools

- Uses a specialised camera lowered into the bore to visually inspect the casing, screens, joints, and internal condition of the bore.

- Helps identify damage, corrosion, blockages, sediment build-up, or evidence of cross-connection between aquifers.
- Provides direct visual evidence to support decisions about bore rehabilitation, decommissioning, or risk categorisation.

Aquifer Pumping Tests

- Used to evaluate aquifer and bore performance and how much water a bore can sustainably supply
- May include step drawdown tests, constant rate pumping tests, and recovery monitoring.
- Helps determine aquifer transmissivity, storage, and borefield reliability.

Water Level, Hydraulic Gradient and Flow Path Analysis

- Requires measurement of water levels in nearby bores or mapping of topography and aquifer heads.
- Helps determine whether a bore is upgradient or downgradient from a contamination source — crucial for understanding actual risk.
- Helps determine whether the pump is adequately submerged below the standing water level.

Water Quality and Isotope Analysis

- Can include targeted sampling for pathogens, nutrients, metals, or environmental tracers.
- Helps understand recharge sources, contamination timing, or mixing between aquifers.

Analytical or Numerical Modelling

- Used to simulate groundwater flow and predict the effect of pumping on water levels or contaminant movement.
- Can incorporate aquifer geometry, boundaries, recharge rates, and groundwater gradients.
- Useful for testing scenarios like “What happens if a nearby septic fails?”

Note: Some of the data required for an advanced assessment can be collected by a non-expert (e.g. community infrastructure staff, rangers, or field contractors). This may include:

- Collecting water samples for lab analysis.
- Capturing downhole camera footage.
- Documenting site observations (e.g. distances to potential contamination sources, headworks condition).

However, it is essential that non-expert users consult with a qualified hydrogeologist or groundwater professional to:

- Determine which methods or tools are appropriate for the risks identified at the site.
- Ensure that data collection is targeted and fit-for-purpose.
- Guide interpretation and help identify appropriate next steps.

6. Tips for Finding Information

Additional information and maps

The Bushtel website can also provide some additional context about your Homeland. For example, you can search for your Homeland by name. This then brings up links to a map and a community profile.

“The Bushtel website (<https://bushtel.nt.gov.au/>) can also be useful to get additional information about your Homeland.”

The screenshot shows the Northern Territory Government BUSHTEL website. The search bar contains '220 CORELLA CREEK' and the dropdown menu is set to 'Administrative Boundaries'. The search results show '220 CORELLA CREEK' with aliases, electorate (BARKLY), and local government wards (KUWARRANGU). To the right of the results, three links are circled in red: 'Map', 'Profile', and 'SLAP Map'. A map of the Northern Territory is displayed on the right side of the page, showing the location of Corella Creek in the north-eastern part of the territory.

Figure 5 The example above shows 'Corella Creek' as the search input and the links to more information are circled in red.

What is the distance from septic to the production bore?

If you don't know the distance to the closest septic system and your production bore, you can estimate it prior to a field trip using "Know Your Bore".

- Septic systems are usually co-located with dwellings so an estimate of distance can be measured using satellite imagery.
- In "Know Your Bore" there is a scale in the bottom left corner that can be used to estimate distance. In the example below the nearest dwelling to the east is approximately 100m away from the bore.
- Accurate distances can be measured during a site visit, if required.

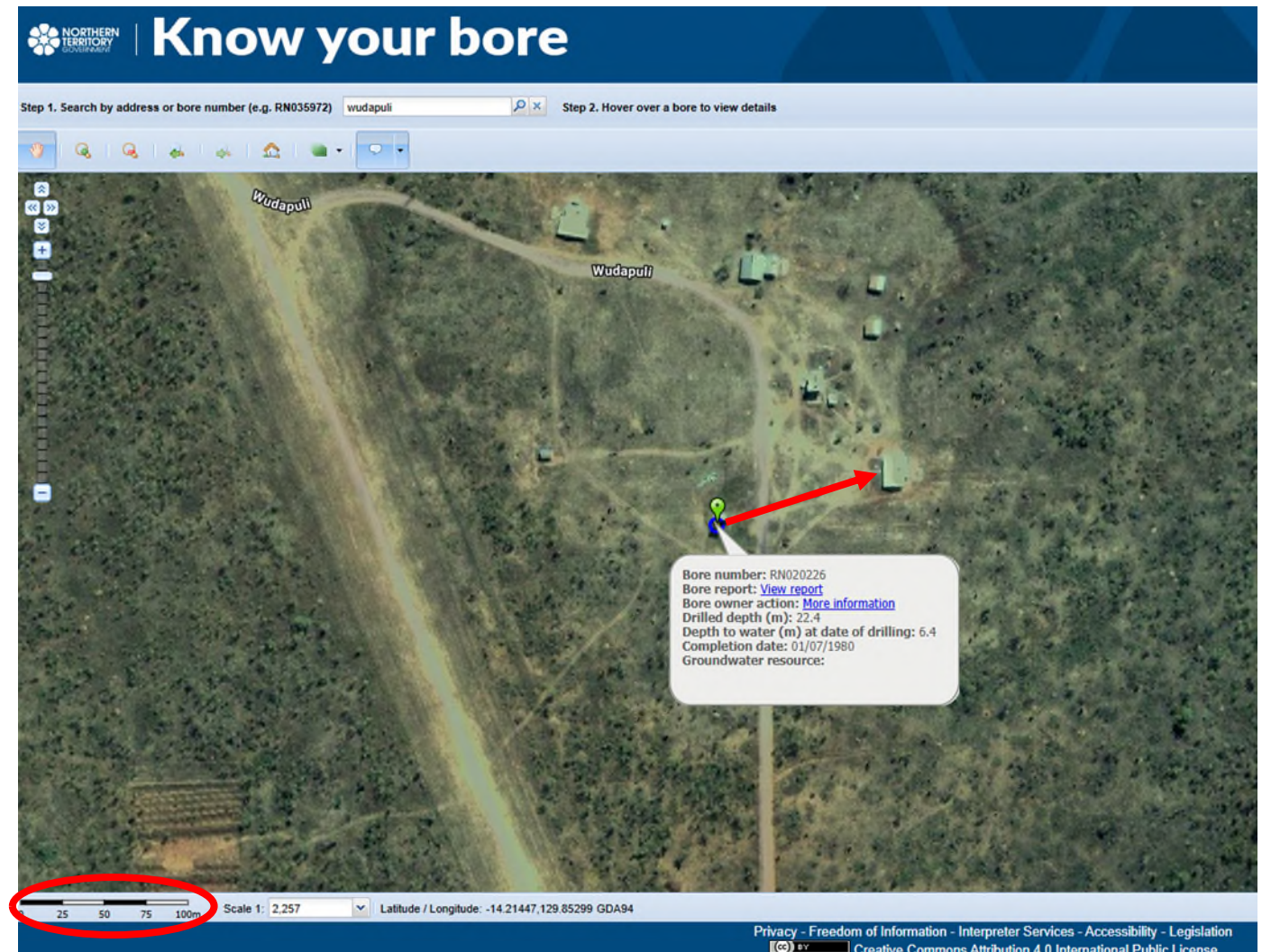


Figure 6 The example above shows the location of the scale bar and the approximate distance to the nearest dwelling from the production bore.

Are there any major groundwater affecting activities nearby?

Major groundwater affecting activities may include mining activities or irrigated agriculture projects. If you unfamiliar with the area, this can be investigated using “Know Your Bore”.

- In “Know Your Bore” there is a scale in the bottom left corner that can be used to estimate distance. The examples below show what a mining development and irrigated agriculture may look like on satellite imagery.

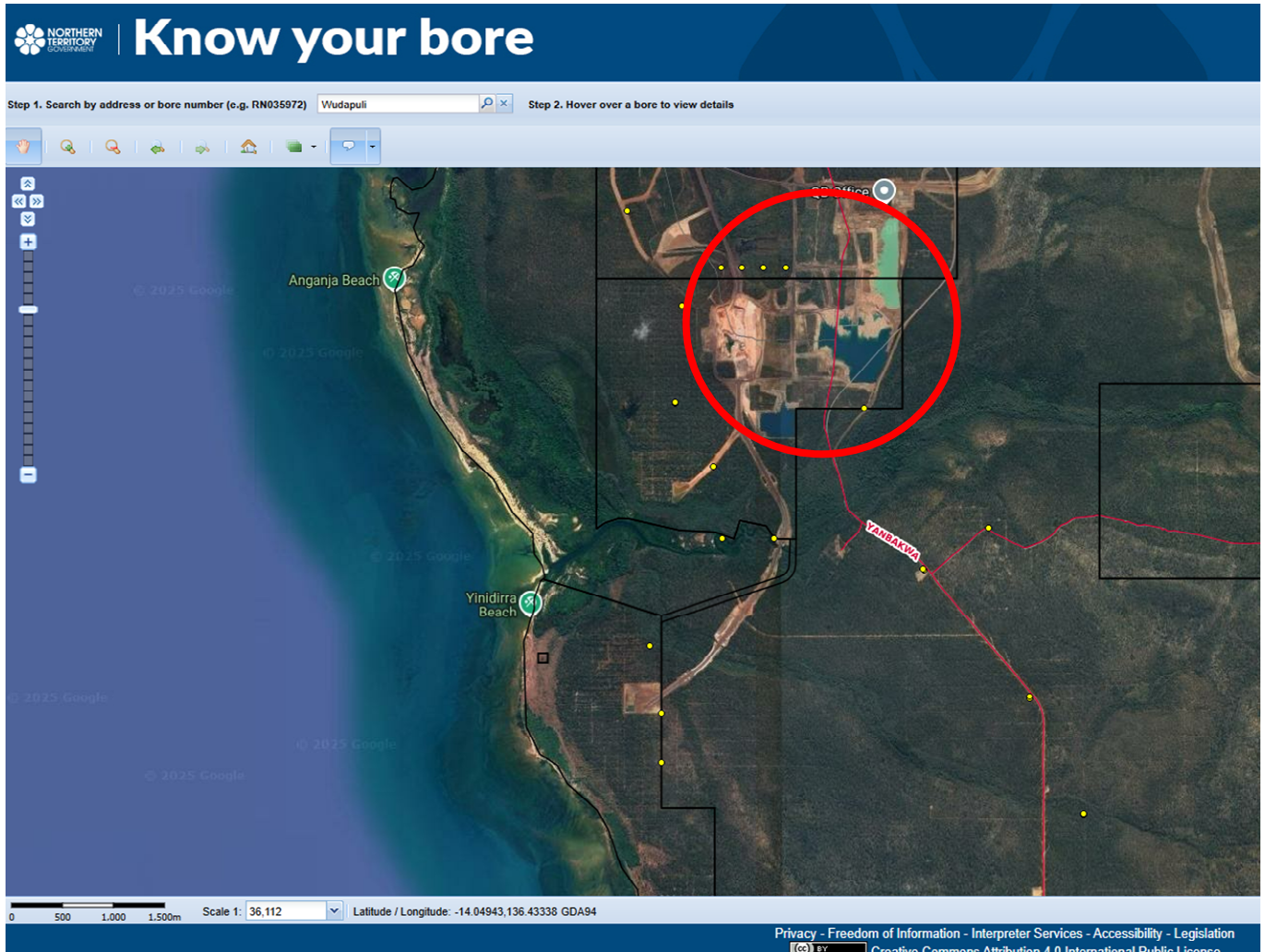


Figure 7 The example above shows an example of a mining development.



Figure 8 The example above shows an example of irrigated agriculture.

7. Need Help?

Water Technology Pty Ltd – Groundwater Discipline

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Ekistika

Homelands Services Group

8. Glossary

Term	Definition
aquifer	A geological formation or group of formations capable of storing and transmitting usable quantities of groundwater.
aquifer confinement	The condition in which an aquifer is overlain by a low-permeability layer (such as clay or shale) that restricts the vertical movement of water. This creates a confined aquifer, where groundwater is under pressure, as opposed to an unconfined aquifer, which is directly recharged from the surface.
aquifer performance	The capacity of an aquifer to yield water over time, typically evaluated through aquifer pumping tests and water level response.
aquifer pumping tests	Controlled field tests where groundwater is pumped from a bore at a known rate to observe the response in water levels over time. These tests are used to determine aquifer properties such as transmissivity, storativity, and hydraulic connectivity, and to assess bore performance and sustainable yield.
aquifer storage	The capacity of an aquifer to store water, typically described by the storage coefficient or specific yield, depending on confinement.
aquifer transmissivity	A measure of how much water an aquifer can transmit horizontally, calculated as the product of hydraulic conductivity and saturated thickness.
bore water source	The local aquifer that stores groundwater.
borefield reliability	The ability of a group of bores (borefield) to consistently meet water supply demands under varying conditions.
constant rate pumping test	A type of aquifer pumping test where water is pumped at a steady rate to observe drawdown and assess aquifer transmissivity and storage properties.
contaminant transport pathways	Routes through which pollutants move from a source to a receptor, including soil, groundwater, surface water, and infrastructure cracks.
contamination	The presence of harmful or unwanted substances in the bore water source that degrade its quality and pose a risk to human health or the environment.
down-hole camera	A device lowered into a borehole to visually inspect the casing, screens, water column, and structural condition of the bore.
environmental tracer	A chemical or isotopic marker (natural or introduced) used to track groundwater movement, recharge rates, or contamination pathways.
flow path analysis	The process of identifying and mapping the trajectory that groundwater follows through an aquifer system, based on hydraulic gradients, aquifer properties, and geological structure, often used to assess contaminant transport or recharge zones.
groundwater	Water located beneath the Earth's surface in soil pores and fractures of rock formations, stored within aquifers and accessed via bores or springs.
hydraulic gradient	The slope of the water table or potentiometric surface, driving the direction and rate of groundwater flow.
headworks	The above-ground infrastructure at a bore or well, including components such as casing, pumps, valves, access ports, and protective covers, used to control, protect, and access the groundwater supply.
Homeland	A small, remote Aboriginal community in the Northern Territory, typically located on Aboriginal-owned land, that is eligible for NT Government Homelands Program support.

hydrogeologist	A scientist who studies the distribution, movement, and quality of groundwater within soils and rocks, typically to assess water availability, manage groundwater resources, or evaluate environmental risks.
isotope analysis	A technique used to measure the ratios of stable or radioactive isotopes in water to trace its origin, age, recharge processes, and interactions with the environment. Commonly applied in hydrogeology to identify groundwater sources, mixing zones, and residence times.
macro	A set of programmed instructions in Excel that automates repetitive tasks or complex operations, typically written in Visual Basic for Applications (VBA) and triggered by a command or button.
pathogen	A microorganism (e.g. bacteria, virus, protozoa) that can cause disease in humans or animals when present in water sources.
permeability barriers	Subsurface features (e.g. clay layers, faults) that significantly restrict or block groundwater flow within or between aquifers.
recharge sources	Natural or artificial inputs of water that replenish an aquifer, such as rainfall infiltration, river leakage, or managed aquifer recharge.
registered number (RN)	A unique identifier assigned by the Northern Territory Government to each water bore. The RN must be clearly and permanently displayed on the bore and included in all official documentation, such as the Statement of Bore form. This number is essential for tracking bore construction, maintenance, and compliance with water regulations.
step drawdown test	A short duration aquifer pumping test in which the discharge rate is incrementally increased in steps to assess well efficiency and aquifer response.
sustainable yield	The maximum rate at which groundwater can be extracted from an aquifer without causing long-term decline or adverse environmental impacts.
topography	The arrangement of natural and artificial physical features of the landscape, which influences surface drainage and groundwater flow.

9. References

Water Technology (2025a). Bore Risk Assessment Tool – On-site Data Collection Procedures. June 2025.

Water Technology (2025b). Water for Homelands – Bore Risk Assessment Tool: Technical Report. June 2025.