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NSW Aquifer Interference Policy

From the eyes of a regulator

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Hydrogeology

From Wikipedia, the free encyclopedia

This article includes a list of references, but **its sources remain unclear because it has insufficient inline citations**. Please help to improve this article by introducing more precise citations. *(September 2007)*

Hydrogeology (*hydro-* meaning water, and *-geology* meaning the study of the Earth) is the area of geology that deals with the distribution and movement of groundwater in the soil and rocks of the Earth's crust (commonly in aquifers). The term **geohydrology** is often used interchangeably. Some make the minor distinction between a hydrologist or engineer applying themselves to geology (geohydrology), and a geologist applying themselves to hydrology (hydrogeology).

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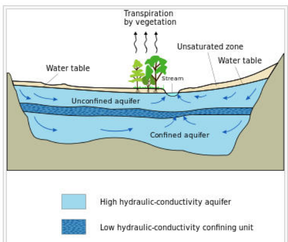

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- Commenced September 2012
- Followed on from several years of earlier development and an election commitment
- Applies across the state
  - *Water Management Act 2000*
  - *Water Act 1912*
- Provides clear and objective guidance to ensure project impacts are properly managed

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NSW Aquifer Interference Policy – key points

- Account for all water taken, including post closure
- Assess impacts
  - Water table
  - Water pressure
  - Water quality
- Understand and quantify risks, outline mitigation and risk management strategies

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AIP: Accounting for water

- Must account for all water for regardless of quality
- All affected water sources must be considered
- Water licences may be required in multiple sources and multiple water sharing plans
- Assessment against rules of water sharing plan
- Must account for ongoing take
- Passive inflow and seepage is considered take

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AIP: Accounting for water - tips

- Clear and unambiguous tables
- Consolidated summary – surface & groundwater
- Indication if water is required for operation or is incidental
- Annual & maximum, year by year if possible
- Present information in a consistent format
- Ensure management against existing water licences is clear

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AIP: Assessing the impacts

- Groundwater types
  - highly productive (as mapped – not site specific)
  - less productive
- Aquifer types
  - Alluvial
  - coastal sands
  - porous rock
  - fractured rock

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AIP: Assessing the impacts

- Impact types
  - water table
  - water pressure
  - water quality
- Impacts on water dependent assets
  - water supply bores
  - groundwater dependent ecosystems
  - groundwater dependent culturally significant sites
  - highly connected water sources (incl surface water)

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AIP: Assessing the impacts

- Level 1 impacts are defined as acceptable
- Level 2 impacts will need additional work

Table 1 – Minimal Impact Considerations[1] for Aquifer Interference Activities

Highly Productive Groundwater Sources			
	Water Table	**Water Pressure**	**Water Quality**
1. Alluvial Water Sources These considerations apply to all highly productive alluvial groundwater sources except those listed at item 1.1	1. Less than or equal to a 10% cumulative variation in the water table, allowing for typical climatic "post-water sharing plan"[2] variations, 40m from any: (a) high priority groundwater dependent ecosystem; or (b) high priority culturally significant site; listed in the schedule of the relevant water sharing plan; or A maximum of a 2m decline cumulatively at any water supply work. 2. If more than 10% cumulative variation in the water table, allowing for typical climatic "post-water sharing plan" variations, 40m from any: (a) high priority groundwater dependent ecosystem; or (b) high priority culturally significant site; listed in the schedule of the relevant water sharing plan then appropriate studies[5] will need to demonstrate to the Minister's satisfaction that the variation will not prevent the long-term viability of the dependent ecosystem or significant site. If more than 2m decline cumulatively at any water supply work then make good provisions should apply.	1. A cumulative pressure head decline of not more than 40% of the "post-water sharing plan"[2] pressure head above the base of the water source to a maximum of a 2m decline, at any water supply work. 2. If the predicted pressure head decline is greater than requirement 1. above, then appropriate studies are required to demonstrate to the Minister's satisfaction that the decline will not prevent the long-term viability of the affected water supply works unless make good provisions apply.	1. (a) Any change in the groundwater quality should not lower the beneficial use category of the groundwater source beyond 40m from the activity; and (b) No increase of more than 1% per activity in long-term average salinity in a highly connected surface water source at the nearest point to the activity. Redesign of a highly connected[3] surface water source that is defined as a "reliable water supply"[4] is not an appropriate mitigation measure to meet considerations 1.(a) and 1.(b) above. (c) No mining activity to be below the natural ground surface within 200m laterally from the top of high bank or 100m vertically beneath (or the three dimensional extent of the alluvial water source - whichever is the lesser distance) of a highly connected surface water source that is defined as a "reliable water supply". (d) Not more than 10% cumulatively of the three
1.1 Lower Murrumbidgee Deep Groundwater source		1. A cumulative pressure head decline of not more than 40% of the "post-water sharing plan" pressure head above the top of the relevant aquifer[7] to a maximum of a 3m decline, at any water supply work. 2. If the predicted pressure head decline is greater than requirement 1. above, then appropriate studies are required to demonstrate to the Minister's satisfaction that the decline will not prevent the long-term viability of the affected water supply works, unless make good provisions apply, unless make good provisions apply.	

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AIP: Assessing the impacts - tips

- Clearly identify sensitive receptors
  - Water users
  - GDEs
  - Town water
  - Etc
- Who or what could be impacted?
- GDEs – address <u>all</u> GDEs, not just high priority
- Water quality – categorise the existing beneficial uses

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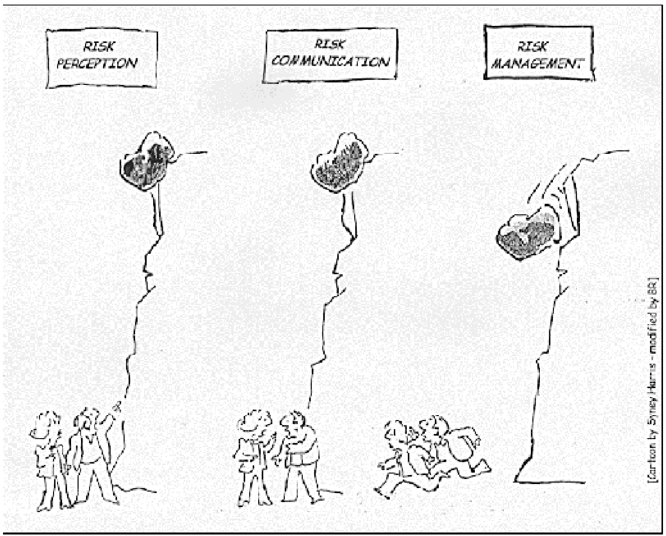
AIP: Risk management



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AIP: Risk management

- Understand the risks
- Minimise risks (avoid, prevent, reduce)
- Plan remedial actions
- Ensure appropriate conditions
- Update modelling as data improves
- Monitoring
- Security deposits
- Penalties

AIP: Risk management - tips

- Understand and define uncertainty, sensitivity
- What are the potential impacts if modelling is not perfect?
- How could these impacts be managed?
- What monitoring is required?
- Need an understanding of feasible and available mitigation options up front.
  - Details of application of measures can be deferred to post-management plan, but we need to understand that feasible options exist.

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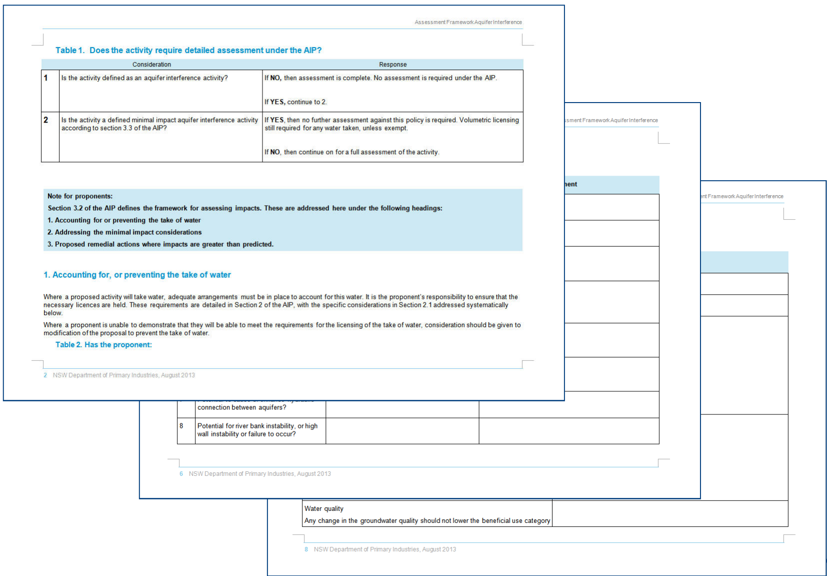
AIP Assessment framework



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Modelling

- Bad data = bad model
- Understand and use the Australian GW modelling guidelines
- Consider alternative conceptualisations
- Classify, and justify model confidence classification according to guidelines
- Peer review – use template
- Provide information on ongoing review and validation of model – and what will be done if predictions are a long way out

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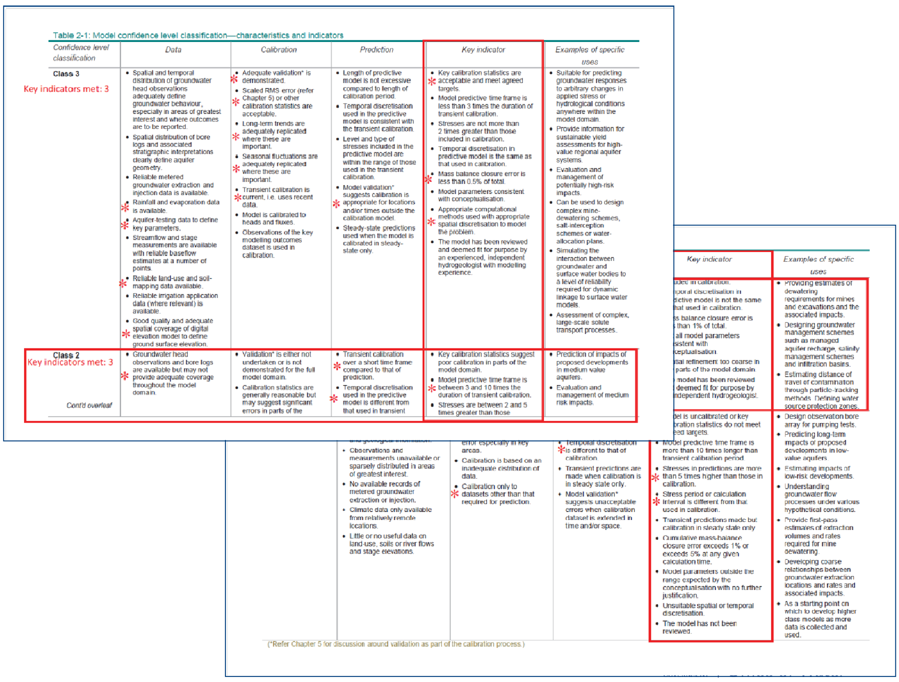

General tips – help us help you

- Don’t make us solve a puzzle. Key points should be up front and centre.
- Use available templates and guidelines.
- Avoid extensive cross-referencing – it can be hard to manage and review.
- High quality maps and diagrams
- Visualisation assistance – x-sections, 3D
- Use standard and consistent bore numbers
- Responding to submissions – tabulated responses are great

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More information

- Fact sheets
- Website
- Guidelines
- Assessment framework
- Guide to the AIP (coming soon!)

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