Standardising variations in the language of natural resource management across state, discipline and audience borders

This paper is the second part of the Schmidt and Ahmad presentation.

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About the author

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Context

The Murray–Darling Basin Sustainable Yields Project (CSIRO, 2008) was the first large-scale, multi-disciplinary project undertaken by CSIRO in recent years to assess the availability of water now and in the future, under likely climate change scenarios. Several projects have followed since, including the Northern Australia Sustainable Yields Project (CSIRO, 2009b) the South-West Western Australia Sustainable Yields Project (CSIRO, 2009c), the Tasmania Sustainable Yields Project (CSIRO, 2009a), the Great Artesian Basin Water Resource Assessment (Smerdon et al., 2012), the Flinders and Gilbert Agricultural Resource Assessment (CSIRO, 2012b) and the Pilbara Water Resource Assessment (CSIRO, 2012a).

These projects are usually, although not always, focused on assessing water resources. So what's involved with that? Well, it's a little bit like following the water cycle (Ladson, 2008) – water assessments begin with climate modelling to assess likely future rainfall. Enter **climate modellers**. Next come the **surface water hydrologists** and **river system modellers** to work out how much of the rainfall becomes runoff and then streamflow, followed by the **groundwater hydrologists** to assess how much of it infiltrates through the ground into the aquifers below. Once this is done, we have a pretty good picture of how much water there is available in the system. Most projects use this as a setting to begin thinking about the environment and how the flora and fauna are affected by the amount of water present. Enter **ecologists**. At times, these projects look at the economic situation of the local communities involved (particularly in irrigation farming communities). Enter **economists**.

Local data are held by the Commonwealth, state and local government departments. These institutions maintain weather stations, drill boreholes, manage national parks and issue local irrigation licences; they are the ones who measure and maintain data pertaining to natural resource management. Inevitably, there are differences in the way these data are measured, recorded and reported.

These projects also span physical boundaries. The Murray–Darling Basin Sustainable Yields Project spanned Queensland, New South Wales, the Australian Capital Territory, Victoria and South Australia. The Northern Australia Sustainable Yields Project spanned from Western

Australia, across the top of the Northern Territory and into Queensland. The Great Artesian Basin Water Resource Assessment spanned from Queensland to the Northern Territory, to New South Wales and down to South Australia. The other three projects have been more straightforward in that they have been confined to a single state.

Project structure

The projects described above usually constitute:

- a Project Team (usually split into teams by scientific discipline, as well as the Reporting Team)
- a Technical Reference Panel (comprising technical experts who review all of the work)
- a Steering Committee (comprising the client and other stakeholders who can provide governance for the project).

The Project Team usually consists of a Project Leader, who is responsible for leading the research and providing high-level integration for the various disciplines; a Project Coordinator, who is responsible for project administration and coordinating the review process; and a Team Leader for each of the disciplines including reporting. The Team Leaders are usually experts in their discipline and, consequently, an invaluable resource when it comes to negotiating terminology. The authors are anyone who has contributed to the report and may belong to any part of the Project Team.

The Reporting Team is responsible for quality assurance with respect to content, format and delivery (as described in Schmidt, 2013), including:

1. providing the Project Teams with standards and templates
2. making some of the maps and graphics
3. integrating report content once the individual Project Teams have written it
4. editing reports and ensuring quality in content, referencing and formatting
5. revising maps and editing text throughout the review process
6. producing the final report.

Current practice

Currently, most efforts to standardise terminology are initiated by the editors, and usually, they occur during the editing process rather than during the writing process. There are some discussions that are pre-empted by the authors during project workshops (usually when they hear their cross-disciplinary colleagues using a term in an unfamiliar way), but not many. These negotiations tend to be mediated by the Project Leader and include the Team Leaders and Reporting Team members. Editing Conventions (at times also referred to as 'Reporting Standards') are where the outcomes of terminology negotiations are recorded. These documents are used as a reference point for the entire Project Team to ensure consistency within the project. They are used in supplement to the *Style manual* (Snooks & Co., 2002).

At times the negotiation occurs too late in the project or too close to the reporting deadlines. This is usually the worst time for it to take place because it results in Reporting Team members having to comb through all of the outputs of the project in order to standardise the terminology.

Editing Conventions or Reporting Standards documents are specific to projects and distributed to the entire Project Team as PDF files. Usually, these documents are republished several times during the life of a project so as to adequately capture the outcomes of terminology negotiations held throughout the project.

Negotiating terminology

Large-scale integrated multi-disciplinary projects are essential for getting a clear picture of the resources in a specific geographical location, e.g. a geological basin, or a catchment. Integrating the findings across these disciplines is where language disconnects and inconsistencies are most likely to be identified.

In order to provide the audience with a cohesive and well-integrated set of key findings, all unnecessary variations in terminology need to be identified and eradicated. These inconsistencies are different from the sorts of everyday language variations that authors often use to keep readers engaged. In order to eradicate these inconsistencies, a standard term needs to be negotiated and agreed upon by the Project Team, recorded in the Editing Conventions and used consistently by everybody involved.

The following are a few examples of terminology negotiations in projects that I have worked on.

Would a groundwater management unit by any other name smell as sweet?

What you call a groundwater management unit depends on what jurisdiction you are in, what institution you work for and what project, plan or legislation you are working on.

Variations on the theme include:

- groundwater area (DERM, 2012; DPIPWE, 2012)
- groundwater management area (DERM, 2012)
- groundwater management unit (DSE, 2012)
- groundwater resource unit (Smerdon and Ransley, 2012)
- proclaimed groundwater area (DOW, 2012)
- water planning area (DLRM, 2012)
- groundwater sustainable diversion limit area (MDBA, 2010).

At first glance, this offers a great deal of editorial annoyance along the lines of 'why can't jurisdictions use consistent terminology?' However, a second look and a better understanding of groundwater management reveal how complex the whole field is. Unlike surface water management, groundwater managers need to think in 3D. Water can be extracted from aquifers that sit at varying depths underground, at times stacked on top of each other, and some of the aquifers may extend into neighbouring jurisdictions. Over time, it becomes clear that rather than a thoughtless inconsistency, this variation in terminology reflects a necessary acknowledgement of complexity.

However, this complexity is difficult to handle in cross-jurisdictional projects. The question of whether a certain amount of extraction from a groundwater area in New South Wales is comparable to the same amount of extraction in a groundwater resource unit in Queensland is complicated enough without the added confusion of differing terminology. Most general audience reports require a description of these areas (usually with a map illustrating their geological extents) before any water management issues can be discussed meaningfully.

River Murray, Murray River, River Murray?

When the Murray–Darling Basin Authority began work on the documentation that eventually became the Basin Plan (MDBA, 2010), they made an interesting style choice. Rather than referring to Australia's most notorious river as 'the Murray River' (as it is known in the majority of the country) they chose to use the name more commonly known in South Australia: 'River Murray'.

Looking back, it seems that the same choice has been made in earlier documents produced by the MDBA and, in fact, the National Water Commission as well as Geoscience Australia refer to it that way. I am not aware of a federal-government-wide decision to stick to the South Australian way of referring to this resource. Authors I have worked with don't seem to do so and have negotiated hard to use the more popular 'Murray River'. Current practice within the Reporting Team varies depending on the project.

Is the aquifer half empty or the stream half full?

One cross-disciplinary disconnect faced by surface water hydrologists working with groundwater hydrologists is the use of 'gaining' streams and 'losing' streams. In the surface water world, the concept of gaining and losing streams is straightforward – streams that lose water into the aquifer(s) below are considered losing streams and, likewise, streams that gain water from the aquifer(s) below are considered gaining streams.

Groundwater hydrologists tend to find the terminology of gaining and losing to be counterintuitive because they are more concerned with the water in the aquifers. After all, a gaining stream means a losing aquifer(s), and a losing stream means a gaining aquifer(s). A crucial discrepancy is when the point at which a gaining stream becomes a losing stream is identified differently by each team. Instances like this are where the Reporting Team can step in and initiate a dialogue between the two teams to help them resolve the inconsistency.

Not to bore you but, well ...

So let's say there are two holes in the ground and one contains water while the other contains oil. What do you call which and why?

One thing that authors across every team were able to agree on during the beginning of the Great Artesian Basin Water Resource Assessment was that 'industry usage' of the terms 'bore' and 'well' was inconsistent. A quick look at reports produced by mining companies and consultancies in the Great Artesian Basin showed that this was true. In some instances, the terms were used interchangeably, while in others the terms were used without having been defined. So although the reader was given the distinct impression that these terms were being used very deliberately, they had no way of working out whether it was water or oil that was in question.

Since the authors on the project had been working with these industry reports it was apparent that they were used to the ambiguity. I sensed a hesitation on the part of the authors to standardise these terms in the project, but it was clear that this was a terminology negotiation that was very necessary.

We quickly developed a ruling that the Team Leaders were happy with – bores were for water and wells were for oil. The authors now had a guideline they could follow regardless of what their industry colleagues did. Once the decision was made, I was given the impression that they were glad to have some clarity around the use of these terms.

Dumbing down or just watering down a bit?

The Great Artesian Basin consists of a complex system of interconnected aquifers. Bores at different points in the Basin vary in their height above sea level and in the pressure of the water in them. The term 'hydraulic head' is used to talk about this concept. The definition of the term is: 'the sum of the elevation of the measurement point above MSL (Mean Sea Level) and the pressure head'. This is an elegant concept that helps visualise groundwater level. Imagine if every bore was a geyser that was constantly flowing—the water would rise to different heights for different bores. Now think of a three-dimensional image of the surface that could be plotted from these points.

The Steering Committee of the Great Artesian Basin Water Resource Assessment decided that this concept was too complicated for the general audience reports and consequently different terminology needed to be used for different audiences. 'Hydraulic head' became acceptable only in technical reports while general audience reports used 'groundwater level'. This meant that the editors needed to standardise to different terms depending on the intended audience of each report. It is an example of introducing audience appropriate variation rather than standardising terminology.

A positive aspect of this decision was that, perhaps because it came from the Steering Committee or perhaps because it required implementation by the Reporting Team rather than by the authors, there were few objections. Although it was a decision that affected nearly every product in the project, implementation was fairly smooth.

Summary

During the course of my work on the projects discussed above it has become clear that although unnecessary variations in technical terminology can add to the complexity of the document and make it harder for the audience to comprehend it, there are instances where the variations are necessary. In fact, overzealous editors can do more harm than good if they fail to recognise the necessity of this variability.

Also, there are instances when a variation in terminology is intentionally introduced for the purposes of strategic communication, for example, to communicate with different audiences who vary in their level of interest and expertise.

Future work

So far, as a team, we have produced standards and conventions as one all encompassing document that goes out to all authors and map makers on the project. However, in the future, we propose to collate all of our instructions across all prior projects into one central database that is available to the authoring teams online. The intent is that all conventions will be tagged according to different variables including category (hyphenation, spelling, punctuation, referencing, etc.), prior project (the name of the project that gave birth to that particular convention) and perhaps even degrees of negotiability (e.g. 'non-negotiable because it's divisional policy', 'negotiable because it is the personal preference of one author').

The advantage of displaying conventions and standards in this way is that it will be electronically searchable (hence improving efficiency) and it can be sorted by the tags described above, thereby increasing the ease with which a list of conventions can be produced for a particular project. We are presently investigating whether commercial off the-shelf software is available or whether we have to build the system in-house. Any suggestions or ideas on how to do this are welcome.

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