Editorial

Truth, Reality, Belief, Faith: Science in Public Debate

TRUTH, reality, belief and faith are some of the tools we take with us into any negotiation process even those involving science. For me a truth is something we can all agree on, whether it is something undeniable or not; reality is something that is undeniable and has presence despite our definition; belief is something that we individually have evidence for, but which we have not established as a truth; and faith is something for which we have no evidence, but we feel is right. Although these tools of thought are used equally, most scientists would find it hard to admit how often we are unsure which one we are using. Unfortunately science and its methods are not easily understood by the uninitiated. Despite our insistence on scientific rigour, too few of us are willing to acknowledge that many of the methods we use to condense and express our ideas still revert to intuition, feelings, personal biases and misinformation. This is no more so than when we attempt to develop policy, act as members of committees or are called upon to consult on environmental issues.

Science as a culture

Scientific knowledge is to many a different culture with a difficult language, and sometimes a remarkably different set of beliefs and guiding principles. Even when we use common terms, they can mean vastly different things to us than to our partners in decision making. We should treat initial contact as if we were from a vastly different culture. Like all such encounters one of the worst things we can do is to preach the undeniable truth and superiority of our way of life (like believing we have a more powerful god). We need to tread carefully; otherwize we may find that whatever we say is dismissed out of hand. It is important to remember that opposing opinions about the environment have relevance as much as do alternative viewpoints of religion. Showing our ideas are compatible and mutually beneficial on at least some level often helps.

Are we on the same page?

Do we all have the same concept of the object or idea being discussed? Most often the answer is no. Although Socrates assailed this problem nearly 2 500 years ago, it is still one of the greatest issues in our modern day world. I remember debating the values and importance of tree hollows. Debate continued for many meetings before consensus was met to preserve hollow bearing trees. But despite the many pamphlets handed out, landholders misunderstood and thought a hollow bearing tree was a hollow tree, that is, it no longer had heart wood from bottom to top. If they were aware that hollows only needed to be entrances at the end of branches or cracks in stems, it would have significantly changed the nature of the debate. With even common ecological terms such as diversity and richness often misunderstood by practicing ecologists, it is no wonder non-scientists get confused.

Definitions should be as clear, distinct and as close to reality as possible. Yet, boundaries are often unclear in agreed definitions and easily manipulated by sectional interests. For example, rainforests are usually defined by ecologists as communities containing rainforest species. Rainforest species are of course those that occur in rainforests (*ditto* for wetlands), but rainforests often contain residual eucalypts from an earlier successional stage. An ecologist might still consider this a rainforest, but others, seeing the eucalypts, consider them to be eucalypt forests. The distinction might not matter except when there is a policy to protect "rainforest" from logging, but allow logging in "eucalypt forest". It was a semantic argument over the meaning of "rainforest" which led to the infamous Terania Creek debate in northern New South Wales and ultimately to the reservation of most of that State's northern rainforests as World Heritage. An analogous debate concerns "old growth" forest and its conservation. Early definitions for the purpose of conserving forest classed as "old growth" required that there had been no post-colonial anthropomorphic disturbance. However policy allows minimal farming or logging activities within old growth, which subsequently makes the forest no longer "old growth" by definition. In the context of existing policy, the definition adopted was unworkable for the purposes of conservation.

Limits of our knowledge and data

We are often forced to use models when data are deficient. No matter how complex the algorithms, if you are not aware of the limitations of the information that goes in, you are using faith and belief if you try and force

its outcomes on others. When modelling, the universe stops where data stops, whereas in real life there are no limits. I remember trying to reconcile modelled forest corridor placement to real forest patches. Many significant forest patches did not have corridors linking them in the modelled system because these patches lay just outside the boundary of the model and did not "exist". Similarly in vegetation mapping, where ground based surveys have been sparse, models are often highly suspect, with accuracy falling away logarithmically from ground based sites. So often models are discarded despite the effort that has gone into them because of the insistence that they present the truth (they are doctrine), yet they are eventually shown to be flawed in some way. This is no truer than in debates about vegetation mapping. To the uninitiated and even to many practitioners, maps and boundaries become reality.

Ecologists try and limit the applicability of their work to the system under investigation. Despite our training, when faced with limited information and limited time, we are forced to provide management guidelines based on information from entirely different systems.

As scientists we believe that what we are seeking is truth and reality, but forget that these (especially when involved in emotional issues like forest logging) are just models which are based on the amount and quality of current information. We should acknowledge the limits of our data and understanding; otherwise our products and thoughts become doctrine and dogma. The strength of the scientific method is that knowledge increases with time and effort. We should not criticize others for revising their ideas or attitudes to issues with new knowledge as this is something we should all be doing. Scientists should provide public comment, but need to remember the limits of their knowledge and not feel that providing caveats or precautionary comment is a weakness.

Maximization is not the only answer

Our culture is driven by the paradigm that more is better. More is not always better, yet we strive to produce benchmarks and management decisions that maximize increases within a locale. This is very similar to a farmer practicing greater returns per unit area, or greater stock numbers per paddock. I think most ecologists would think such farming decisions are nïave for believing that there will not be negative consequences associated with such actions. Yet as ecologists we often fall into the same trap: for example, that greater richness per site (species density) or greater vegetation cover is the primary goal or that such scores are meaningful in a positive way. This is a belief or faith that more is better.

Do not lose sight of the whole picture

It is easy to be caught up with a single issue and to forget that information about systems is often inadequate. If we end a landscape management practice, that does not mean that systems will either return to what they were or remain stable. For example, in northeastern forests of New South Wales, past logging and grazing practices were associated with high frequency (every 2–5 years), but low intensity fires. However, the natural fire regime may have been anything (depending on the assemblage) from between 15 to 300+ years with a mix of high and low intensity fires. Many of these lands have been taken under the National Parks reserve system after regional forest agreements, but although the overstorey may be what it has always been, the recruiting eucalypts may only be a small selection of species that were able to survive a high fire frequency. Weeds that were not a problem under previous grazing and burning regimes now present management problems. Yet, is the best management policy an attempt to return to pre-European conditions (assuming these are even known) or is it better to allow natural successional processes to proceed unimpeded? Biological systems are often driven by large scale temporal process in climate. Despite the seeming persistence of many dominant floristic elements over short time spans, natural turnover in dominance may occur over decades or even centuries particularly in semi-arid and arid areas. Management on these time scales is difficult, if not impossible.

Communicating

It would be good if we could all be trained in expressing our knowledge to the public. Unfortunately, our universities do not value this skill and in my own training, it was discouraged by some as an unworthy task. Thus, too many of us learn on the job and make mistakes as we go. For many, the process is so disheartening that they never attempt to speak to the public, often for fear of criticism from their colleagues. The failure of our education system should not be a reason to dissuade us from taking part in decision making processes and to provide good information and opinion where necessary. We should always remain true to what it is to be a scientist and enable logic and the scientific method to be upheld. Remember however, that we are not all-knowing and there is a need to distinguish between faith, belief, truth and reality. We are only human and that holistically, science and scientists are just one ingredient.

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