



ENVIRONMENTAL VALUATION AND UNCERTAINTY

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The state of the environment is critical to the welfare of the community. For environmental considerations to be fully accounted for in broader policy development, the environmental impacts of policy proposals need to be described clearly, and in a manner that allows them to be compared with other types of impacts on the community.

The Australian Government and the state and territory governments are committed to improving the quality of regulation through the use, where appropriate, of cost–benefit analysis to assess regulatory proposals. A cost–benefit analysis involves a systematic evaluation of the impacts of a regulatory proposal on the wellbeing of the community as a whole.¹

This guidance note provides advice on incorporating environmental impacts and uncertainty into regulatory impact analysis. It should be read in conjunction with the *Australian Government Guide to Regulation* and the *Council of Australian Governments best practice regulation: A guide for ministerial councils and national standard setting bodies*. A more detailed discussion of the issues in this paper is provided in the Office of Best Practice Regulation (OBPR) *Environmental valuation and uncertainty* research paper.

How do I describe environmental impacts?

It is important to describe the environmental assets in question, their services and the environmental baseline in the background and problem sections of your regulation impact statement (RIS).

The types of information you should provide about an environmental asset includes:

- its physical size
- its condition
- the role it plays in the local and broader ecosystems
- the ways it is used by humans
- the way the nearby environment is used.

It is also important to convey how the environmental asset benefits the community. One way to do this is to use the ‘ecosystem services’ framework, which categorises all of the roles the environmental asset plays into different services provided to the community. Those services are:

- provisioning services—*providing* goods and resources (such as crops, grazing land, mineral resources and forests) that the community values
- regulating services—*regulating* the environment in ways that the community values (such as pollinating crops and maintaining air and water quality)
- cultural services—providing non-material, or *cultural*, benefits to the community, including spiritual enrichment, recreation and aesthetic experiences

¹ See the [Cost-benefit analysis guidance](#) note for more information.

- supporting services—providing *supporting* services, such as soil formation and nutrient recycling, that are necessary for the production of all other ecosystem services.

When you are describing ecosystem services, trace them through to things that are directly valued by individuals. As an example, the local wetland (the environmental asset) might regulate sediment levels in a river system (an ecosystem service). However, it is unlikely that people will directly value this service, so you will need to identify the flow-on effects or endpoints (cleaner water for recreation, greater native fish abundance, and so on) that are directly valued. In this way, the value of the asset to the community can be clearly conveyed.

Describing how your proposed regulation will affect the environmental asset involves first identifying the baseline. This is what is likely to happen to the asset if the current situation is allowed to continue. In doing so, describe what the effects on the environmental endpoints are likely to be. You should quantify the impacts if possible, but a lack of information may mean that you will need to provide a qualitative assessment.

You also need to describe the impact of the policy options that you are considering. Do this by drawing up alternative scenarios, each one corresponding to how the world would look under each of the policy alternatives. Each scenario should concentrate on how the endpoints will change in the future.

Once you have drawn up the scenarios, the impact of each policy option is simply the difference between the endpoints in each scenario and the endpoints in the baseline. Where possible, you should try to quantify the impact of each scenario. However, due to limitations in our knowledge of some environmental processes, that might not always be possible; in those cases, you should provide a detailed qualitative description of the impacts.

How do I value environmental changes?

Information about the way the community values environmental impacts, and the size of that valuation, should be included in the impact analysis section of your RIS.

After you have identified how the environmental asset (and ecosystem services) may change as the result of a policy option, the next question is ‘What does this mean for the community?’ At the heart of this question is the value that the community places on the benefits that the environment provides, and in cost–benefit analysis that value is expressed in dollar terms.

Because environmental benefits are not commonly traded in markets, it can be difficult to put a dollar value on them. A large amount of economic literature has been established to look at how these values can be estimated, and what some of them are.

There are two basic ways you can estimate how much people value the environment:

- You can examine their behaviour in related markets. For example, the price for real estate in a scenic area may be able to tell you something about the value people place on the scenery.
- You can ask them. A number of survey-based methods have been developed that can help you estimate the dollar value that the community places on environmental benefits.

See the OBPR [Environmental valuation and uncertainty research report](#) for further information on these methods.

However, using these methods to estimate the environmental values will generally require time, money and expertise. Fortunately, many studies have been made of environmental valuation, and it *may* be possible to use the results of that work to estimate the values you are interested in.

Whether and how you will be able to use an existing study will depend on such things as:

- the quality of the existing study
- whether the study considers environmental assets or changes similar to the ones you are interested in
- the size of the environmental changes being considered
- how similar the community whose valuation has been estimated is to the one you are looking at
- the significance of the policy issue you are examining (in general, the more significant the policy issue, the more careful you will need to be in transferring values from another study).

Once you have identified an appropriate value, you can then apply it to the change in the environmental endpoints that you estimated earlier to arrive at an estimate of the value that a community places on an environmental asset or a change in the asset's endpoint. When you report the estimated value to the community, you need to reflect any inherent uncertainty, whether it is from our knowledge of the science behind the estimation of endpoints or the valuation of those changes.

How does uncertainty affect my analysis?

No decision is made with complete certainty; there are always factors that you will not be completely informed about, and this is particularly so when you are looking at complex environmental systems.

Uncertainty needs to be taken into account in your analysis. First, you should describe the source of the uncertainty. For example, the science behind a particular issue may be well understood, but there is a data gap that creates uncertainty. Or the underlying processes are not well understood, and that is what creates the uncertainty.

It is also important to describe the nature of the uncertainty. How will it change? With more research into the problem, can it eventually be reduced or removed, or will it always be there in one form or another?

Taking uncertainty into account in your analysis can help you determine the best strategy to solve the problem you are interested in. For example, a resilient strategy—one that gets good (but maybe not the best) results over a wide range of uncertain outcomes—may be the best option where there is significant uncertainty. Or an adaptive strategy—one that is more easily changed when new information becomes available—may be best where the level of uncertainty is expected to change over time.

The level of uncertainty therefore needs to be reflected in the confidence with which your RIS recommends policy options.

What about discount rates?

OBPR recommends using a real discount rate of 7 per cent, with a sensitivity analysis at 3 per cent and 10 per cent, reflecting the uncertainty about the 'true' discount rate. For analyses involving very long timeframes, this uncertainty means that it is appropriate to use a time declining discount rate. For analyses involving a period of analysis of more than 30 years, the OBPR recommends using the rates in Table 1.

Table 1: Declining long-term discount rate

Period of years	1–30	31–75	76–125	126–200	201–300	301+
Discount rate	7.0%	5.4%	4.8%	4.3%	4.0%	3.7%

Note: See OBPR's *Environmental valuation and uncertainty* research report for an explanation of how these rates were derived.

Conclusion

Given the complex nature of environmental systems and the uncertainty resulting from, in some cases, our limited understanding of ecosystem processes, it is vital that you provide a balanced summary of the impacts of your proposed option. This means that the summary must be supported by the preceding analysis in the RIS, and convey any recommendations in a way that reflects your confidence in the underlying assumptions and findings. Where there are important caveats in the analysis—whether they relate to the methodologies used to estimate or value environmental impacts, or uncertain knowledge about values or underlying processes—they need to be noted.

Assistance

If you have any questions about this guidance note, email OBPR at helpdesk-OBPR@pmc.gov.au or call (02) 6271 6270.

Your portfolio Regulatory Reform Unit is also a useful source of information.

Further information on the RIS process is in the [Australian Government Guide to Regulation](#).