

Why scientists and engineers should not adjust for risk through arm-waving appeals to 'the precautionary approach'

The precautionary approach, as invoked by Dr Shand, NIWA or the Ministry for the Environment, provides no guidance as to whether a conservative approach to a potential risk would justify deferring - or precipitating - costly ameliorative action.

Since costs are something that can only be experienced by sentient beings, natural science has nothing to offer on the question of whether current or future land-owners who wish to take a precautionary approach would prefer to take on optimistic or pessimistic view about future sea-level rise.

The view that 'science' dictates that a conservative approach justifies moving a projected future shoreline inland is merely a conceit, amongst scientists who hold that view, and a statement of ignorance about the limits of natural science, by those in the KCDC who hold this view.

Science cannot tell the scientists how the future is going to unfold. They don't know how human technologies or emissions will evolve, whether there will be peace or war amongst the major powers, or what destruction Mother Nature might have in store for life on Earth. Any pretence of climate science to be today's Notradamus is a conceit. Humility and scepticism about unproven propositions are the hallmarks of the scientific method.

The precautionary approach is not a scientific approach to uncertainty.

Shand and supporting scientists appear to accept that risk = probability x consequence, but they fail to apply this approach in two respects. First they fail to provide probabilities for the full range of plausible future shorelines, including accretion possibilities. No rational investor faced with uncertainty would fail to consider both optimistic and pessimistic scenarios. Second, they utterly fail to assess (human) consequence, even for the only shoreline outcome that they postulate.

If a projected shoreline is shifted inland 'to allow for uncertainty' consequence is likely to be lost value from forgone improvements to existing properties, etc. Conversely, if it were shifted seawards "to allow for uncertainty" ~~to allow for uncertainty~~, the r properties.

The situation can be compared to the basic operations research text book example of the optimal inventory decision: a restaurant buys fresh produce at the ~~customers with~~ or n i demand. Overstocking means losing money at the end of the day on unsold product. Under-stocking means lost profit from missed sales. What early morning purchase decision would the scientists appearing on behalf of the KCDC suggest a restaurant owner, adopting the 'precautionary

As far as I can see, they would be baffled by this question. And so they should be! The precautionary approach is devoid of content as a guide to decision-making under uncertainty. In the literature, the optimal inventory decision for a risk-neutral restaurant owner is to buy to the point where the loss at the margin from being under-stocked equals the loss at the margin from being over-stocked.

That point is only found by looking at the scale of the consequences from being under-stocked compared to over-stocked. The scientists are not looking at consequences in any systematic way. The 'precautionary approach' rule gives them no guidance as ~~ly the text-book should~~ approach because they don't have adequate information owners' risk preferences.

Being an expert in natural physical processes does not make them competent to tell the restaurant owner how much produce to buy. Nor does it make them competent to determine in which direction a projected shoreline should be moved to account for risk.

Those decisions are the responsibility of those who bear the costs of their consequences.

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2014