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Letter to the Editor

Reply to Calow: In Defense of Science and Its Inclusion in Decision Making

*Sabine E Apitz,† Thomas Backhaus,‡ Peter M Chapman,**§ Wayne G Landis,*|| and Glenn Suter#*

†SEA Environmental Decisions, Hertfordshire, United Kingdom
‡University of Gothenburg, Gothenburg, Sweden
§Chapema Environmental Strategies, North Vancouver, British Columbia, Canada
||Huxley College of the Environment, Western Washington University, Bellingham, Washington, USA
#Senior Editor, Book Reviews, Integrated Environmental Assessment and Management (IEAM)
***Deceased*

DEAR EDITOR:

We thank Calow (2017) for his comments on our commentary (Apitz et al. 2017), and we share his concerns about the potential for scientists to confound evidence and values during complex problem solving. In our letter, we urge transparency, particularly when scientists serve as advocates for particular environmental and science policy positions, either intentionally or unintentionally. Values are inherent in environmental management and pollution regulation, and they are appropriate when they are based on laws, public policy, and engagement with stakeholders (Elliot 2017).

As summarized in Calow (2014), the debate about separation of the roles of risk assessors and risk managers is not a new one. In the United States, such interaction was discouraged in the 1983 National Academy of Sciences (NAS) book *Risk Assessment in the Federal Government* (also known as the "Red Book") to protect the risk assessor from coercion in favor of predetermined policy choices by risk managers (NRC 1983). Nine years later, the US Environmental Protection Agency's (USEPA's) *Framework for Ecological Risk Assessment* stressed the importance of the assessor–manager interaction in performing a risk assessment (USEPA 1992), as did the US National Research Council (Stern and Feinberg 1996) and the US National Academy of Sciences Silver Book (NRC 2009). Additional studies describe the importance, types, and extent of such interactions (e.g., Cirone and Duncan 2000; Duncan 2005; Suter and Cormier 2012).

In light of the current global political climate, we are compelled to lend our voices to proponents of healthy science and policy interactions that are based on clear communication, crystal clear transparency, and mutual respect. Several decision analysis tools aid in facilitating the interaction between science and decision makers in the formulation of policy. Tools such as weight of evidence (USEPA 2016), multicriteria decision analysis (e.g., Linkov et al. 2007), and influence diagrams (Carriger and Newman 2012) facilitate the weighing of facts and inferences to better inform policy and management options considering a range of stakeholder, regulatory, and other priorities. Wyant et al. (1995) describe how engagement among decision makers, risk assessors, and stakeholders facilitates the adaptive management process. More recently, Van den Brink et al. (2016) and Landis et al. (2017) have expanded these frameworks.

At this time, the overriding issue is not the undue influence of scientists as stealth advocates for particular management decisions but rather the apparent undermining of the utilization of scientific evidence in policy and decision making. We are alarmed by what some call a "war on science" (Otto 2016); science is under attack by those who aggressively seek to influence public policy on the environment, as well as on a broad range of other issues. Their tactics obscure facts and the preponderance of evidence gathered over decades and across a broad swath of environmental disciplines. The campaigns in this war include proposed cuts to research funding, cutting of scientific staffs, elimination of science advisory panels, deletion of scientific evidence from agency websites, and agenda-based changes to science education.

We oppose those who seek to exclude science from environmental decision making. We advocate for active engagement of scientists in public discourse at every opportunity to educate the public and elected officials about the implications of scientific work. We encourage our colleagues in the scientific community to become more proactive. We need to highlight the importance of science in everyday life. We oppose actions and efforts that censor scientific information, block lines of communication, and destabilize research infrastructure. We must be diligent in the exposure of scientific fraud, fraudulent claims of scientific credibility, and the use of "alternative facts." If the fear of perceived bias inspires scientists to stand silent, this silence will simply ensure that the loudest voices come from the antiscience contingent.

* Address correspondence to wayne.landis@wwu.edu
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