



Scientific Objectivity in Ecological Intervention

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Editorial

Volume 7 Issue 3

Received Date: September 12, 2023

Published Date: September 27, 2023

DOI: 10.23880/jenr-16000350

Abstract

To be objective is to be attentive to the relevant facts. However, this is exceptionally challenging in ecology – more so than in social sciences – because there are so many distal factors and confounding variables in ecosystems that do not compare in quantity to those in social ones. Thus, when we intervene in nature, we can seldom be sure that our intervention will have the intended effect and, moreover, that it will have no other unintended ones. This essay aims to show that we are either intervening into nature when we cannot be objective, or when we can but objectivity is essentially useless. This finding supports arguments against anthropic intervention into ecosystems.

Keywords: Objectivity; Ecology; Intervention; Arrogance; Environmental Engineering

Objectivity is the cornerstone of science. It has many meanings – it is ‘plurivocal’ [1] – but what is common to all of them is that objectivity is always a virtue that indicates a shared basis for trust [2,3]. Objectivity safeguards against epistemic threats [4] and lets us stay faithful to facts rather than invented fiction [5].

One significant way in which science strays from fact into fiction is when scientists ignore inconvenient evidence and begin looking *for* evidence rather than *at* it. As John Stuart Mill once remarked, ‘he who knows only his own side of the case, knows little of that’. For research to be objective, researchers must engage with ‘facts that are inconvenient for their party opinions’ [6] which are ‘hypotheses or phenomena that can seriously undermine the integrity of the research programme’ [7].

Awareness of inconvenient facts, including inconvenient unintended consequences, is particularly challenging when it comes to ecological intervention because ecosystems are so complex. There are all sorts of distal factors and confounding

variables that make it very difficult to associate, or isolate, singular causes and effects. In short, it is very difficult to know whether an effect – positive or negative, intended or not – was caused by our intervention, or whether our intervention had no effect at all. This is a serious epistemic problem, the consequence of which is that almost any intervention is either going to do very little, or a lot more than you had hoped it would, depending on just how it fits into a specific ecological context.

Failure to appreciate this epistemic problem results in prometheanism, of which there are many examples caused by the ‘engineering mindset’ behind most ecological intervention [8]. For example, originally introduced into the American river system in the 1970s to manage algal blooms and improve water quality in aquaculture and wastewater treatment facilities, Asian carp quickly proliferated beyond their intended confines. The decision to introduce them was predicated on a limited understanding of their potential ecological impacts. The carp outcompeted native species, disrupted trophic dynamics, and altered habitat structures.

Even non-interventionist, prohibitive policies can have these kinds of effects. For instance, if you are hellbent on protecting wildlife, it might be difficult to see anything wrong with the United States Endangered Species Act of 1973 (16 U.S.C. § 1531 et seq.) which imposed development restrictions on landowners who found endangered species on their property. You might not realize that it actually encouraged preemptive habitat destruction and the deliberate slaughter of endangered species to avoid discovery [9], and you might be quick to cite the 'official success stories' of the bald eagle and the peregrine falcon to support your case, failing to see how their protection was likely in large part due to the Peregrine Fund and the ban on certain pesticides, not by the Endangered Species Act [10].

It is a lot harder to be attentive to the relevant facts when it comes to intervening in ecosystems. Social sciences simply do not have as many distal factors to be aware of because social systems are simply not as complex as ecological ones. It is a whole lot easier, at least in principle, to isolate causes and effects. Implement social distancing, then see what happens [11]. Remove it, see what happens. Introduce masks, look again. Then reintroduce social distancing, see what happens. The developmental psychologist gets a good idea about what is good and bad for children from this, and the sociologist can cleanly identify what keeps society together and what tears it apart. And this is exactly what the economist does: he moves money about and sees the effects; he raises interest rates and sees people save, lowers them again and the economy starts running away from him whilst inflation rises; he taxes a product, its price goes up, and people buy less of it; he bans a product and a black market pops up. No economist has ever expressed confusion about *why* a black market exists. Of course, introducing a whole load of measures together makes a mess of it, but that is down to the scientist, not the system, which really is quite suitable for manipulation.

What makes society even easier to manipulate than nature is that we have more epistemic access to social systems than ecological ones. The social scientist can answer many questions in theory without ever needing to go out into the world simply because he is part of society himself. He knows that taxes irritate him and everyone he knows; he waits in line when there is a sign telling him to do so; he would rather drive because public transport is inconvenient; and so on. It is also easier to gain epistemic access to social systems. You can poll people, not animals or plants.

To be objective is to be attentive to the relevant facts, *or as attentive as you can reasonably be expected to be*. Does that mean that the ideal of objectivity is harder for ecologists than other scientists, or that objectivity simply is not as useful in ecology? It depends on whether we view the epistemic challenge created by distal factors in ecology as a limit in

principle to our ecological knowledge, or whether it is just another difficulty to be overcome. If relevant facts were pages of a book, does the confounding effect of distal factors merely make the book thousands of pages longer, or are the pages locked behind a vault created by their sheer numeracy?

If objective science represents the best science we can do, then what does that say about ecology? It leaves us with a very pessimistic picture about what we can hope from ecological science if, even when it is fully objective, we still do not have the faintest idea about whether our intervention will have the effect we want it to have; or, if objectivity does give us reliability in ecology as it does in other sciences, it is practically impossible to attain. Such pessimism makes the whole field look awfully promethean. We are either intervening into nature when we cannot be objective, or when we can but objectivity is essentially useless. Thus, what we have here is another argument (this one from singular causation) for a position that has been advanced with increasing fervour recently [5]: namely, that wherever possible we should simply avoid ecological intervention.

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