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Don't overlook what's underfoot – save the bugs and germs

Andrew Beattie

One of the biggest problems for conservation today is that it [ignores 95% of all known species](#) on Earth. Could a company ignore that proportion of its clients or a government so many of its voters? So why does this problem exist in conservation?

Some 90% of all of the Earth's species are either invertebrates or micro-organisms, and the folly of ignoring the latter is encapsulated by UK Professor Tom Curtis writing in [Nature Reviews Microbiology](#):

I make no apologies for putting micro-organisms on a pedestal above all other living things, for if the last blue whale choked to death on the last panda, it would be disastrous but not the end of the world. But if we accidentally poisoned the last two species of ammonia-oxidisers, that would be another matter. It could be happening now and we wouldn't even know [...]



It's good to save the whale but protect the little things too.

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[Ammonia oxidisers](#) are naturally occurring bacteria that are essential for maintaining the most economically valuable nutrient in soil: nitrogen.

They are good examples of the other millions of mostly tiny soil species, either microbial or invertebrate, upon which all agriculture and forestry depends.

Their astonishing genetic, chemical, metabolic and population properties are those that generate the essential processes, such as nitrogen cycling, that drive all the primary industries. This being so, the primary industries are obviously biodiversity-based industries.

Yet we are confronted every day with a wide range of opinion that [agriculture and forestry](#) are the [greatest threats to biodiversity](#).

So how bad is this disconnect?

We can't see all the biodiversity

I once asked a farmer if he had any biodiversity on his land. He said that he had a few patches of remnant native vegetation that attracted some birds and other species.

“How many species would that be,” I asked. He said he thought it would add up to several dozen.

When I pointed out that the square metre of soil he was standing on likely harboured 2,000 different species he was staggered – even more so when I pointed out that they contributed directly to his yields and profits.

Recent research has explored approximate dollar values of these components of biodiversity, and there is one example that provides some sharp insights. Across the world an economically vital invertebrate, the [honey bee](#), is in catastrophic decline, threatening yields in many crops in many countries.



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While research is revealing the possible cause, farmers are increasingly [looking for alternatives](#), especially native bee species and other suitable flying insects.

Honey bee pollination has an annual value of several billion dollars worldwide but it is beginning to look like other species, including native bees, beetles and flies, can maintain economically significant pollination rates.

But very often the native bees' ability to survive in agricultural landscapes where they are needed and their conservation status – that is, their future as economic resources – is unknown.

It is important to note here that in addition to the primary industries, microbial and invertebrate biodiversity provides vital resources for an increasing variety of other industries.

These includes pharmaceuticals, industrial chemicals, construction materials and the species that drive the newer bio industries such as [bio-control](#), [bio-mining](#) and [bio-remediation](#).

But as Professor Curtis points out, we haven't a clue whether or not any of these resource species require conservation – because nobody is looking.

Industry too needs to protect biodiversity

Perhaps the biodiversity-based industries provide hope for conservation. If a large component of biodiversity is essential to a large component of the economy, then its study and

conservation becomes the business of the industries that depend on this biodiversity for their resources.

This opens the door to a massive change in attitude towards biodiversity conservation. It ceases to be an activity confined to conservationists but is directly in the interests of a variety of biodiversity-based industries at the core of every economy.

Why hasn't this happened? It is because the interests of those focused on the 5% of species on Earth that are plants and vertebrates have come to dominate the field.

Thus, biodiversity has been sold short all along. There are many in conservation who argue passionately that conserving biodiversity for economic reasons – placing a dollar value on species – is unethical.

This is the point raised by US Professor [Michelle Marvier](#) of the Breakthrough Institute, writing in the [Ecological Society of America](#):

Setting up dichotomies of economic growth versus the protection of nature is a dead-end for conservation.

Conserve all species great and small

Humanity needs both the large, charismatic species of plants and animals, and the vast hordes of mostly microscopic species that greatly outnumber them.

Importantly, there are many connections between them. The benefits flow in both directions. Pollinators are again a good example: areas of natural vegetation around crops supply native pollinators while the crops supply huge amounts of nectar and pollen to their insect benefactors.

Natural biodiversity also supplies the predators and parasites of crop pests. There is less knowledge about interactions involving microbes but we do know that some modern agricultural methods greatly reduce the diversity of soil microbes. This is likely to be detrimental to ecologically sustainable food production.

It is going to take very serious resources to capture the knowledge required to work out the functions and conservation status of the millions of micro-organisms and invertebrates upon which we all depend.

Sure it's going to be a hard sell, but at least we should see conservation and industry as partners rather than rivals.

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