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Earth's species feel the squeeze

By Jonathan Amos
BBC News science reporter

If we continue with current rates of species extinction, we will have no chance of rolling back poverty and the lives of all humans will be diminished.



"Unprecedented" effort is required to slow biodiversity loss

That is the stark warning to come out of the Millennium Ecosystem Assessment (MA), the most comprehensive audit of the health of our planet to date.

Organisms are disappearing at something like 100 to 1,000 times the "background levels" seen in the fossil record.

Scientists warn that removing so many species puts our own existence at risk.

It will certainly make it much harder to lift the world's poor out of hardship given that these people are often the most vulnerable to ecosystem degradation, the researchers say.

The message is written large in Ecosystems and Human Well-being: the Biodiversity Synthesis Report.

It is the latest in a series of detailed documents to come out of the MA, a remarkable tome drawn up by 1,300 researchers from 95 nations over four years.

“ Biodiversity and human well-being just cannot be separated ”

Dr Kaveh Zahedi, World Conservation Monitoring Centre

The MA pulls together the current state of knowledge and in its latest release this week focuses specifically on biodiversity and the likely impacts its continued loss will have on human society.

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In one sense, and precisely because it is a synthesis, the new document contains few surprises. It is, nonetheless, a startling - and depressing - read.

A third of all amphibians, a fifth of mammals and an eighth of all birds are now threatened with extinction. It is thought 90% of the large predatory fish in the oceans have gone since the beginning of industrial trawling.

And these are just the vertebrates - the species we know most about. Ninety percent of species, maybe more, have not even been catalogued by science yet.

MA BIODIVERSITY SYNTHESIS

The last 50 years have seen the biggest biodiversity upheaval in human history

Over half the world's biomes (vegetation types) have experienced about 20-50% conversion to human use

The rates of change have been greatest in tropical and sub-tropical dry forests

Some 35% of mangroves and about 20% of corals have gone

Across a range of taxonomic groups, species are in decline

"Changes in biodiversity were more rapid in the last 50 years than at any time in human history," said Dr Georgina Mace, the director of science at the Institute of Zoology, in London, UK, and an MA synthesis team member.

"And when you look to the future, to various projections and scenarios, we expect those changes to continue and in some circumstances to accelerate.

"Future models are very uncertain but all of them tell us that as we move into the next 100 years, we'll be seeing extinction rates that are a thousand to 10,000 times those in the fossil record."

'Invisible services'

One feature that sets the MA apart from previous projects of its kind is the way it defines ecosystems in terms of the "services", or benefits, that people get from them.

Some of these services are obvious - they are "provisional": timber for building; fish for food; fibres to make clothes.

At another level, these services are largely unseen - the recycling of nutrients, pollination and seed dispersal, climate control, the purification of water and air - but without these "support" and "regulating" systems, life on Earth would soon collapse.



Most industrial fisheries are either fully or overexploited

And although we may be some distance away from an "end scenario", there is no doubt the

rapid expansion of the human population and its high consumption of natural resources have taken a heavy toll on ecosystems and the organisms that inhabit them.

"Biodiversity and human well-being just cannot be separated," said Dr Kaveh Zahedi, the officer in charge of the Unep World Conservation Monitoring Centre in Cambridge, UK.

"We are befitting from a whole range of services that up until now have almost been invisible; we haven't considered them. And then they suddenly pop up on our radar screens - we have a tragedy in Asia with a tsunami and we realise that those mangroves that were cut down had a value; they provided a service in terms of coastal protection."

Similar picture

Land-use (habitat) changes, climate change, pollution and over-exploitation - they are all pushing down on biodiversity and the pressure shows little sign of easing.

"The magnitude of the challenge of slowing the rate of biodiversity loss is demonstrated by the fact that most of the direct drivers of biodiversity loss are projected to either remain constant or increase in the near future," the MA biodiversity synthesis report says.

Removing huge swathes of forest has a blunt and clear impact on biodiversity by taking out the habitat formerly occupied by plants and animals. But there are subtle changes taking place, too.

“ If you do things the right way, if you chose the right options for poverty alleviation, you can also maximise biodiversity and sustainability ”

Dr Georgina Mace, Institute of Zoology

The distribution of species around the globe is becoming more homogenous, as invasive creatures hitch a ride on fast human transport and trade routes.

Genetic diversity, also, is declining rapidly.

This is most obvious in domesticated plants and animals where the pursuit of high yields and the pressures of global markets have pushed farmers towards a limited range of cultivars and breeds.

And so it is not simply that species are fewer in number, their changed circumstances may also have reduced their resilience and their ability to cope with future change.

Possible tensions

In 2002, world governments, through the Convention on Biological Diversity, set themselves the target of making a "substantial reduction in the rate of loss of biological diversity" by 2010.

The MA illustrates just how tough it will be to meet that target. What is more, there may even be occasions when progress towards that target conflicts with the even loftier 2015 Millennium Development Goals of cutting into world hunger and poverty, and improving healthcare.

A classic example is the development of rural road networks - a common feature of hunger reduction strategies - which are likely also to accelerate rates of biodiversity loss by fragmenting habitats and by opening up new areas to unsustainable harvests.

BIODIVERSITY AND POVERTY

Biodiversity and human well-being are inextricably linked. Humans benefit from ecosystem services, but unsustainable use drives biodiversity loss. People living in rural areas in developing nations are often most dependent on biodiversity. And they are usually most vulnerable to ecosystem service degradation. They cannot afford to move out or import new services.

This sort of thing has been well documented in Africa where the bushmeat trade that endangers many species follows the development of transport infrastructure.

"This is a very important issue," said Dr Mace. "It's clear there are going to have to be trade-offs and compromises but it's not a simple relationship. It's not a case that you can have 20% poverty and 80% biodiversity."

"If you do things the right way, if you chose the right options for poverty alleviation, you can also maximise biodiversity and sustainability."

And Dr Neville Ash, another MA synthesis team member, added: "The bottom line is that you cannot achieve long-term poverty alleviation without sustainability."

"In order to reduce hunger and poverty and increase access to clean water and sanitation, we need to have a strong base of environmental sustainability which is providing these services on which people rely for their well-being."

Little time

It is very evident, too, that we need to get a move on.

The wheels of global governance turn slowly, as was seen with the Kyoto Protocol on climate change which finally entered into force in February after many years of negotiation.

The MA has identified possible solutions - from significant shifts in consumption patterns and better education, to the adoption of new technologies and a large increase in the areas enjoying protection.

And if some of the ideas sound "old hat", such as the abolition of farming subsidies that drive crop production to the detriment of field biodiversity - that is because they are.

"Most of the approaches to achieving more sympathetic management of the natural environment and the conservation of biodiversity - I think we and governments know them already," commented Graham Wynne, the chief executive of the UK bird conservation group, the RSPB.

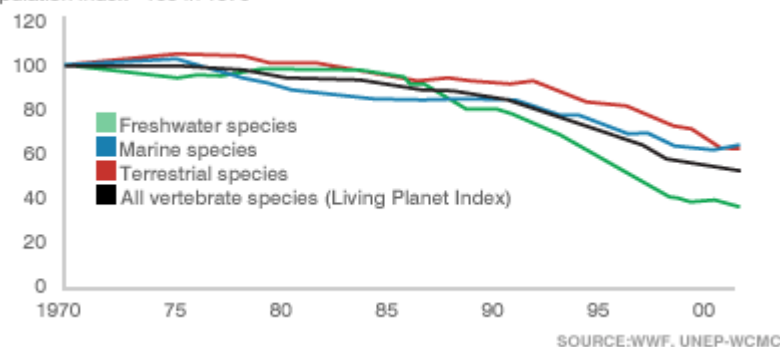
"The real challenge is to deploy them more extensively and more intelligently.

"And you can't get away from the fact that we simply need more money.

"The sums of money we throw at the environment in the West are relatively modest; and the sums of money the West is prepared to devote to developing countries is pitiful."

THE LIVING PLANET INDEX

Population index = 100 in 1970



The Living Planet Index is a measure of the state of the world's biodiversity. It measures trends of vertebrate populations in terrestrial, freshwater and marine environments

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