

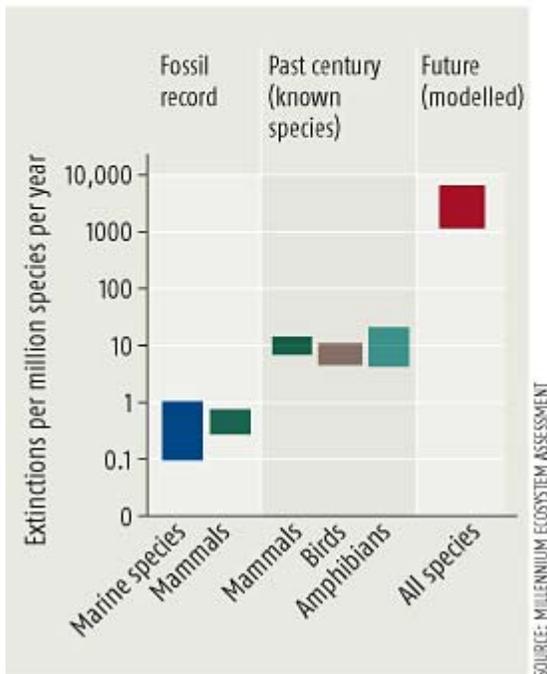
Planet in peril: Civilisation's litany of destruction

By Bob Holmes and Duncan Graham-Rowe

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DESTROYING LIFE

Extinctions are likely to accelerate, according to the MA's model. The model is based on rates at which species are shifting to more threatened categories, extinction probabilities based on IUCN threat categories, impacts of projected habitat loss, and other factors



Destroying life

HUMANKIND's trampling footprints are becoming ever larger. Our increasing numbers and quest for more resources are changing and destroying ecosystems at an unprecedented rate. This will not surprise ecologists, but the scope and rigour of the Millennium Assessment (MA) makes the finding harder to ignore than ever.

"There are no surprises - but that's good," says Stuart Pimm, an ecologist at Duke University in Durham, North Carolina. "It means a group of people have pulled all the numbers together in a way thousands of scientists can sign off on."

The most obvious changes are converting natural ecosystems to farmland and felling forests for lumber and pulp (see Chart). Forests have been almost completely eradicated from 25 countries, and in another 29 the area covered by forest has fallen by more than 90 per cent. Nearly a quarter of Earth's land surface is now under cultivation, and more virgin land has fallen to the plough since 1945 than during the entire 18th and 19th centuries combined. The trend has slowed recently though, and the amount of cropland has actually fallen in Europe and China, and stabilised in North America.

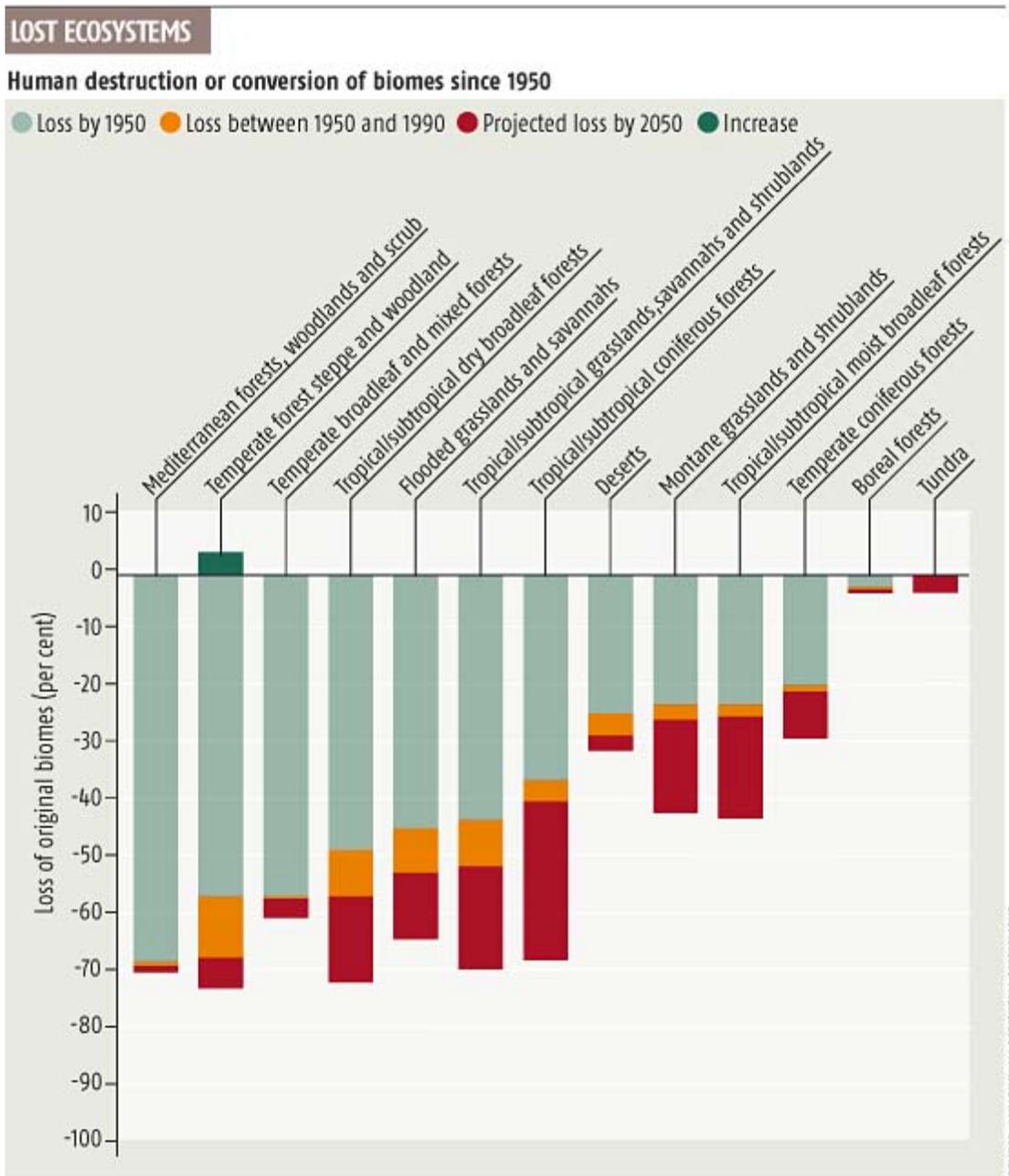
Nonetheless, the worry is that continued ecosystem degradation will lead to abrupt changes. Two "ecosystem services" already in the danger zone are fisheries and supplies of fresh water. According to the report, these are now so degraded that they are already well beyond levels that can sustain existing demands, let alone provide for future needs.

Largely as a result of farming, people have greatly altered the flow of water and nutrients through Earth's ecosystems. Irrigation has doubled the use of surface water since 1960 and is rapidly reducing ground water reserves in some arid

regions. It is almost 100 years since synthetic nitrogen fertiliser was first manufactured, and the world has got through more than half of the total ever used in the last 20 years.

Crop fertilisation has doubled the availability of nitrogen worldwide since the mid-19th century (see Graph) and tripled the availability of phosphorus since 1960. This leads to eutrophication of lakes and rivers and creates dead zones on the ocean floor due to oxygen depletion. What is more, deforestation and fossil-fuel burning have boosted CO₂ levels in the atmosphere by about a third since the beginning of the industrial revolution, with 60 per cent of that rise since 1959.

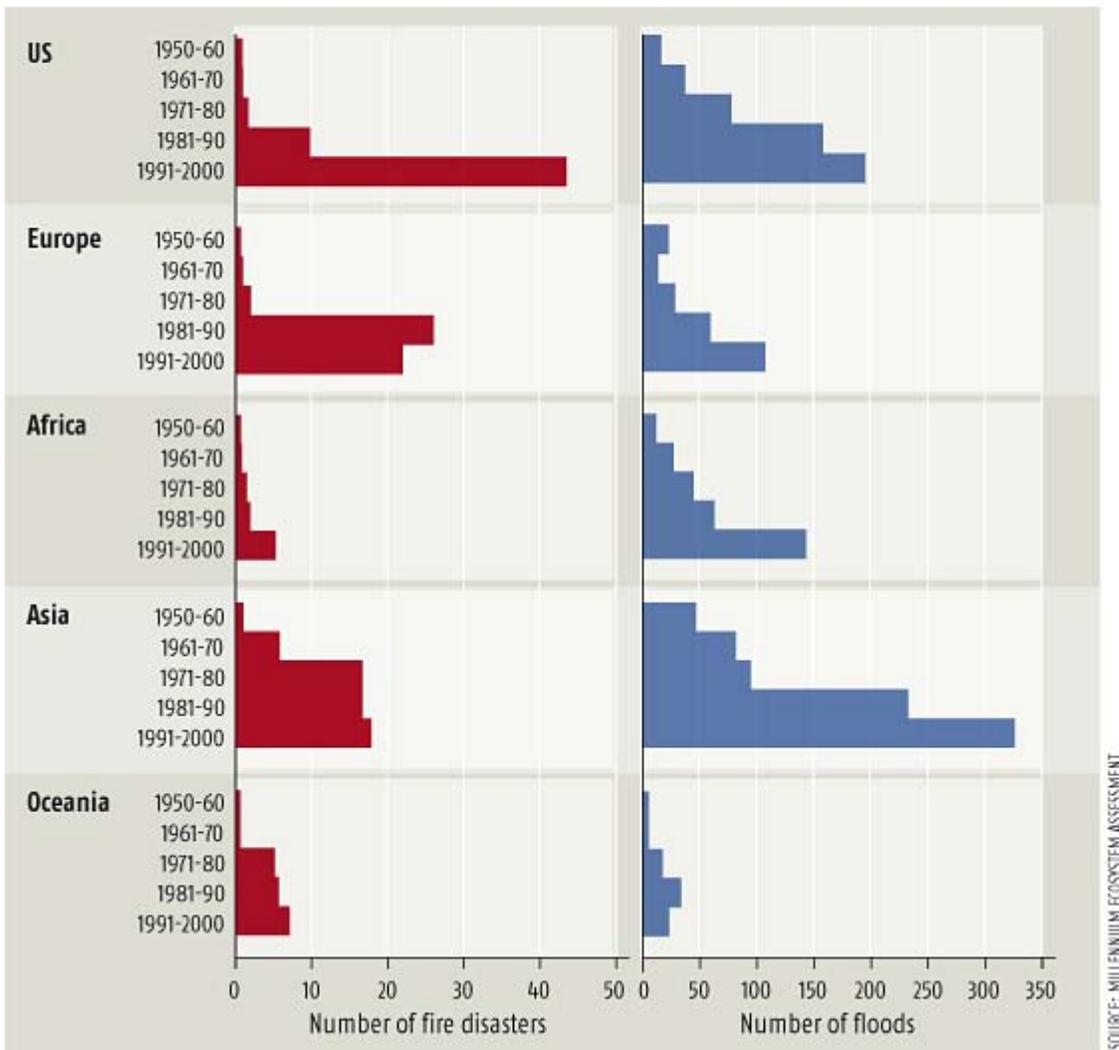
The most obviously irreversible trend is the loss of biodiversity (see Chart). Extinction rates today are perhaps as much as a thousand-fold higher than the norm throughout evolutionary history. Some 10 to 30 per cent of the world's land vertebrates are now threatened with extinction.



Lost Ecosystems

NATURAL DISASTERS

As ecosystems are damaged and people move into danger zones, more fires and floods are having a disastrous impact



SOURCE: MILLENNIUM ECOSYSTEM ASSESSMENT

Natural disasters