# NINE CRITICAL FACTORS THAT DETERMINE EARTH'S FUTURE

by Glenn Rogers

Insect extinction is eight times the rate of other creatures. Photograph: Courtesy of Entomologisher Verein Krefeld/Scientific American

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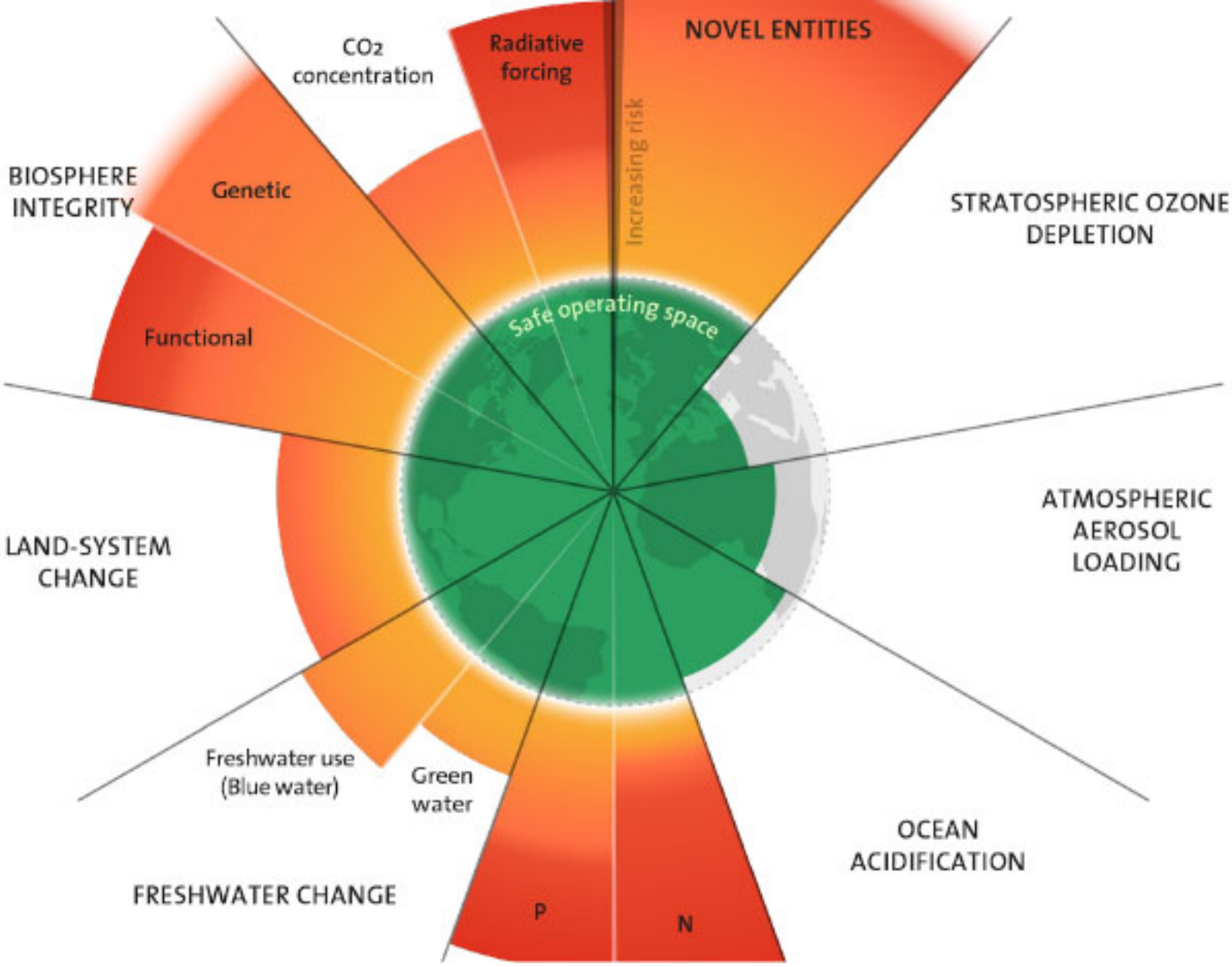
Since 2009, scientists researched nine crucial parts of the Earth's ecosystem that are necessary for the planet's stability. The University of Copenhagen and other international institutions have recently quantified those essential ingredients. This research identifies the critical elements to the health of the planet.




Critical Earth Zones

**The list: climate change, biodiversity loss, nitrogen and phosphorus pollution, freshwater depletion, forest removal leading to food insecurity, and novel entities or new diseases from a changing planet.**

For now, Ocean Acidification, Atmospheric Aerosol Loading and Ozone Depletion are within the safe category.

CLIMATE CHANGE

Today, despite the fact the Earth is in crisis, the fossil fuel industry still receives billions of dollars in subsidies. $CO_2$ is the primary driver of Climate Change. Today, we have 1.5 times more $CO_2$ than was present in Greenland 416,000 years ago. When the ice in Greenland melts, sea level will rise 23 feet.

A possible solution to Climate Change is the creation of Solar Roads throughout America, providing three times more clean energy than we use today.

BIODIVERSITY LOSS

With 2-1/2% of insects becoming extinct yearly, it is possible to project that in 100 years, all insects will be gone.  Bees, for example, which pollinate 80% of all plants, including many of the fruits and vegetables we eat will disappear. This is the most significant loss of all the nine categories.

NITROGEN AND PHOSPHORUS CYCLE

This extinction is primarily due to the use of nitrogen and phosphorus chemicals to encourage food production. Unfortunately, their overuse can also cause pollution in our water. We have seen that many fish and supportive marine systems suffer from Red Tide, believed to be a result of algae bloom. Runoff from farm factories and human waste and sewage outflow cause Red Tide.

FRESH WATER DEPLETION

Recently. the Colorado River, which provides water to Lake Mead and Lake Powell, has been drying up, leading to less water for crops and less electrical generation. According to Wikipedia, the Central Valley in CA has sunken as much as 28 feet.

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NOVEL ENTITIES

As wildlands diminish, bringing the human population closer and closer to animals from the jungle, the transfer of viruses and bacteria becomes more

likely. If COVID-19 came from a "wet market" in China, this would be the best example of a disease from a  novel entity. Ebola, first identified in 1976, is another example. Today, it is often spread by contact with infected human liquids, but initially, the infection came from fluids from an animal in the wild.

OCEAN ACIDIFICATION

Fortunately, this is one of the few categories within the safe zone in the chart. However, we are close to exceeding the safe zone. When $C0_2$ from the atmosphere is in contact with the ocean, the ocean becomes more acidic. By adding less C02 into the atmosphere, we can correct this problem further.

ATMOSPHERIC AEROSOL LOADING

Typically, volcanoes, wildfires, clouds and industrial smoke constitute aerosols in the atmosphere. However, tiny plastic particles have been increasingly found in our air and water. In the summer of 2023, wildfire smoke from Central Canada spread as far east as New York. Health experts warn senior citizens to stay indoors and warn youngsters not to participate in strenuous physical play while smoke levels are high.

OZONE DEPLETION

Because of the Montreal Protocol, an international agreement, we have reduced the amount and number of ozone-depleting chemicals in the atmosphere. The ozone layer protects us from the harmful rays of the sun. This progress gives scientists the hope that other boundaries that have been crossed can become safe again.

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