

A ROUGH GUIDE TO PLANETARY BOUNDARIES

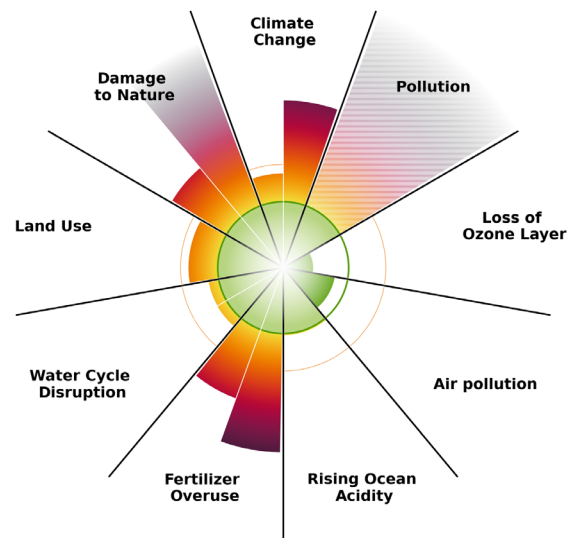
**Our planet's vital signs are flashing red.
7 out of 9 Planetary Boundaries are breached.**

What are Planetary Boundaries?

The Planetary Boundaries represent nine key systems of the Earth that tell us if our planet is able to take the pressure from human activities while still working properly. The Planetary Boundaries are guardrails that help keep the Earth stable and healthy, so that it keeps providing full life support.

Reading the Planetary Boundaries diagram

Going past the Planetary Boundaries means the Earth's key systems become less stable, less able to support life and less resilient to damage. The Planetary Boundaries Diagram works like a traffic light: **Green** color within the diagram means that a Planetary Boundary is in the Safe Operating Space, **yellow** means increasing risk, and **red** means danger. The latest annual Planetary Health Check report finds that seven out of the Planetary Boundaries are outside the Safe Operating Space, meaning they are outside the safe zone. Fortunately, there are many solutions we can choose, which can reverse the direction to bring us back inside the Planetary Boundaries.



The Boundaries

● LOSS OF OZONE LAYER (STRATOSPHERIC OZONE DEPLETION)

WHAT IS MEASURED:

The thinning of the ozone layer in the upper atmosphere.

WHAT IT IMPACTS:

A weaker ozone layer allows more harmful ultraviolet (UV) radiation to reach Earth's surface, damaging crops, harming marine life and increasing risks to human health due to higher exposure to UV radiation.

● AIR POLLUTION (INCREASE IN ATMOSPHERIC AEROSOL LOADING)

WHAT IS MEASURED:

The concentration of tiny atmospheric particles (aerosols) that influence cloud formation and Earth's energy balance.

WHAT IT IMPACTS:

Aerosols change how much sunlight reaches the surface and how much heat is trapped in the atmosphere. In excess, they disturb regional rainfall patterns, weaken monsoons, and increase the risk of droughts and floods. This in turn can lead to food and water insecurity.

● LAND USE (LAND SYSTEM CHANGE)

WHAT IS MEASURED:

How much natural land, especially forests, is converted into farmland, cities, or infrastructure.

WHAT IT IMPACTS:

Clearing forest removes habitats, weakens biodiversity and ecosystems, alters water cycles, and releases stored carbon into the atmosphere. All of this reduces Earth's capacity to support human populations.

● **WATER CYCLE DISRUPTION** (FRESHWATER CHANGE)

WHAT IS MEASURED:

Variation from normal levels of freshwater in rivers, lakes, groundwater, and soil moisture.

WHAT IT IMPACTS:

Overusing water dries out ecosystems, reduces river flow, lowers groundwater levels, and harms wetlands. This affects drinking water, agriculture, and wildlife. When freshwater is overused, communities face water shortages, reduced crop yields, and increased vulnerability to drought.

● **RISING OCEAN ACIDITY** (OCEAN ACIDIFICATION)

WHAT IS MEASURED:

The rise in ocean acidity, caused by the ocean absorbing excess carbon dioxide from the atmosphere.

WHAT IT IMPACTS:

More acidic oceans can weaken coral reefs, shell-forming species, and many other marine organisms. This weakens marine food webs, damages reefs, and reduces the ocean's ability to support life and store carbon. As ocean chemistry shifts, this could disrupt human food supplies from the ocean.

● **GLOBAL WARMING** (CLIMATE CHANGE)

WHAT IS MEASURED:

The amount of greenhouse gases in the atmosphere. These gases slow down energy loss to space and are currently increasing, mostly due to the burning of fossil fuels, which warms the planet.

WHAT IT IMPACTS:

A (rapidly) changing climate disrupts weather patterns, melts ice sheets, raises sea levels, and increases the frequency of extreme events like regional flooding, droughts, and heatwaves. When the climate becomes unstable, it threatens food systems, water supplies, infrastructure, and the long-term safety of human societies.

● **DAMAGE TO NATURE** (CHANGE IN BIOSPHERE INTEGRITY)

WHAT IS MEASURED:

The decline in biodiversity and ecosystem functioning.

WHAT IT IMPACTS:

Healthy ecosystems provide clean air and water, food, store carbon, break down pollution, and reduce the impacts of droughts, floods, and heat waves. When species are lost or ecosystems are degraded, these life-support functions weaken. As nature's health declines, the Earth's systems become less stable and less able to support human societies.

● **FERTILIZER OVERUSE** (MODIFICATION OF BIOGEOCHEMICAL FLOWS)

WHAT IS MEASURED:

The disruption of natural nitrogen and phosphorus cycles caused by excessive fertilizer use and livestock waste.

WHAT IT IMPACTS:

Too many nutrients damage soils, reduce biodiversity, and allow a few fast-growing species to dominate. Excess nutrients wash into rivers, lakes, and oceans, where they create oxygen-poor "dead zones" that most life cannot survive. When nutrient cycles are overloaded, ecosystems lose balance and their ability to sustain food production, clean water, and long-term environmental stability.

● **POLLUTION** (INTRODUCTION OF NOVEL ENTITIES)

WHAT IS MEASURED:

The release of untested human-made substances that the Earth cannot safely absorb or break down.

WHAT IT IMPACTS:

These pollutants accumulate in soil, water, air, and living organisms. They can harm wildlife, disrupt hormones, contaminate food chains, degrade ecosystems, and undermine the stability of natural systems that support life. Chemical pollution increases long term risks to human health.

We have to act now.

Website: <https://www.planetaryhealthcheck.org/>

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