

## Review

# A horizon scan of biological conservation issues for 2025

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We discuss the outcomes of our 16th horizon scan of issues that are novel or represent a considerable step-change and have the potential to substantially affect conservation of biological diversity in the coming decade. From an initial 96 topics, our international panel of 32 scientists and practitioners prioritised 15 issues. Technological advances are prominent, including metal and non-metal organic frameworks, deriving rare earth elements from macroalgae, synthetic gene drives in plants, and low-emission cement. We include new insights into accelerated impacts of changes to Antarctic ice masses and air and water quality. We hope that anticipating and mitigating negative impacts, and making best use of new opportunities related to these issues, will contribute to better outcomes for biological diversity.

## Horizon scanning for conservation

Horizon scanning is a well-accepted method of identifying emerging opportunities and threats in adequate time to develop actionable solutions or capitalise on impending opportunities [1]. We have conducted annual horizon scans of topics relevant to biological conservation since 2009 [2]. Because horizon scanning aims to identify issues and provide early opportunities to manage or mitigate impacts before they materialise or expand, we expect that the trajectories of some of the issues will not develop as currently anticipated.

## Identification of issues

Twenty-seven participants convened in person for the 2025 scan, with five additional participants joining online. We followed our standard process, applying a modified Delphi technique to select issues (e.g., [2,3]) (Figure 1). This technique is transparent, repeatable, and inclusive [2,4]. See Box 1 for methods.

## Greater biological risks from nocturnal, near-surface level ozone

Exposure to near-surface level ozone ( $O_3$ ) negatively impacts ecosystem functions by inhibiting plant growth and microbial diversity [6]. Ozone is a secondary pollutant produced in photochemical reactions of nitrogen oxides ( $NO_x$ ) and volatile organic compound precursors from industrial, transport and residential sources, with additional contributions from biological sources such as trees. Ozone is destroyed by titration of nitrogen oxides. Where ozone production is increasing, titration is inhibited, and the proportion of volatile organic compounds is high relative to nitrogen

## Highlights

Our 16th annual horizon scan identified 15 emerging issues of concern for global biodiversity conservation.

The issues cover impacts such as extracting rare earth elements from macroalgae, the use of synthetic gene drives in plants, and low-emission cement recycling.

Two issues reflect unanticipated, rapid changes in Antarctica: the destabilisation of Antarctic sea ice and the accelerated melting of the Thwaites glacier.

A 10-year retrospective shows that many of the issues highlighted in this annual horizon scan do indeed increase in importance over the next years.

The 15 issues presented here are essential reading for anyone interested in global biodiversity conservation and potential future trajectories.

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**Box 1. Horizon scanning methods**

Thirty-two scientists, practitioners, and policy makers participated in this year's horizon scan. Each submitted two to five novel, largely unknown, issues, that might impact biological conservation during the next decade. Issues were gathered from participants' networks and colleagues in person, by email and social media, and at conferences. This year, over 600 people were consulted. We counted all direct contacts (e.g., people at a conference), considering a single email or social media post as a single contact unless more than one person responded.

This year, 96 issues were initially submitted for consideration. However, two issues submitted by several individuals were similar and thus merged, yielding a total of 92 unique issues for the first round of scoring. Each participant, individually and confidentially, scored all issues from 1 to 1000 (low to high) on the basis of the issue's novelty and potential impact (positive or negative) on biological conservation. Participants also added notes on issues to inform future discussion.

We attempted to counteract the effect of voter fatigue [5] by randomly assigning participants to receive one of three lists of issues in a different order. We converted the scores into ranks (1–92) and considered issues with median ranks of 1–36 against the qualifying criteria. We then asked the authors of issues with which >55% of participants were familiar to provide a sentence identifying the issue's step-change or novelty. We removed one topic from further consideration because we had covered it extensively in previous scans, and added the issue ranked 37 to the list. Participants had the opportunity to retain any other issues ranked lower if substantially justified. This year, no lower-ranked issues were retained, and 36 issues advanced to the second round and were discussed at the workshop.

Each participant was allocated a maximum of 4 of the 36 issues, none of which they had submitted, to research prior to the workshop discussion. In September 2024, the workshop participants convened (27 in person and 5 online). All participants also joined the meeting by Zoom to enable addition of comments or links with the chat function. Participants considered each issue against the same criteria as applied in round 1 and scored it from 1–1000 (low to high) at the end of its discussion. Scores were converted into ranks at the end of the workshop, and the 15 issues with the highest median ranks were revealed.

The issues:

- Greater biological risks from nocturnal, near-surface level ozone
- Metal and non-metal organic frameworks
- Macroalgae as a new source of critical rare earth elements
- Emerging techniques for remediating per- and polyfluoroalkyl contamination
- Adhesive trichome hair mimics as alternatives to pesticides
- Synthetic gene drives in plants
- Light evaporating water without heat
- Low emission cement recycling
- Impacts of near-magma geothermal drilling
- Compounded effects of water quality and quantity on human and natural systems
- European laws and unintended challenges for wood production
- Record Antarctic sea ice lows across the continent could lead to large-scale ecosystem alterations
- Faster than predicted melting of Thwaites glacier
- Anthropogenic impacts on seabed carbon stores
- Potential alteration of ocean processes by offshore wind energy infrastructure

oxides, nocturnal ozone concentrations may increase, with peak concentrations sometimes exceeding diurnal levels [6]. Causes of the disproportionately high nocturnal levels are debated, but measures to reduce nitrogen sources from vehicles and livestock may reduce the titration effect. In part because of cumulative effects of nocturnal stressors, some organisms are more susceptible to nocturnal than to diurnal ozone [7]. These effects may be mitigated by reducing emissions and concentrations of both nitrogen oxides and volatile organic compound precursors [8], for example by planting species that emit low levels of volatile organic compounds in urban areas [6].

### Metal and non-metal organic frameworks

Metal organic frameworks (MOFs) are porous materials characterised by high surface areas and high-volume pore structures. Such materials enable efficient gas separation, storage, and catalysis. These properties have a range of potential environmental mitigation applications including carbon capture, removal of pesticides from water, absorption of pollutants, storage of gases

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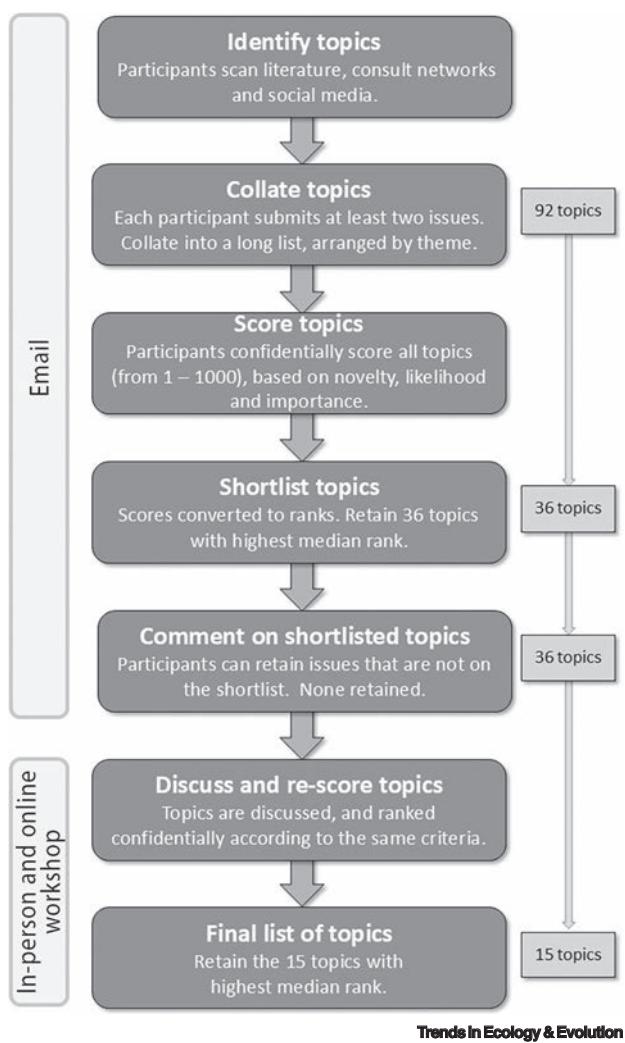


Figure 1. Process for identifying and evaluating horizon scan issues.

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Email  
In-person and online workshop

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(especially hydrogen and carbon dioxide), and battery manufacturing. Metal organic frameworks are in early commercial use and their market demand is likely to grow [9]. Additionally, recent advances in artificial intelligence have aided development of non-metal organic frameworks that combine ionic interactions with permanent porosity [10]. Compared to metal organic frameworks, non-metal organic frameworks are lighter, more stable, cheaper, more resistant to moisture and chemical reactions, and simpler to synthesise, and their production processes do not require mining of metals. Use of both metal and non-metal organic frameworks may support conservation of biological diversity directly via pollutant remediation and a reduction in mining of some metals, and indirectly by improving batteries and carbon sequestration.

### Macroalgae as a new source of critical rare earth elements

Rare earth elements, a group of 17 chemical elements including neodymium, lanthanum, and yttrium, have many chemical, medical, and technological applications, including batteries, electronic photovoltaic cells, and wind turbines. Mining and enrichment of rare earth elements with pyrometallurgical or chemical methods can have adverse environmental effects. In addition, global supply chains of rare earth elements are vulnerable because over 90% of these elements

are mined and processed in one country (China). Due to their rapid growth and ability to concentrate positively charged minerals, macroalgae are proposed as low-impact sources of rare earth elements. Macroalgae may be used to bioconcentrate rare earth elements from wastewater [11] or seawater in coastal areas, and bioconcentration factors of over  $1 \times 10^5$  for several rare earth elements were observed in cultivated macroalgae [12]. Further concentration is possible through biomass processing, which generates an organic fraction. The organic fraction could be a biofuel feedstock while minerals are further concentrated [12]. The development of macroalgal culture and concentration technologies offers a potential low-impact rare earth element source that could diversify current supply chains, support decarbonization, and clean waste streams before discharge into the environment.

### Emerging techniques for remediating per- and polyfluoroalkyl contamination

Per- and polyfluoroalkyl substances (PFAS), a group of nearly 15 000 synthetic chemicals that contain carbon–fluorine bonds, are used in industrial processes and products, from food packaging and cosmetics to fire-fighting foam and semiconductor manufacturing. This major class of persistent organic pollutants, sometimes referred to as forever chemicals, are difficult to metabolise, resistant to degradation, and prone to bioaccumulation. They are dispersed globally by atmospheric deposition and regionally through soils and surface waters, thereby posing a threat to global environmental and human health. Long-term exposure to PFAS can affect wild animals and humans by disrupting metabolic, immune, and endocrine function [13]. Innovative physical, chemical, and biological remediation techniques are being developed to remove PFAS from wastewater and heavily contaminated sites. Examples include the use of a mixture of sodium hydroxide, water, and dimethyl sulfoxide that degrades up to 40% of PFAS [14] and rapid electrothermal mineralization that remediates contaminated soil [15]. Some of these methods could remediate locally concentrated substances in soils or contaminated water, reducing the current rates at which they are released to open environments.

### Adhesive trichome hair mimics as alternatives to pesticides

Some 3.5 billion kg of active ingredients in pesticides (insecticides, herbicides, and fungicides) are used annually in agriculture. Pesticides have a global market value of US\$45 billion, yet the external costs of unintended toxicity beyond the point of application amount to US\$4–US\$19 per kg [16]. Deployment of integrated pest management without such pesticides avoids imposing these costs and minimises environmental impacts. A new class of synthetic adhesive trichome (glandular hair) mimics that are based on triglyceride oils appears to prevent outbreaks of western flower thrips (*Frankliniella occidentalis*) and potentially other small arthropod pests [17]. These pests cause damage to a wide variety of crops through virus transfer, and this is prevented by their immobilization in the adhesive trichome mimic [17]. Because the synthetic mimics function as a physical deterrent, insects are unlikely to evolve resistance. The environmental and human health risks of synthetic chemical pesticides have often been underestimated by regulators. Physical deterrents may interrupt in a substantively different manner, and these new compounds would warrant new toxicity assessments.

### Synthetic gene drives in plants

Gene drives change the inheritance pattern of a particular trait. Modifying these drives can increase the probability of a gene's transmission from the typical 50% to 99%; use of synthetic drives to promote evolutionary changes in populations is referred to as genetic welding [18]. Technical challenges preventing insertion of synthetic gene drives into plants have been overcome [19,20]. In one case, insertion of synthetic gene drives led to an 88–99% transmission rate of modified genes in thale cress, *Arabidopsis thaliana*, over two successive generations

[19]. Drives spread through a population via a toxin–antidote that selectively kills non-carriers. Potential conservation applications include spreading adaptive genes in threatened plant species to increase resilience to climate change, disease, or other anthropogenic stressors, or targeting non-native invasive species. Similarly, agricultural applications could selectively eliminate undesirable plants without synthetic herbicide use. Potential risks include indefinite expansion of the gene drives, which may adversely affect target species or drive resistance, and the transmission of these genes to related non-crop species. Although in-built safety mechanisms for attenuating the drives are being developed, the application of gene drives likely will be subject to strict regulatory control given their potentially irreversible impacts.

### Light evaporating water without heat

The discovery that light can evaporate water without heat has significant potential for industrial applications, particularly in solar desalination, drying processes, delivery of clean water, and energy production. Fourteen experiments demonstrated that photons in the visible spectrum cleave water clusters from air–water interfaces [21]. The experiments suggested that such photomolecular evaporation is prevalent in nature, and that the process can impact weather, climate, and Earth's water cycle [22]. Accordingly, understanding of this process could improve climate modelling. Researchers are exploring the use of photomolecular evaporation to improve the efficiency of solar-powered desalination systems. It may be possible to increase the amount of water produced by solar desalination (currently 1.5 kg/m<sup>2</sup>) three- or fourfold with this light-based approach [23]. Photomolecular evaporation also may facilitate development of desalination batteries, providing a new, sustainable means of energy production and desalination [24].

### Low-emission cement recycling

Cement production is projected to increase by a third by 2050 [25]. Through the stages of its production and use, cement contributes at least 7.5% of global carbon dioxide-equivalent emissions. Raw limestone for cement production frequently comes from areas with distinct, diverse, and spatially restricted ecosystems. A new approach for emission-free cement recycling produces a cement paste that can be used in place of lime flux in electric arc furnaces for steel recycling. Emissions from the steel industry are lowered at this stage because the paste is decarbonated in the initial production of cement. The slag produced from the furnace can be cooled rapidly and converted to clinker, the core component of cement. The extremely high temperatures in an electric arc furnace are critical to maintaining sulfates and chlorides as gases. The chemistry of both the cement paste and the scrap steel affects the ultimate magnitude of emissions. The new approach may be commercially viable, and therefore a possible, practical replacement for some conventional methods of cement production that also reduces emissions from the lime flux component of steel recycling [26].

### Impacts of near-magma geothermal drilling

Magma chambers are reservoirs of molten rock beneath Earth's surface in volcanically active regions. Although difficult to detect, magma chambers are within reach of modern borehole drilling. In 2009, drilling near a magma chamber in Iceland inadvertently breached the chamber without causing an eruption, leading to electricity generation at ten times the power of a standard geothermal borehole for 9 months before the extreme temperatures (900°C) caused overheating [27]. Iceland's Geothermal Research Cluster (GEORG) plans to drill into a magma chamber in 2026 to study magmatic activity and extract geothermal energy. This method, near-magma geothermal, could eventually be deployed more widely as a source of sustainable energy. The potential high-power outputs from near-magma geothermal could generate energy in new ecosystems, with potential adverse local effects. However, concentrated power generation could

reduce demand for fossil fuels and more diffuse renewable-energy infrastructure. Impacts would likely be concentrated in areas of high geothermal activity, including in tropical areas with high concentrations of native species and where generation of geothermal energy previously was minimal [28]. Further environmental effects may arise if high financial returns encourage local regulatory changes, potentially facilitating loss of relatively natural land cover and other ecological attributes [29].

### Compounded effects of water quality and quantity on human and natural systems

Given continuing global changes in climate and land use, effective water availability for human and natural systems may decrease not only with respect to water quantity – the focus of water scarcity assessments to date – but also with respect to water quality. A global model of future clean-water scarcity suggested that, by 2050, inputs of nitrogen, and by inference other pollutants, to rivers from point and non-point sources may increase water scarcity for as many as 3 billion more people, and 40 million km<sup>2</sup> more basin area, than affected during the late 20th century [30]. Nitrogen enrichment in flowing and standing waters affects primary producers and can cascade throughout the food web [31]. Anomalously high nitrogen concentrations also interact with warming, leading to hypoxia and harmful algal blooms. Additionally, deteriorating water quality may reduce the potential for adaptive action to maintain water supply in a changing climate. Increases in water scarcity may prompt increases in human migration, particularly within countries where average income is low and compounded by other environmental and social stressors [32], inevitably leading to changes in the distribution of land use and demands on natural resources.

### European laws and unintended challenges for wood production

The EU's new Regulation on Deforestation-Free Products (EUDR) came into force on 30 December 2024, and established rules that, to be placed on the EU market, certain wood and wood products must be generated without deforestation, forest degradation, and breaches of local environmental and social laws [33]. The EU Forest Strategy for 2030 protects all European old-growth forests [34]. These rules are intended to address fundamental drivers of biodiversity loss. Many of the challenges of EUDR implementation outside of the EU are well known, and they impact supplies and costs. Other factors may affect the EU domestic forest industry. For example, demand for wood is rising in the EU, while wildfires, storms, and pest outbreaks are affecting supply [35]. Accordingly, increasing regional wood production will be challenging, not least because areas with the greatest potential for wood production are privately owned and fragmented [35]. The new regulations are likely to reduce deforestation and protect forests. However, the resulting supply chain challenges may also reduce imports and domestic production, affecting the EU's green economy transition. EU and international efforts to meet these new regulations could lead to intensification of forest management, substantial afforestation, and unforeseen offshore impacts.

### Record Antarctic sea ice lows across the continent could lead to large-scale ecosystem alterations

While losses of Arctic sea ice and terrestrial ice sheets are well documented, the Antarctic sea ice had long been thought to be stable. In 2021, the Intergovernmental Panel on Climate Change reported no significant trends in Antarctic sea ice between 1979 and 2020 [36]. However, since then, the three lowest minimum sea-ice extents have been registered, and five of the eight lowest have occurred since 2016. Ice loss is now observed all around the continent, not just in some regions [37]. These observations could reflect a tipping point in Antarctic sea ice extent, with substantial consequences for Southern Ocean biodiversity. Reduced extent of sea ice alters the location of marginal ice zone algal blooms which many

animals, including zooplankton, depend on for feeding [38], decreases ice-associated algal biomass, and increases light penetration, altering iron supply and plankton and benthos primary production patterns, simplifying food webs, and shifting coastal benthic ecosystems from animal- to macroalgal-dominated [39]. An increase in macroalgae could lengthen food webs and decrease ecosystem stability [40]. Macroalgae are also controlled through sea ice scour, which could further exacerbate the shift in taxonomic dominance as sea ice extent shrinks [39].

### Faster than predicted melting of Thwaites glacier

New research indicates that the Thwaites glacier, often referred to as the Doomsday glacier due to its potential to trigger ice sheet collapse in western Antarctica, is melting substantially faster than previously understood [41]. Complete melting of the Thwaites glacier would lead to a 0.65 m rise in global mean sea level, with subsequent collapse of areas of the West Antarctic ice sheet potentially leading to sea level rise of over 3 m [41]. The glacier has been losing mass to the ocean rapidly since the 1990s, and models underestimated observed loss rates because of a complex set of feedback mechanisms that affect retreat at the glacier grounding line. In some locations, warmer sea water is intruding several kilometres under the ice and causing differential melting around crevasses and other subglacial features [41]. With much of the western Antarctica ice sheet overlying land below sea level, incursion of warm sea water under the ice sheet could lead to rapid and extensive ice loss. Global sea level rise of 0.65 m has the potential to drive significant biodiversity loss, both directly through the loss of species' habitats and indirectly through displacement of human populations [42]. Proposed engineered interventions, such as massive subsea curtains to reduce glacier loss [43], could themselves have considerable impacts on Antarctic ecosystems.

### Anthropogenic impacts on seabed carbon stores

Marine sediments are one of the largest pools of organic carbon on Earth. Approximately 350 Mt of organic carbon per year is added to marine sediments, predominantly at continental margins. Anthropogenic disturbance and resuspension of organic matter may facilitate re-mineralisation of this carbon pool, with one estimate suggesting that benthic trawling could generate emissions of 0.34–0.37 Pg CO<sub>2</sub> year<sup>-1</sup> [44]. However, considerable uncertainty remains in the depositing processes and locations of carbon in sediments [45] and the extent to which trawling and other disturbances mineralise organic carbon [46]. Economic benefits and limited legal constraints have meant few restrictions to date on the expansion of benthic trawling, energy and communications engineering, and deep-sea mining despite their considerable impacts on seabed species and ecological function. When combined with growing commitments and incentives for reducing carbon dioxide emissions, the development of reliable estimates of sediment carbon loss due to industrial processes could create incentives for increased regulation of seabed impacts, with consequences for the climate, biodiversity conservation, and the growing industrial interests in the seabed.

### Potential alteration of ocean processes by offshore wind energy infrastructure

Offshore wind energy converts winds over open water to electricity via bottom-fixed or floating turbines. Bottom-fixed turbines are built on the sea floor generally at depths of ≤60 m. Floating turbines are anchored to the sea floor at depths up to 1500 m. Although direct impacts of offshore wind energy infrastructure on species, such as collisions and displacement, are already acknowledged, understanding of potential indirect impacts are emerging. Both fixed and floating installations alter transfer of wind energy to water and may increase mixing of seasonally stratified waters, particularly where tidal currents are weak, affecting production of phytoplankton and carbon storage [47]. Mixing affects temperature throughout the water column and

brings nutrients closer to the surface. It also can displace phytoplankton from waters in which light penetration enables fixing of inorganic carbon. Effects of such displacement may cascade through the food web [47]. It remains unclear whether these effects may propagate across large areas, such as the southern North Sea [48], or whether they are likely local and transient [49].

### Concluding remarks

Many of the issues presented this year are already emerging, but the level of their application or impact is changing dramatically and we are therefore describing significant 'step changes'. For example, although disturbance of marine and coastal sediments by dredging and construction is well understood, scientists and society are just beginning to appreciate the role of marine and coastal sediments in carbon storage. Although gene drives have been known since the 1960s, new advances now make it possible to incorporate them into crop plants. Metal organic frameworks were first synthesised in the late 1990s but extensive commercial production is far

#### Box 2. Ten-year retrospective

Two issues presented in the 2015 horizon scan – the predicted decline of krill due to the disappearance of Antarctic sea-ice, and the emergence of novel coastal ecosystems – are closely related to issues in this year's horizon scan.

In 2015, we reported on the likely effect on krill of a marked decline in Antarctic sea-ice [50]. Recent studies indicate that populations of Antarctic krill have moved over 1000 km south, which has been attributed to climate-change-induced alterations in the locations of recruitment and of conservation of thermal niches [51]. Changes in the Southern Annular Mode that drive ice extents appear to affect feeding success by juvenile and larval krill [51]. Rapid declines in sea-ice will likely continue, and krill contract to areas even further south, increasing the distances that migrating predators such as whales and penguins must travel to find adequate food supplies.

The impact of decreasing sea-ice on intertidal areas around the Antarctic Peninsula was highlighted in 2015. Ten years on, our understanding of biodiversity (particularly spatial variability) in the intertidal zone in Antarctica remains poor [52]. Benthic macrofauna take advantage of ice-free intertidal areas during summer [52]. Therefore, ice retreat is likely to increase the spatial and temporal availability of these areas for colonisation by invertebrates. We regarded the cascading effects of loss of Antarctic sea-ice on ecosystem stability as a sufficient step-change in impact to warrant the issue's inclusion.

A third topic presented in 2015 also resonates with one of this year's issues. Efforts to develop techniques for extracting substances from algae have featured in our scans over the years (e.g., [53]). In 2015, we highlighted the possibility that algae could provide a more sustainable alternative to palm oil [50]. Since then, scientists have developed a technique to extract oils from a type of microalgae [54]. However, the industrial-scale production required to fully replace palm oil is still distant as scientists continue working to improve the content and yield of valuable compounds such as astaxanthin (a carotenoid) and lipids [54]. This year, we present innovations to extract rare earth elements from macroalgae.

One topic we featured in 2015, the adoption of electric vehicles, has far exceeded projections. In 2015, it was thought that 2% of passenger cars worldwide might be electric by 2020. In reality, about 5% of cars sales in 2020 and 14% of those in 2022 were electric<sup>1</sup>. In September 2024, Norway became the first country in the world in which over 50% of private cars were electric<sup>2</sup>, and record growth in ownership of electric cars is occurring in China.

Impacts from broader issues, such as 'Reproducibility in environmental science', or 'Investor-state dispute settlements in free trade negotiations', are more difficult to determine. However, one issue from 2015 is advancing: local, national, and international institutions considering or implementing a relaxation in legislation prohibiting the use of recreational narcotics. In 2015, we discussed the environmental impact of increased production of recreational drugs if legalised. A UN report in 2022 found that indoor-grown cannabis has a carbon footprint 16–100 times that of outdoor-grown cannabis, and the carbon footprint of producing 1 kg of cocaine is 30 times greater than that from production of cocoa beans [55]. Deforestation for illegal coca cultivation, and waste generated and disposed of during synthetic drug manufacture, can have substantial effects on biodiversity [55].

In 2015, we reported that impact investments, financial instruments designed to benefit both the financial sector and society, had grown rapidly since 2005. Growth of this sector has continued, jumping to over US\$500 billion in 2018 and US\$1.16 trillion in 2022. However, biodiversity remains a minor part of the investment market. The market is more strongly concentrated on renewable energy and decarbonisation, and it still appears that market demand for investment opportunities outstrips supply [56].

more recent, with novel non-metal organic frameworks emerging as promising alternatives. Finally, although the melting of the Thwaites glacier has been reported previously, recent studies show dramatic changes in melt rate are occurring that will have considerable effects on global sea level. These issues are likely to have markedly greater impacts on conservation and biodiversity in the years ahead than previously thought.

Other topics we highlighted this year may appear at first glance to be well known. For example, although it is widely reported that Arctic sea-ice has been steadily declining since the 1980s, the extent of Antarctic sea-ice has long been stable or even increased. As a result, the substantial reduction in Antarctic sea ice extent over the last few years may drive potentially irreversible ecosystem shifts. Although ozone concentrations have increased in urban areas over the last two decades, there has been little consideration of the magnitude of effects of diurnal and nocturnal concentrations of ozone.

Climate change is related to over half the issues selected. Four are partially or wholly related to novel or unexpectedly accelerated impacts, which we suggest requires an increasing focus on adaptation, especially with respect to management of coastal and freshwater systems. A further four are associated with means of reducing greenhouse gas emissions or promoting renewable energy, some of which may affect land use over large areas.

Our previous horizon scans have highlighted many novel issues, and many issues that may have undergone a major step-change. **Box 2** presents a retrospective of the 2015 horizon scan, summarising issues that were correctly identified as increasing in impact. Whilst it is impossible to predict exactly how the future will transpire, all the issues raised in this latest horizon scan are worthy of increased consideration from the conservation sector, as we seek to address the drivers of biodiversity loss.

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### Declaration of interests

No interests are declared.

### Resources

<sup>i</sup>[www.statista.com/statistics/1371599/global-ev-market-share/#:~:text=Electric%20vehicles%20amounted%20to%20some,have%20particularly%20accelerated%20since%202020](http://www.statista.com/statistics/1371599/global-ev-market-share/#:~:text=Electric%20vehicles%20amounted%20to%20some,have%20particularly%20accelerated%20since%202020)

<sup>ii</sup>[www.bbc.com/news/articles/cx25ljxpygeo](http://www.bbc.com/news/articles/cx25ljxpygeo)

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