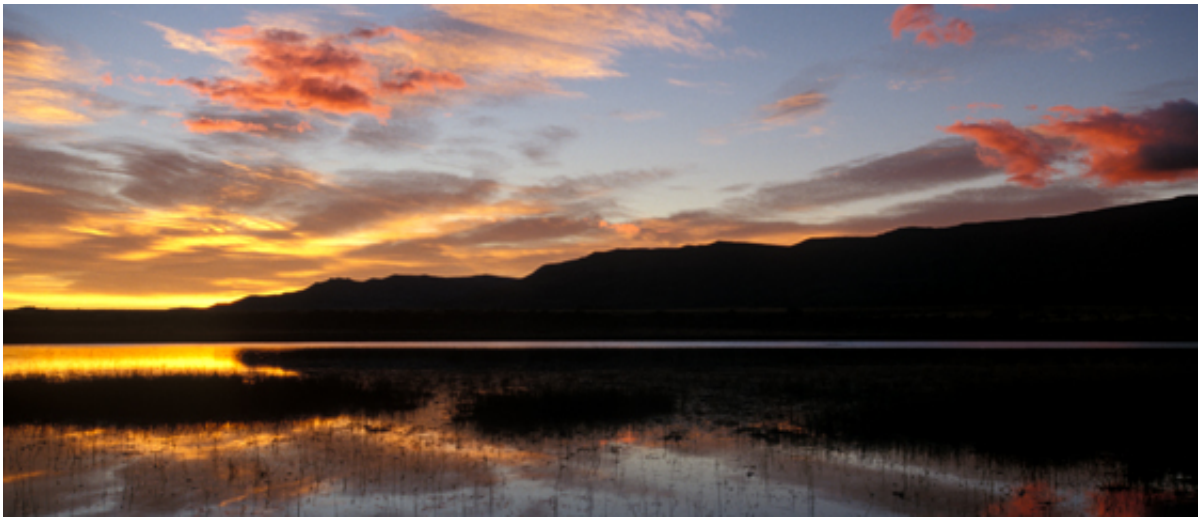
# 15 risks and opportunities to global conservation

January 26 2017, by Olivia Bailey



Credit: Fauna & Flora International

or the eighth year running, an international team of experts with experience in horizon scanning, science communication and research have produced a report that identifies arising global conservation issues. The team included Fauna & Flora International's Dr Abigail Entwistle and the results were published in the scientific journal *Trends in Ecology & Evolution*.

Horizon scanning aims to highlight topics that are not yet widely known among conservation professionals but could have significant effects on global biodiversity. After reviewing 100 potential issues the team

identified 15 topics most likely to have a significant impact on conservation over the next few years; these range from new developments in biotechnology, sand extraction, underwater robotics and blockchain technology.

Dr Abigail Entwistle says, "As conservationists we spend the majority of our time concentrating on threats facing biodiversity in the here and now. However, the world is changing quickly and new threats, and also opportunities, emerge on a regular basis. We need to take the time to look ahead and to be aware of these to be able to respond appropriately – either in terms of informing management to adapt to new threats, or ensuring we make the most of upcoming technological advances which can make conservation more effective."

## Opportunities:

Through their research, the team identified 10 ways in which scientific and technological advancements could offer opportunities to help conservationists in their work to protect the natural world.

## 1. Protecting corals against warming oceans

The discovery that some Symbiodinium strains found in corals have a high tolerance for heat could offer possibilities for manipulating coral symbionts in the wild as a means to protect coral species from bleaching events.

## 2. Underwater robots

Robotics could be used to help us control invasive marine species that are damaging ecosystems. For example, the University of Queensland's COTSbot has proven effective at managing the highly damaging crown-

of-thorn starfish, which is responsible for 40% of coral mortality on the Great Barrier Reef over the past three decades.

## 3. Electronic noses

The use of portable, electronic 'noses' could make it easier to catch those who are transporting illegal wildlife goods – particularly at border crossings. This offers real potential to disrupt major trade routes.

## 4. Using bacteria and fungi to manage agricultural pests

Due to recent advances in genetic screening and engineering, bacteria and fungi can be used for biological pest control and growth stimulation treatments, as an alternative to synthetic chemicals, some of which are known to have harmful effects on biodiversity.

## 5. Floating wind farms

Aside from the potential green energy benefits they offer, the development of large floating windfarms (which have the advantage of more consistent winds than windfarms closer to shore) could have several potential benefits for biodiversity, including offering a refuge for fish collecting under the floating structures. However, these windfarms could also pose a risk to birds flying into structures and the entanglement of marine mammals.

## 6. Creating fuel from bionic leaves

Researchers recently developed an artificial leaf that can produce products (biomass, liquid fuel etc.) up to ten times more efficiently than through natural photosynthesis. The technology has the potential to be

used as a local, renewable energy source in regions without an electricity grid.

## 7. Lithium-air batteries

Storing energy is a constraint to many renewable energy sources. However, the recent development of a lithium-air battery could overcome these limitations. Variations of this battery could boost demand for renewable energy with considerable impacts on land use, water quality, species and ecosystems.

## 8. More efficient biofuel production

The recent development of 'reverse photosynthesis' (which uses energy from the sun to break down, rather than build, plant material) has the potential to transform the production of biofuels and plastics and reduce fossil fuel use and carbon emissions.

## 9. Carbon capture

Dissolving carbon dioxide in water before injecting it into basaltic rocks for storage could be a viable option to reduce emissions into the atmosphere. While this technique requires large amounts of energy and water, it could play a significant role in reducing greenhouse gases in the atmosphere.

## 10. Blockchain technology

Best known for underpinning the web currency, Bitcoin, blockchains can also be used to track online transactions. The technology therefore offers opportunities for conservation, including establishing a currency market for trading carbon credits, improving supply chain traceability (e.g. for

sustainable fish) and tracking illegal wildlife trade.

## Risks:

The team also identified five emerging risks for conservation.

## 11. Bumblebee invasions

The invasion of alien (non-native) bumblebees can lead to declines in local species and increased pollination of non-native plants. As the global bumblebee trade continues to grow, more bumblebees are being released in new locations, with implications for both biodiversity and food security.

## 12. Sand scarcity

Sand is used in a diverse range of industries and as the human population increases so does the demand for sand. Impacts of sand mining include loss of species, degradation of habitats and social conflict.

## 13. Effects of border fences on wild animals

New political trends are leading to an increase in fencing around national boundaries in the USA and Europe. Fences affect the daily movements and migration of animals.

## 14. Effects of changing waste management on animals

Changes in waste management such as closing or covering open landfill sites in the European Union may affect the abundance and behaviour of wildlife that scavenge from rubbish dumps for food.

## 15. Increasing wind speeds at the sea surface

With the increase in average air speed above the oceans and increase in frequency of gales, the distribution and behaviour of oceanic bird species or transoceanic migrants could be affected.

While not all identified topics will materialise, in the past, some have gone on to receive international attention, for example microplastics were identified as a concern in 2010 and are now receiving substantial action, with several governments introducing legislative bans.

Dr Abigail Entwistle: "It's been fascinating to track the rapid response to the issue of microplastic pollution in our ocean from 2010; from initial scientific publications which highlighted this potential risk, through the establishment of a solid scientific evidence base demonstrating the risk to marine life and the parallel mobilisation of NGO action on this issue, to the legislative change we see today…"

**More information:** William J. Sutherland et al. A 2017 Horizon Scan of Emerging Issues for Global Conservation and Biological Diversity, *Trends in Ecology & Evolution* (2017). DOI: 10.1016/j.tree.2016.11.005

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