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An oasis in the Sahara Desert, Libya. Patrick Poendl/Shutterstock

Paradox lost: wetlands can form in deserts, but we need to find and protect them

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Once dismissed as dank and bug-infested backwaters – good only for draining and destroying to make farmland – the world’s wetlands may finally be having their moment in the sun. In the UK, the government is expected to nominate a vast expanse of blanket bogs in the far north of Scotland as a world heritage site. They might not sound attractive to some people, but these bogs are among the world’s biggest stores of carbon, they provide abundant freshwater and they harbour a miraculous array of wildlife.

This recognition that wetlands are worth protecting has its roots in an agreement signed 50 years ago, on February 2 1971 in Ramsar, Iran. The Ramsar Convention is the only international convention that’s dedicated to protecting a specific ecosystem, though in reality, the “wetlands” that the convention refers to can mean anything from swamps and peat bogs to shallow lakes and estuaries.

So far, 171 countries have signed up to the convention and more than 2,400 sites are protected under it, representing between 10% and 20% of the world’s remaining wetlands and collectively covering an area larger than Mexico. Under the convention, governments are committed to the “wise use” and upkeep of wetlands in their borders, but this doesn’t necessarily keep them safe. Nearly 90% of the world’s wetlands have been lost since 1700, and those which remain are being lost at a rate that’s three times faster than forests.

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The floodplain wetlands of the Chobe River, on the Botswana-Namibia border. Stephen Tooth, Author provided

From agricultural expansion and river diversion to invasive species and climate change, wetlands face

numerous threats. But one of the gravest may be ignorance. We still don't know enough about these habitats, and they can still surprise even seasoned scientists like us. Perhaps most surprising of all are those wetlands that seem to confound all logic by thriving amid some of the driest places on Earth.

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Boom and bust amid the dust

Drylands are regions of the world where more water evaporates than falls from the sky. Warm drylands cover about 40% of the Earth's surface, but about 28% of this area overlaps with inland rivers and wetlands. The result is marshes, swamps, floodplains, and oases in a landscape where water is otherwise scarce.

Wetlands are especially important in dry landscapes, as they can be the only supply of freshwater and food for people and wildlife for miles around. Some wetlands in drylands are famous. Iraq's Mesopotamian Marshes (largely believed to be the inspiration for the Garden of Eden) and the Nile River floodplain are both largely surrounded by desert, but it's here in these Middle Eastern wetlands where modern human civilisation emerged.

For every famous example, there are thousands that remain unidentified and unmapped. That's partly because these unique habitats change frequently, sometimes vanishing completely before eventually reappearing. Seasonal downpours can sustain these green patches for a while if the soil doesn't drain well and is particularly good at holding onto the water. Other wetlands in drylands are more permanent thanks to a source of water below ground, with enough seeping to the surface to maintain damp conditions. But some wetlands can lie dormant until they're reawakened by river flooding and suddenly erupt in vibrant shades of green.



The riverine woodland and reed swamps of the Macquarie Marshes in Australia. Stephen Tooth, Author provided

Many wetlands in drylands are small and temporary, only hosting a thriving ecosystem for a few months following good rains that may occur years or even decades apart. Depending on the scale and their timing, scientific surveys may miss these hidden treasures. The boom-and-bust wetlands that are adapted to emerge following occasional pulses of water are so understudied that we're in danger of losing them before we even realise their presence and understand their full value.

All wetlands are prone to change over time. Sometimes rivers change their course and switch where floodwaters, sediment and nutrients end up. Older wetlands dry up, while newer ones develop. These changes create a mosaic of different landforms with different grades of wetness and soil types, helping to create a wide range of habitats that support an equally vast range of wildlife. Understanding the processes that give rise to these wetlands can help us maintain them, but the first step must be debunking the idea that such habitats are static, unchanging features of the landscape.



The Tso Kar lake brings a splash of green to the dry Karakorum mountain plains of India. Rafal Cichawa/Shutterstock

Despite some limitations, the Ramsar Convention remains one of the best mechanisms for protecting and highlighting the value of wetlands, even if many still go under the radar. Though there are signs of change. India recently added a complex of shallow lakes high up in a dry mountain to the Ramsar list. Numerous threatened species may benefit from this habitat, including the vulnerable snow leopard. Hopefully other countries will follow suit and recognise more of these rare and beautiful places before it's too late.

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