**Kaizen Conservation**

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The continuing loss in global biodiversity is well known and resulted in numerous policy initiatives and practical action. Following the success of establishing Yellowstone National Park, conservationists have actively protected sites both on land and, more recently, in the seas. Parks such as the **Kinabalu,** Serengeti or Yosemite are all still jaw-dropping natural spectacles that have benefitted from the protection provided. The armentarium of conservationists has been expanded to include a wide diversity of approaches including regulation, education, captive breeding, and habitat and species management.

Despite this effort, and its numerous successes, the global pattern is gloomy. For example, the latest report of the Living Planet Indexreported that the global index (summarising **16,704 population trends of 4,005 species)** showed a 60% decline between 1970 and 2014 (WWF. 2018) and the recent Global Assessment of the Intergovernmental Panel on Biodiversity and Ecosystem Services report (IPBES 2019) states that we are currently failing to prevent accelerating extinction.

The United Nation’s Convention on Biological Diversity has been assigned the task of ensuring the conservation of biodiversity: representatives of most of the world’s governments will meet in 2020 to create the plan. As the 2020 deadline approaches there is increasing urgency to devise a range of possible options in preparation for that plan; the best known is E.O. Wilson’s (2016) vision that half of the [Earth](https://en.wikipedia.org/wiki/Earth) should be dedicated to nature. I will suggest another: kaizen conservation.

There are innumerable examples of effective conservation measures, but alongside these successes there are many studies showing how not all conservation responses are fully effective. There is a problem of ignoring existing evidence, referred to as evidence complacency, meaning that ineffective techniques are repeatedly used ([Sutherland](https://www.nature.com/articles/s41559-017-0244-1#auth-1) & [Wordley](https://www.nature.com/articles/s41559-017-0244-1#auth-2) 2017). For example, despite the European Union spending many billion Euro annually on agri-environment schemes, numerous studies have shown that the results are mixed with many adopted interventions being ineffective. Batáry et al (2015) showed no evidence of recent schemes being more effective than older ones, which is contrary to the expectation of continual improvement from having learnt from experience.

Collation of the evidence shows that the methods really matter. For example, in creating under-road tunnels to avoid amphibians being squashed by traffic, the diameter, length, whether lit, substrate used, whether water present, entrance position, material used for the tunnel and tunnel microclimate all influence their effectiveness (Smith & Sutherland 2014). Despite this opportunity for learning and improvement, there is not a culture of learning from past successes and failures.

The means by which conservation is implemented has also been shown to really matter. In a review of marine protected areas, Gill et al (2017)showed that the responses varied greatly, with 71% of those studied having a positive influence on fish populations. The best predictor of benefit was the staff and budget capacity: those with adequate staff capacity had ecological effects 2.9 times greater than those with inadequate capacity. Similarly, Coad et al (2019) showed that less than a quarter of the terrestrial protected areas they sampled had adequate staff and financial resources for effective protection.

I suggest we can learn from the Japanese practice of kaizen - change (kai) to become good (zen) - in which there is a collective commitment to identifying and delivering improvement ([Carnerud](https://www.emeraldinsight.com/author/Carnerud%2C%2BDaniel) et al 2018). This approach has been considered as key to delivering much of Toyota’s considerable success and is widely imitated. We could adopt an approach of ‘Kaizen conservation’ with the objective of similarly seeking means of achieving good practice. A comparable approach was adopted by the British Cycling Team, who were committed to the ideal of ‘aggregating the marginal gains’ or, expressed more clearly, seeking ‘the 1% margin for improvement in everything you do’ in which they examined each component and considered how it could be improved (Harrell 2015), whether adjusting tyre weight or improving hand washing to reduce infection risk. The improved performance was seen as central to their remarkable success. This concept of continual improvement is being applied more widely, such as in medical practice (Pentecost et al. 2017).

The justification underpinning the idea of Kaizen conservation is that there is currently both excellent and weak practice. As in the examples above, weak practice can result from using ineffective measures or poor implementation due to insufficient staff, equipment, resources, experience, knowledge or commitment. Concentrating on improving practice is likely to be highly cost effective with the core idea being to focus on improved delivery. This builds on the ideas of building on the existing global experience through the large-scale delivery of evidence-based conservation (Sutherland and Wordley 2019).

What might an agenda look like for Kaizen conservation? There is a need for improving a range of elements that underpin conservation. These include increasing capacity and skills - both at programme management but also for those involved in delivery, completing the collation of existing knowledge on the effectiveness of interventions, dissemination of best practice in manners that influence practice, ensuring suitable equipment is available - including the appropriate use of modern technologies, enhanced training and greater testing of options with feedback to the global community. Such improved delivery of conservation may also lead to more widespread respect and increased funding

There are a range of plans and proposals for responding to the Convention on Biological Diversity 2020 meeting but as these typically act at a higher level they are compatible with kaizen conservation. For example, the idea of ‘bending the curve’ (Mace et al 2018) is that recovery is feasible using existing targets and commitments. One of the key three steps in that concept is ‘to identify actions to deliver the required biodiversity improvements. Traditional biodiversity conservation interventions such as protected areas and species conservation planning remain crucial, but actions must also address major drivers of biodiversity loss and ecosystem change’: kaizen conservation is a means of delivering on this critical step. Similarly, ambitions for dedicating more land to nature (including half earth) or large scale restoration (such as Wolff et al. 2018) are dependent upon effective delivery. Visconti et al (2019) suggest a novel target ‘The value of all sites of global significance for biodiversity, including key biodiversity areas, is documented, retained and restored through protected areas and other effective area-based conservation measures’. This is also based on recognising the mixed effectiveness of current actions and the need to actually deliver biodiversity rather than have actions on paper. Finally, most projects entail working with communities so improving social science delivery (e.g. Stern 2018) is fundamental.

I am definitely not suggesting that Kaizen conservation is the sole or sufficient solution but am encouraging identifying and adopting the cost-effective opportunities that arise though improving delivery. A global response to the biodiversity crisis would also entail combining the agenda described above with an improved protected area network that fills gaps in coverage, delivers judicial reserve expansion and increases the connectivity of the network with the objective of protecting biodiversity and the delivering social benefits including enhanced food security, carbon storage, improved flood control and tourism.

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