

# Kaizen conservation?

WILLIAM J. SUTHERLAND

The continuing decline and loss of global biodiversity has resulted in a wide range of policy initiatives and practical actions. One of the most publicly visible actions is protection for sites on land and, more recently, in the seas. Thankfully, as a result, protected areas such as Kinabalu, Serengeti and Yosemite all remain jaw-dropping natural spectacles. Beyond these well-known efforts, conservationists have been busy in other ways, and our armamentarium has expanded to include a wide diversity of approaches, including regulation, education, captive breeding, reintroduction, and habitat and species management.

But despite these extensive efforts, and the numerous successes, the global pattern remains gloomy. For example, the latest Living Planet Index (summarizing 16,704 population trends of 4,005 species) reported a 60% decline between 1970 and 2014 (WWF, 2018) and the recent Global Assessment of the Intergovernmental Panel on Biodiversity and Ecosystem Services (IPBES, 2019) noted that we are failing to halt the acceleration of extinctions.

One of our key tools is a multilateral treaty, the Convention on Biological Diversity, the objectives of which ‘are the conservation of biological diversity, the sustainable use of its components and the fair and equitable sharing of the benefits arising out of the utilization of genetic resources’. In 2020 representatives of most governments will meet at the Conference of the Parties to the treaty to adopt a new global biodiversity framework. 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 should be dedicated to nature (but see Büscher et al., 2017a,b and Cafaro et al., 2017). Here I 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 or interventions are fully effective. There is a problem of ignoring existing evidence, referred to as evidence complacency, with ineffective techniques being repeatedly used (Sutherland & Wordley, 2017). For example, despite the European Union spending many billion Euros annually on agri-environment schemes, numerous studies have shown that the results are mixed, with many adopted interventions being ineffective. Batáry et al. (2015) found no evidence of recent schemes

being more effective than older ones, contrary to the expectation of continual improvement from learning by experience.

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

The means by which conservation is implemented has also been shown to matter. In a review of marine protected areas, Gill et al. (2017) showed that the response of fish populations (measured as biomass) to protection varied greatly. The best predictor of benefit was staff and budget capacity: protected areas with adequate staff capacity had fish biomass responses 2.9 times greater than areas with inadequate capacity. Similarly, Coad et al. (2019) showed that less than a quarter of the terrestrial protected areas they examined 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 et al., 2018). In a very different field, 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 the team’s remarkable success. This concept of continual improvement is being applied more widely, such as in medical practice (Pentecost et al., 2017).

The justification underpinning this proposal for 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 from poor implementation as a result of insufficient staff, equipment, resources, experience, knowledge or commitment. Concentrating on

WILLIAM J. SUTHERLAND (ORCID [orcid.org/0000-0002-6498-0437](https://orcid.org/0000-0002-6498-0437)) Conservation Science Group, Department of Zoology, University of Cambridge, The David Attenborough Building, Pembroke Street, Cambridge, CB2 3QZ, UK E-mail [w.sutherland@zoo.cam.ac.uk](mailto:w.sutherland@zoo.cam.ac.uk)

improving practice is likely to be highly cost effective, with the core idea being to focus on improved delivery, including building on the global experience of successes and failures through the large-scale delivery of evidence-based conservation (Sutherland & Wordley, 2017).

What would an agenda for kaizen conservation look like? There is need to strengthen a range of elements, in particular by: (1) ensuring there are sufficient staff, (2) enhancing training to increase capacity and skills, both in programme management and in delivery, (3) continuing the collation of existing knowledge on the effectiveness of interventions, (4) disseminating recommendations for best practice effectively, (5) ensuring suitable equipment is available, including the appropriate use of modern technologies, and (6) greater testing of options, with feedback to the global community.

There are a range of plans and proposals for responding to the 2020 meeting of the Conference of the Parties to the Convention on Biological Diversity 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 bending the curve 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 to deliver this critical step. Similarly, ambitions for dedicating more land to nature (including Half-Earth) or large-scale restoration (e.g. Wolff et al., 2018) are dependent upon effective delivery. Visconti et al. (2019) suggested 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 recognizing the mixed effectiveness of current actions and the need to deliver biodiversity conservation rather than to confine actions to paper.

I am not suggesting that kaizen conservation could be the sole or even major means to halt the continuing decline and loss of global biodiversity; it has to act of course alongside other measures, including expansion of the area protected and improvements in other tools. However, it seems likely that the improved delivery of conservation through kaizen conservation could not only be a cost effective means of benefiting wildlife, but that demonstrating increased cost-effectiveness could also lead to greater respect from society and so make further funding of conservation seem more justifiable and attractive.

## References

- BATÁRY, P., DICKS, L.V., KLEIJN, D. & SUTHERLAND, W. (2015) The role of agri-environment schemes in conservation and environmental management. *Conservation Biology*, 29, 1006–1016.
- BÜSCHER, B., FLETCHER, R., BROCKINGTON, D., SANDBROOK, C., ADAMS, B., CAMPBELL, L. et al. (2017a) Doing Whole Earth justice: a reply to Cafaro et al. *Oryx*, 51, 401.
- BÜSCHER, B., FLETCHER, R., BROCKINGTON, D., SANDBROOK, C., ADAMS, W.M., CAMPBELL, L. et al. (2017b) Half-Earth or Whole Earth? Radical ideas for conservation, and their implications. *Oryx*, 51, 407–410.
- CAFARO, P., BUTLER, T., CRIST, E., CRYER, P., DINERSTEIN, E., KOPNINA, H. et al. (2017) If we want a whole Earth, Nature Needs Half: a response to Büscher et al. *Oryx*, 51, 400.
- CARNERUD, D., JACA, C. & BÄCKSTRÖM, I. (2018) Kaizen and continuous improvement—trends and patterns over 30 years. *The TQM Journal*, 30, 371–390.
- COAD, L., WATSON, J.E.M., GELDMANN, J., BURGESS, N.D., LEVERINGTON, F., HOCKINGS, M. et al. (2019) Widespread shortfalls in protected area resourcing undermine efforts to conserve biodiversity. *Frontiers in Ecology and the Environment*, published online 6 May 2019.
- GILL, D.A., MASCIA, M.B., AHMADIA, G.N., GLEW, L., LESTER, S.E., BARNES, M. et al. (2017) Capacity shortfalls hinder the performance of marine protected areas globally. *Nature*, 543, 665–669.
- HARRELL, E. (2015) How 1% performance improvements led to Olympic gold. *Harvard Business Review*. <https://hbr.org/2015/10/how-1-performance-improvements-led-to-olympic-gold> [accessed 14 June 2019].
- IPBES (2019) *Summary for Policymakers of the Global Assessment Report on Biodiversity and Ecosystem Services of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services*. IPBES Secretariat. <https://www.ipbes.net/document-library-catalogue/summary-policymakers-global-assessment-report-biodiversity-ecosystem> [accessed 4 June 2019].
- MACE, G.M., BARRETT, M., BURGESS, N.D., CORNELL, S.E., FREEMAN, R., GROOTEN, M. & PURVIS, A. (2018) Aiming higher to bend the curve of biodiversity loss. *Nature Sustainability*, 1, 448–451.
- PENTECAST, C., RICHARDS, D.A. & FROST, J. (2017) Amalgamation of Marginal Gains (AMG) as a potential system to deliver high-quality fundamental nursing care: a qualitative analysis of interviews from high-performance AMG sports and healthcare practitioners. *Journal of Clinical Nursing*, 27, 2387–2402.
- SMITH, R.K. & SUTHERLAND, W.J. (2014) *Amphibian Conservation: Evidence for Effectiveness of Interventions*. Pelagic Publishing, Exeter, UK.
- SUTHERLAND, W.J. & WORDLEY, C.F.R. (2017) Evidence complacency hampers conservation. *Nature Ecology & Evolution*, 1, 1215–1216.
- SUTHERLAND, W.J. & WORDLEY, C.F.R. (2018) A fresh approach to evidence synthesis. *Nature*, 558, 364–6.
- VISCONTI, P., BUTCHART, S.H.M., BROOKS, T.M., LANGHAMMER, P.F., MARNEWICK, D., VERGARA, S. et al. (2019) Protected area targets post-2020. *Science*, 364, 239–241.
- WILSON, E.O. (2016) *Half-Earth: Our Planet's Fight for Life*. W.W. Norton & Co, New York, USA.
- WOLFF, S. & SCHRAMMEIJER, E. & SCHULP, C. & VERBURG, P. (2018) Meeting global land restoration and protection targets: what would the world look like in 2050? *Global Environmental Change*, 52, 259–272.
- WWF (2018) *Living Planet Report 2018: Aiming Higher*. M. Grooten & R.E.A. Almond (eds). WWF, Gland, Switzerland.