

# FOUR ISLANDS, ONE VISION: A REGIONAL ECOHEALTH NETWORK IN AUSTRALIA AND AOTEAROA NEW ZEALAND

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We are heartened by the rising awareness of and interest in an "ecosystems approach to health." This approach, shortened to ecohealth, steps away from the all-too-prevalent thinking of humans as separate from nature, and is underpinned by rich theory and the small but growing body of evidence that when the diversity, resilience, and ecological functioning of ecosystems improves, so does the health of human communities that



Indigenous seed collectors with Gelganyem Limited in the East Kimberley, Western Australia, with one week's collection of native seeds destined for use in the restoration and rehabilitation of country degraded by mining activities for which they remain the Traditional Owners of the land. Photos: Adam Guest.

exist within and near them (Aronson et al. 2016; Breed et al. 2020; Nabhan et al. 2020). There is also a growing movement towards investing much more heavily in both ecological and ecosystem restoration as activities that may co-benefit ecological and human health (Crosset al. 2019; Aronson et al. 2020; Breed et al. 2020; Robinson 2020). Indeed, Bradby et al. (in review) posit that if ecological degradation represents an "illness" affecting human wellbeing, its deleterious effects might be alleviated by ecological restoration.

In this article, we introduce The Four Islands EcoHealth Network (FIEN), a regional restoration network linking existing restoration projects and organizations in mainland Australia, Tasmania, and the North and South Islands of Aotearoa New Zealand

(hence the name Four Islands; see also Bradby et al. in review). FIEN is the first regional network of the global initiative, EcoHealth Network. FIEN's eight founding member organizations have formally agreed to coordinate activities in a collaborative strategy addressing the underlying causes of ecosystem and health dysfunctions, rather than just treating the symptoms of each. FIEN recognises that actions which "care for country" need to become as central to all communities as it is for the Indigenous Peoples who have long been the traditional custodians of these landscapes. The network aims to investigate the links between ecosystem and human health in the context of their respective restoration activities (Bradby et al. in review). Following the definition by the World Health Organization<sup>1</sup>, FIEN considers human health to include health in all respects -

<sup>1</sup> The World Health Organization defines health as "a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity" (WHO constitution, signed on 22 July 1946 by the representatives of 61 States and entered into force on 7 April 1948).

physical, mental, social, and cultural – including wellbeing and livelihoods.

To improve ecohealth outcomes, we need a restorative culture based on the holistic, multidisciplinary, inter-professional, and trans-cultural ethics and values of ecological restoration (Cross et al. 2019). This culture-shift should be put into practice across a continuum of restorative activities (Gann et al 2019) and in conjunction with a range of related disciplines, most particularly public health but also fields such as ecological design and engineering, and ecological economics. As the SER community well know, there are several interlinked obstacles to acknowledge and overcome before the myriad, mushrooming restoration projects worldwide work together and are more effective in transforming global society. Ultimately, the goal of restoration projects should be to provide lasting ecological, socio-economic, health, and cultural benefits. In other words, they should seek to restore natural capital, human capital, social capital, and cultural capital through the same actions and at the same time. Five pre-requisites to achieve these goals are:

- A universal familiarity with and full application of - the definition for ecological restoration, as originally stated in the SER Primer (SER 2004); see also the "SER International Principles and Standards for the Practice of Ecological Restoration, version 2" (Gann et al. 2019), where the important notion of a "restoration continuum" was employed.
- 2. The integration of ecological restoration and related restorative activities into landscape-scale and regional programs that consciously combine conservation, ecological restoration, community renewal, social justice, and reconnection to the natural world. The contribution in the SERNews issue on Participatory Restoration in May 2020 by Cristina Eisenberg, describing her restoration work with Blackfoot Nation in Alberta, Canada, was a marvellous example of this point (Eisenberg et al., 2020).
- 3. Collaboration among researchers, organizations, and practitioners whose work is compatible with or synergistic with ecological restoration (e.g., medical researchers



Forest re-establishment and research at Waiwhakareke Natural Heritage Park in Kirikiriroa Hamilton (Aotearoa New Zealand) is supported in part by People, Cities & Nature. Forest restoration occurs through year-round engagement with the general public including school groups, retirees, Indigenous Peoples (Maori), city council employees, religious groups, nature clubs, and many more. Photos: Catherine Kirby. Traditional Owners of the land. Photos: Adam Guest.

and practitioners). These partnerships can also help transcend disciplinary, cultural, and socioeconomic barriers and boundaries (Aronson et al. 2020).

- 4. Engagement with Indigenous Peoples wherever possible, recognising, appreciating, and including them as they are holders of significant Traditional Knowledge and Ways of Knowing. This will progress the long-overdue decolonization of conservation and restoration disciplines.
- 5. Raising public awareness of ecological restoration, and the great hope it holds for the natural world and human health.

We argue that the most crucial tool to achieving these five pre-requisites is to address them concurrently, which is best accomplished through networked collaboration.

## FOUR ISLANDS: ONE VISION

The Four Islands EcoHealth Network (FIEN) is a regional network: a cooperative and coherent collaboration of affiliated organizations. Regional networks, such as FIEN, are crucial for investigating and communicating the complex social, cultural, economic, and ecological dynamics linking restoration practice and human health. FIEN aims to harness the unique geographical, cultural, and historic coherence of Australia and Aotearoa New Zealand, and to collaboratively explore restoration across the many "different but similar" bioclimatic, biophysical, political, and socio-cultural contexts offered by these countries and communities.

FIEN was established at a workshop in Hobart, Australia, in February 2020. This gathering included ecologists, medical and public health professionals, land managers, restoration researchers, and program managers who convened to strategize how a diverse array of ecological restoration projects that are already underway might collaborate (Bradby et al. in review). It was agreed that this network would build on shared research questions and methodologies to create shared experiments, training, and capacity-building structures and tools, under a commitment to seek ways to simultaneously improve human health through work that spans the restorative continuum and assists rural, urban, and suburban socio-ecological systems. As described in a recent essay in the Natural History of Ecological Restoration blog, our unified vision is about "Healthy Societies Built from Healthy Ecosystems."

FIEN will focus on the dialogue between restoration ecologists, restoration practitioners, medical researchers, and health professionals. When discussing restoration, the language of clinical medicine provides strong metaphors useful for communication, education, research, lobbying, and outreach. Furthermore, because of the increasingly clear and strong links between ecosystem health and human health, physicians and public health professionals have an essential and synergistic role to play alongside restoration scientists and practitioners. Insight from the fields of clinical medical practice, research, and public health can also provide lessons for ecosystem restoration practitioners (Aronson et al. 2016).



Restored urban forests in Aotearoa New Zealand are convenient to access and often used for community education about nature's value to people (86% of New Zealanders live in cities). Left to Right: People, Cities & Nature (PCaN) graduate student Monique Hall checking an understory enrichment planting; PCaN leader Bruce Clarkson tells the story of the restored forest; students of a tertiary education institute on a field trip about urban forest planting and monitoring. Photos: Kiri Joy Wallace, Monique Hall.

Traditional Ecological Knowledge holders are highly valued in the FIEN. The Indigenous Peoples of Australia and Aotearoa New Zealand have rich and diverse cultural heritages intrinsically tied to the land with which they have lived for (in some cases) tens of thousands of years. Many Indigenous communities now aspire to restore their traditional lands that have been damaged or degraded following invasion and colonialization, and the act of doing so is in itself a contribution to their health and wellbeing. Indigenous Peoples already have a strong role in several organisations affiliated with FIEN. Building these relationships across the FIEN network is a critical goal that recognises the importance of Traditional Ecological Knowledge (TEK) holders and the more holistic approaches of Indigenous Peoples' philosophies and cultures to "nature" and the human culture-nature nexus. A recent popular science article by Dr. Kiri Joy Wallace touched on the significance of restoration and inclusion of TEK to the public health sector, native ecosystems, and people of Aotearoa New Zealand. This article, and a related recent paper in Restoration Ecology (Hall et al., in press), highlight the importance of recognizing that many Indigenous Peoples already hold substantial knowledge about ecosystem care that pertains to restoration practice and that they should be full partners in any restoration vision. Other authors have documented some of the health benefits restorative work can bring to Indigenous Peoples, such as improved mental and cultural health and wellbeing, and a reconnection with country (Nabhan et al 2020).

## **FIEN MEMBERS**

To date, eight organizations have joined together to create FIEN. Below are brief overviews of the founding members of FIEN.All are affiliated organizations of the global EHN, and the first five are Hubs in the network (umbrella organizations that leverage their associations with other organizations and individuals to coordinate sites and a shared vision for ecological restoration).

 <u>Gondwana Link (GLink)</u> – the "keeper of the vision" for a 1000 km-long restoration region in southwestern Australia, GLink is a loose coalition of community-led land management organizations in collaboration with larger NGOs, businesses, individuals, and research institutions. Indigenous Peoples – especially the Noongar and Ngadju peoples of south-western Australia – play a significant leadership and management role across the program (Bradby et al. 2016).

- Great Eastern Ranges (GER) an initiative aiming to bring people together and restore and reconnect ecosystems across eastern Australia, from western Victoria to far north Queensland. GER achieves landscape-scale restoration through a series of related and complementary projects undertaken by regional networks of partner organizations working in local nodes of collaboration.
- North East Bioregional Network (NEBN)

   a community-based, not-for-profit nature conservation organization, NEBN aims to create jobs in nature conservation and ecological restoration and to protect, maintain, and restore ecological resilience and integrity in local ecosystems.
- People, Cities & Nature (PCaN) a socioecological urban restoration research program in Aotearoa New Zealand. PCaN researches how to improve native biodiversity and ecosystem services and investigates how people and businesses engage in restoration by studying cross-sector alliances, use of green space, and how Maori restoration values are an integral part of urban restoration (Wallace and Clarkson 2019; Walker et al. 2019).
- <u>Reconnecting Northland (RN)</u> a program aiming to connect human communities and reduce ecological fragmentation through increasing conservation and restoration activities, and supporting community-led research projects across *Te Taitokerau* (Northland), in northern Aotearoa New Zealand.
- <u>Gelganyem Limited (GLT)</u> manages funds and assets on behalf of the Traditional Owners (Indigenous Peoples) in a mining lease area in north-eastern Western Australia, and oversees Traditional Owner-led projects in large-scale native seed collection and the propagation of local-provenance native plants.
- Healthy Landscapes Group (HeaLa) a group based at the University of Tasmania establishing local initiatives that use the extraordinary natural heritage of Tasmania to

advance ecohealth knowledge and health. HeaLa seeks to understand nature-health outcomes and human-nature connections using interdisciplinary methods and participatory research in regional cities like Hobart (e.g. Marsh et al. 2020).

 Healthy Urban Microbiome Initiative (HUMI) a UN-backed initiative seeking to restore the immune-restorative power of biodiverse green spaces in cities to maximize human health gains.

## SUMMING UP AND LOOKING FORWARD

What are the next steps for the FIEN? With the support of the EHN, FIEN is focusing on building and catalysing a small but dynamic high-profile network of like-minded people and organizations. The urgent needs are to establish holistic research frameworks which include the robust monitoring of cultural, social, and public health benefits of ecological restoration programs. From that base we can better document the beneficial effects that occur when restoration processes are integrated. A third key objective is to communicate our findings in ways that have influence and impact the global community, with particular attention to human wellbeing.

To achieve these goals, we need to link together not only health and restoration "people" (from professionals to amateur volunteers), but a wide range of diverse stakeholders working in areas convergent with restoration, conservation, and public health. Like the EHN, the FIEN argues for a strong place-based focus where people can openly observe and get involved with projects, instead of just hearing or reading about them.

We believe that an ecohealth approach is the only way our society can avert its ominous trajectory of exploitation and degradation – one in which both we and our environment suffer. We hope that FIEN is only the first of many networks bringing motivated, likeminded people together to repair ecosystems, build healthier human communities, and reinstate the important relationship between the two.

### REFERENCES

Aronson J, Blatt CM, Aronson TB (2016) Restoring ecosystem health to improve human health and wellbeing: physicians and restoration ecologists unite in a common cause. *Ecology and Society* 21:39. [http://www. ecologyandsociety.org/vol21/iss4/art39/]

Aronson J, Goodwin N, Orlando L, Eisenberg C, Cross AT (2020) A world of possibilities: Six restoration strategies to support the United Nation's Decade on Ecosystem Restoration. *Restoration Ecology* 28:730-736

Bradby K, Keesing A, Wardell-Johnson G (2016) Gondwana Link: connecting people, landscapes, and livelihoods across southwestern Australia. *Restoration Ecology* 24:827-835

Bradby K, Wallace KJ, Cross AT, Flies E, Witehira C, Keesing A, Dudley T, Breed MF, Howling G, Weinstein P, Aronson J (in review) Four Islands EcoHealth Network: An Australasian initiative building synergies between the

Once a sterile cement slab, this University Student Accommodation site was transformed into an on-site community garden by The Healthy Landscape Group, who are tracking the impact on local perceptions, community and wellbeing. Read more here: Marsh et al. 2020. Photo: Bohdi Diaz-Icasuriaga.



restoration of ecosystems and human health. Restoration Ecology

Breed MF, Cross AT, Wallace K, Bradby K, Flies E, Goodwin N, Jones M, Orlando L, Skelly C, Weinstein P, Aronson J (2020) Ecosystem restoration – a public health intervention. EcoHealth <u>https://doi.org/10.1007/s10393-020-01480-1</u>

Cross AT, Neville PG, Dixon KW, Aronson J (2019) Time for a paradigm shift towards a restorative culture. *Restoration Ecology* 27:924-928

Flies E, Skelly C, Negi SS, Prabhakaran P, Liu Q, Liu K, Goldizen FC, Lease C, Weinstein P (2017) Biodiverse green spaces: a prescription for global urban health. Frontiers in Ecology and the Environment 15:510-516

Flies EJ, Mavoa S, Zosky GR, Mantzioris E, Williams C, Eri R, Brook BW, Buettel JC (2019) Urban-associated diseases: Candidate diseases, environmental risk factors, and a path forward. *Environment International* 133:105187

Gann GD, McDonald T, Walder B, Aronson J, Nelson C, Jonson J, Eisenberg C, Hallett JG, Guariguata MR, Liu J, Hua F, Echeverría C, Decleer K, Gonzales EK, Dixon K (2019) International principles and standards for the practice of ecological restoration. Second ed. *Restoration Ecology* <u>https://doi.org/10.1111/rec.13035</u>

Hall MM, Wehi PM, Whaanga H, Walker ET, Koia JH, Wallace KJ (In press) Promoting social and environmental justice to support Indigenous partnerships in urban ecosystem restoration. *Restoration Ecology* 

Haskell BD, Norton BG, and Costanza R (1992) Introduction:What is ecosystem health and why should we worry about it? Pages 3-20 in R. Costanza, B. G. Norton, and B. D. Haskell, editors. Ecosystem health: new goals for environmental management. Island Press, Washington, D.C., USA

Lai H, Flies EJ, Weinstein P, Woodward A (2019) The impact of green space and biodiversity on health. *Frontiers in Ecology and the Environment* 17:383-390

Liddicoat C, Weinstein P, Bissett A, Gellie N, Mills J, Waycott M, Breed MF (2019) Can bacterial indicators of a grassy woodland restoration inform ecosystem assessment and microbiota-mediated human health? Environment International 129:105-117

Liddicoat C, Sydnor H, Cando-Dumancela C, Dresken R, Liu J, Gellie N, Mills J, Young J, Weyrich L, Hutchinson M, Weinstein P, Breed MF (2020) Naturally-diverse airborne environmental microbial exposures modulate the gut microbiome and may provide anxiolytic benefits in mice. *Science of the Total Environment.* doi: 10.1016/j. scitotenv.2019.134684

Marsh P, Mallick S, Flies E, Jones P, Pearson S, Koolhof I, Byrne J, Kendal D (in press) Restoring community wellbeing, connection to nature and trust: Contextualizing aspirations for a new Campus Community Garden. International Journal of Environmental Research and Public Health

Nabhan GP, Orlando L, Monti LS, Aronson J (2020) Hands-on ecological restoration as a nature-based health intervention: reciprocal restoration for people and ecosystems. *Journal of Ecopsychology*. <u>https://doi.org/10.1089/eco.2020.000</u>3

Rapport DJ, Costanza R, McMichael AJ (1998) Assessing ecosystem health. Trends in Ecology & Evolution 13: 397-402

Robinson JM, Cando-Dumancela C, Liddicoat C, Weinstein P, Cameron R, Breed MF (2020) Vertical stratification in urban green space aerobiomes. *bioRxiv* doi: 10.1101/2020.06.28.176743

Robinson J (2020) Four reasons why restoring nature of the most important endeavour of our time. The Conversation. <u>https://theconversation.com/four-reasons-</u> why-restoring-nature-is-the-most-important-endeavour-ofour-time-147365

Society for Ecological Restoration International (SER) (2004). SER International Primer on Ecological Restoration. Society for Ecological Restoration International.

Walker ET, Wehi PM, Nelson NJ, Beggs JR, Whaanga H (2019) Kaitiakitanga, place and the urban restoration agenda. New Zealand Journal of Ecology 43:1-8

Wallace KJ, Clarkson BD (2019) Urban forest restoration ecology: a review from Hamilton, New Zealand. *Journal of the Royal Society of New Zealand* 49:347-369

