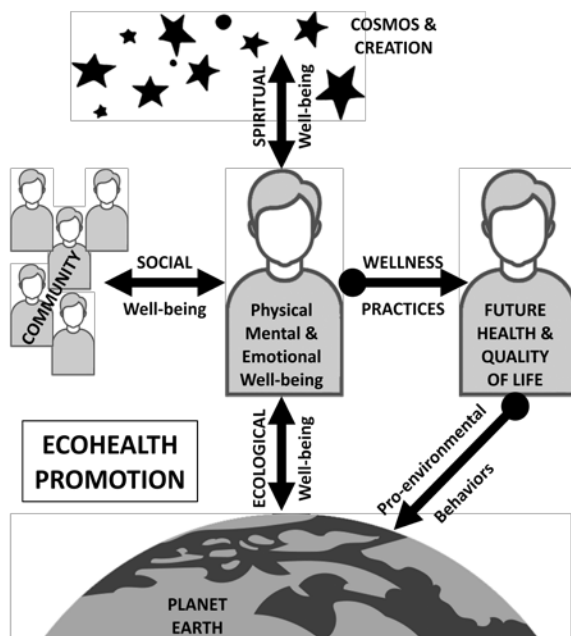


...PROMOTE ECOHEALTH

ECOHEALTH

Ecohealth is a conflation of an ecosystemic approach to health that uses systems theory to explore the intersection between both human and environmental well-being. The health of people and health of an ecosystem are inextricably interconnected with numerous directly and inversely linked causal pathways that can be both harmful and/or beneficial.

Promoting ecohealth is the process of helping people to make personal decisions and think systemically about improving both their individual wellness and that of the surrounding ecosystem. To enhance personal and planetary well-being, people should be supported and encouraged, through **harmonious interactions with nature**, to aspire to a state of mutually beneficial relationships made across interwoven dimensions of well-being. The graphic below depicts three **internal** dimensions (physical, mental, and emotional) and three **external** dimensions (spiritual, social, and ecological).



EVIDENCE

Increasing evidence has been accumulating for holistic health benefits associated with nature contact and participation in outdoor activities. Drawing on this evidence, wellness practices promote ecohealth, improve human health, and preserve the planet for future generations. A few examples of wellness practices include:

- interacting with nature (gardens, parks, forests or water bodies) using all the senses and engaging with other people;
- being physically active in nature, ideally for a minimum of two hours per week; peak health benefits accrue when spending at least three to five hours per week;
- encouraging growing children to engage in self-directed, unsupervised, and risky play in nature; and
- learning and teaching outdoors.

EE staff should consider how these can be integrated into programs in order to promote ecohealth for clients. A summary of evidence and references are listed on the next pages.

Ecohealth promotion can occur via intentional programming or incidentally through lifestyle choices and the adoption of evidence-based wellness practices. These can be built into EE programs as a primary practice or foundational framework and can also be incorporated adjunctively to complement other therapeutic or specifically targeted goals of the EE program. Contraindications for promoting ecohealth in certain contexts are primarily related to internal ecohealth considerations such as phobias, ailments, or physical impediments.

Stephen Ritchie, Jonah D'Angelo & Simon Priest

Stephen Ritchie
 LAURENTIAN UNIVERSITY
 sritchie@laurentian.ca
 705-675-1151 x 1046
<http://www.advl.laurentian.ca/>

FURTHER RESOURCES

REFERENCE	ECOHEALTH DIMENSION					
	PHYSICAL	MENTAL	EMOTIONAL	SOCIAL	SPIRITUAL	ECOLOGICAL
Andre, E. K., Williams, N., Schwartz, F., & Bullard, C. (2017). Benefits of Campus Outdoor Recreation Programs: A Review of the Literature. <i>Journal of Outdoor Recreation, Education, and Leadership</i> , 9(1), 15-25. https://doi.org/10.18666/jorel-2017-v9-i1-7491	X	X		X		X
Ardoin, N. M., Bowers, A. W., Roth, N. W., & Holthuis, N. (2018). Environmental Education and K-12 Student Outcomes: A Review and Analysis of Research. <i>The Journal of Environmental Education</i> , 49(1), 1-17. https://doi.org/10.1080/00958964.2017.1366155	X	X				X
Ayotte-Beaudet, J.-P., Potvin, P., Lapierre, H. G., & Glackin, M. (2017). Teaching and Learning Science Outdoors in Schools' Immediate Surroundings at k 12 Levels: A Meta-Synthesis. <i>Eurasia journal of mathematics, science and technology education</i> , 13, 5343-5363.		X				
Baker, D. (2011). <i>The Effects of Adventure and Wilderness Therapy: A Meta-Analytic Review</i> [thesis, James Cook University]. Townsville, Australia.	X	X		X		
Bamberg, S., & Möser, G. (2007). Twenty Years After Hines, Hungerford, And Tomera: A New Meta-Analysis of Psycho-Social Determinants of Pro-Environmental Behaviour. <i>Journal of Environmental Psychology</i> , 27(1), 14-25. https://doi.org/10.1016/j.jenvp.2006.12.002						X
Barragan-Jason, G., De Mazancourt, C., Parmesan, C., Singer, M. C., & Loreau, M. (2022). Human-Nature Connectedness as a Pathway to Sustainability: A Global Meta-Analysis. <i>Conservation Letters</i> , 15(1), 1-7. https://doi.org/10.1111/conl.12852						X
Barton, J., & Pretty, J. (2010). What is the Best Dose of Nature and Green Exercise for Improving Mental Health? A Multi-Study Analysis. <i>Environmental Science Technology</i> , 44(10), 3947-3955. https://doi.org/10.1021/es903183r		X				
Becker, C., Lauterbach, G., Spengler, S., Dettweiler, U., & Mess, F. (2017). Effects of Regular Classes in Outdoor Education Settings: A Systematic Review on Students' Learning, Social and Health Dimensions. <i>International Journal of Environmental Research and Public Health</i> , 14(5), 1-20. https://doi.org/10.3390/ijerph14050485	X	X		X		
Bedard, R. M., Rosen, L., & Vacha-Haase, T. (2003). Wilderness Therapy Programs for Juvenile Delinquents: A Meta-Analysis. <i>Journal of Therapeutic Wilderness Camping</i> , 3(1), 7-13.		X		X		
Bettmann, J. E., Gillis, H. L., Speelman, E. A., Parry, K. J., & Case, J. M. (2016). A Meta-analysis of Wilderness Therapy Outcomes for Private Pay Clients. <i>Journal of Child and Family Studies</i> , 25(9), 2659-2673. https://doi.org/10.1007/s10826-016-0439-0		X		X		
Bowen, D., & Neill, J. (2013). A Meta-Analysis of Adventure Therapy Outcomes and Moderators. <i>The Open Psychology Journal</i> , 6, 28-53. https://doi.org/10.2174/1874350120130802001	X	X		X	X	
Bowler, D. E., Buyung-Ali, L. M., Knight, T. M., & Pullin, A. S. (2010). A Systematic Review of Evidence for the Added Benefits to Health of Exposure to Natural Environments. <i>BMC Public Health</i> , 10(456), 1-10. https://doi.org/10.1186/1471-2458-10-456	X	X	X			
Brito, H. S., Carraça, E. V., Palmeira, A. L., Ferreira, J. P., Vleck, V., & Araújo, D. (2022). Benefits to Performance and Well-Being of Nature-Based Exercise: A Critical Systematic Review and Meta-Analysis. <i>Environ Sci Technol</i> , 56(1), 62-77. https://doi.org/10.1021/acs.est.1c05151	X	X	X			

REFERENCE

	ECOHEALTH DIMENSION					
	PHYSICAL	MENTAL	EMOTIONAL	SOCIAL	SPIRITUAL	ECOLOGICAL
Britton, E., Kindermann, G., Domegan, C., & Carlin, C. (2020). Blue Care: A Systematic Review of Blue Space Interventions for Health and Wellbeing. <i>Health Promotion International</i> , 35(1), 50-69. https://doi.org/10.1093/heapro/day103	X	X		X		X
Browning, M. H. E. M., Shipley, N., McAnirlin, O., Becker, D., Yu, C.-P., Hartig, T., & Dzhambov, A. M. (2020). An Actual Natural Setting Improves Mood Better than its Virtual Counterpart: A Meta-Analysis of Experimental Data [Systematic Review]. <i>Frontiers in Psychology</i> , 11, 1-12, Article 2200. https://doi.org/10.3389/fpsyg.2020.02200			X			
Brussoni, M., Gibbons, R., Gray, C., Ishikawa, T., Sandseter, E., Bienenstock, A., Chabot, G., Fuselli, P., Herrington, S., Janssen, I., Pickett, W., Power, M., Stanger, N., Sampson, M., & Tremblay, M. (2015). What is the Relationship Between Risky Outdoor Play and Health in Children? A Systematic Review. <i>International Journal of Environmental Research and Public Health</i> , 12(6), 6423-6454. http://www.mdpi.com/1660-4601/12/6/6423	X	X	X	X		
Cao, K., Wan, Y., Yusufu, M., & Wang, N. (2020). Significance of Outdoor Time for Myopia Prevention: A Systematic Review and Meta-Analysis Based on Randomized Controlled Trials. <i>Ophthalmic Research</i> , 63(2), 97-105. https://doi.org/10.1159/000501937	X					
Capaldi, C. A., Dopko, R. L., & Zelenski, J. M. (2014). The Relationship Between Nature Connectedness and Happiness: A Meta-Analysis [Original Research]. <i>Frontiers in Psychology</i> , 5, 1-15, Article 976. https://doi.org/10.3389/fpsyg.2014.00976			X			
Cason, D. R., & Gillis, H. L. (1994). A Meta-Analysis of Outdoor Adventure Programming with Adolescents. <i>Journal of Experiential Education</i> , 17(1), 40-47.		X				
Cooley, S. J., Jones, C. R., Kurtz, A., & Robertson, N. (2020). 'Into The Wild': A Meta-Synthesis of Talking Therapy in Natural Outdoor Spaces. <i>Clinical psychology review</i> , 77, 101841-101841. https://doi.org/10.1016/j.cpr.2020.101841	X					
Coventry, P. A., Brown, J. E., Pervin, J., Brabyn, S., Pateman, R., Breedvelt, J., Gilbody, S., Stancliffe, R., McEachan, R., & White, P. L. (2021). Nature-Based Outdoor Activities for Mental And Physical Health: Systematic Review and Meta-Analysis. <i>SSM - Population Health</i> , 16, 1-15, Article 100934. https://doi.org/https://doi.org/10.1016/j.ssmph.2021.100934	X	X	X			
Daryanto, A., & Song, Z. (2021). A Meta-Analysis of the Relationship Between Place Attachment and Pro-Environmental Behaviour. <i>Journal of Business Research</i> , 123, 208-219. https://doi.org/https://doi.org/10.1016/j.jbusres.2020.09.045						X
Deng, L., & Pang, Y. (2019). Effect of Outdoor Activities in Myopia Control: Meta-analysis of Clinical Studies. <i>Optometry and Vision Science</i> , 96(4), 276-282. https://doi.org/10.1097/OPX.0000000000001357	X					X
Djernis, D., Lerstrup, I., Poulsen, D., Stigsdotter, U., Dahlggaard, J., & O'Toole, M. (2019). A Systematic Review and Meta-Analysis of Nature-Based Mindfulness: Effects of Moving Mindfulness Training into an Outdoor Natural Setting. <i>International Journal of Environmental Research and Public Health</i> , 16(17), 1-19. https://doi.org/10.3390/ijerph16173202	X	X		X	X	
Eigenschenk, B., Thomann, A., McClure, M., Davies, L., Gregory, M., Dettweiler, U., & Inglés, E. (2019). Benefits of Outdoor Sports for Society. A Systematic Literature Review and Reflections on Evidence. <i>International Journal of Environmental Research and Public Health</i> , 16(6), 1-21. https://doi.org/10.3390/ijerph16060937	X	X	X	X		
Fang, B.-B., Lu, F. J. H., Gill, D. L., Liu, S. H., Chyi, T., & Chen, B. (2021). A Systematic Review and Meta-Analysis of the Effects of Outdoor Education Programs on Adolescents' Self-Efficacy. <i>Perceptual and Motor Skills</i> , 128(5), 1932-1958. https://doi.org/10.1177/00315125211022709		X				
Ferrell, A. D. (2017). <i>A Meta-Analysis of Social Emotional Learning Outcomes in Challenge Course Programs</i> (Publication Number 10269688) [PhD, University of Colorado].Boulder, CO.		X		X		
Fleischer, C., Doebler, P., Bürkner, P. C., & Holling, H. (2017). Adventure Therapy Effects on Self-Concept: A Meta-Analysis. <i>PsyArXiv (preprint)</i> , 1-53. https://doi.org/https://doi.org/10.31234/osf.io/c7y9a		X				
Fyfe-Johnson, A. L., Hazlehurst, M. F., Perrins, S. P., Bratman, G. N., Thomas, R., Garrett, K. A., Hafferty, K. R., Cullaz, T. M., Marcuse, E. K., & Tandon, P. S. (2021). Nature and Children's Health: A Systematic Review. <i>Pediatrics</i> , 148(4), 72-94. https://doi.org/10.1542/peds.2020-049155	X	X				
Gagliardi, C., & Piccinini, F. (2019). The Use of Nature - Based Activities for the Well-Being of Older	X	X				

REFERENCE

	PHYSICAL	MENTAL	EMOTIONAL	SOCIAL	SPIRITUAL	ECOLOGICAL
ECOHEALTH DIMENSION						
People: An Integrative Literature Review. <i>Archives of Gerontology and Geriatrics</i> , 83, 315-327. https://doi.org/10.1016/j.archger.2019.05.012						
Gascon, M., Zijlema, W., Vert, C., White, M. P., & Nieuwenhuijsen, M. J. (2017). Outdoor Blue Spaces, Human Health and Well-Being: A Systematic Review of Quantitative Studies. <i>International Journal of Hygiene and Environmental Health</i> , 220(8), 1207-1221. https://doi.org/10.1016/j.ijheh.2017.08.004	X	X	X			
Geneshka, M., Coventry, P., Cruz, J., & Gilbody, S. (2021). Relationship between Green and Blue Spaces with Mental and Physical Health: A Systematic Review of Longitudinal Observational Studies. <i>International Journal of Environmental Research and Public Health</i> , 18(17), 1-29. https://doi.org/10.3390/ijerph18179010	X	X				
George, J. T. (2011). <i>Efficacy of Outdoor Behaviour Healthcare (OBH) for Adolescent Populations: A Meta-Analysis</i> [PhD, University of Indianapolis]. Indianapolis, IN.	X	X	X	X		X
Georgiou, M., Morison, G., Smith, N., Tiegies, Z., & Chastin, S. (2021). Mechanisms of Impact of Blue Spaces on Human Health: A Systematic Literature Review and Meta-Analysis. <i>International Journal of Environmental Research and Public Health</i> , 18(5), 1-41. https://doi.org/10.3390/ijerph18052486	X	X				X
Gianfredi, V., Buffoli, M., Rebecchi, A., Croci, R., Oradini-Alacreu, A., Stirparo, G., Marino, A., Odone, A., Capolongo, S., & Signorelli, C. (2021). Association between Urban Greenspace and Health: A Systematic Review of Literature. <i>International Journal of Environmental Research and Public Health</i> , 18(10), 5137.	X	X				
Gillis, H. L., & Speelman, E. (2008). Are Challenge (Ropes) Courses an Effective Tool? A Meta-Analysis. <i>Journal of Experiential Education</i> , 31(2), 111-135.	X	X		X		
Gillis, H. L., Speelman, E., Linville, N., Bailey, E., Kalle, A., Oglesbee, N., Sandlin, J., Thompson, L., & Jensen, J. (2016). Meta-analysis of Treatment Outcomes Measured by the Y-OQ and Y-OQ-SR Comparing Wilderness and Non-wilderness Treatment Programs. <i>Child & Youth Care Forum</i> , 45(6), 851-863. https://doi.org/10.1007/s10566-016-9360-3	X	X		X		
Gonzalez, M. T., & Kirkevold, M. (2014). Benefits Of Sensory Garden and Horticultural Activities in Dementia Care: A Modified Scoping Review. <i>Journal of Clinical Nursing</i> , 23(19-20), 2698-2715. https://doi.org/10.1111/jocn.12388	X	X		X		
Gray, C., Gibbons, R., Larouche, R., Sandseter, E., Bienenstock, A., Brussoni, M., Chabot, G., Herrington, S., Janssen, I., Pickett, W., Power, M., Stanger, N., Sampson, M., & Tremblay, M. (2015). What is the Relationship between Outdoor Time and Physical Activity, Sedentary Behaviour, and Physical Fitness in Children? A Systematic Review. <i>International Journal of Environmental Research and Public Health</i> , 12(6), 6455-6474. http://www.mdpi.com/1660-4601/12/6/6455	X					
Green Analytics. (2020). <i>Developing a Conceptual Framework to Understand the Business Case for Ecohealth In Ontario</i> . https://www.ecohealthontario.ca/business-case-for-ecohealth	X	X		X		X
Grouzet F.M.E., Lee E.S. (2014) Ecological Well-Being. In: Michalos A.C. (eds) Encyclopedia of Quality of Life and Well-Being Research. Springer, Dordrecht. https://doi.org/10.1007/978-94-007-0753-5_3966	X	X		X	X	
Hans, T. A. (2000). A Meta-Analysis of the Effects of Adventure Programming on Locus of Control. <i>Journal of Contemporary Psychotherapy</i> , 30(1), 33-60. https://doi.org/10.1023/a:1003649031834		X				
Hanson, S., & Jones, A. (2015). Is there Evidence that Walking Groups have Health Benefits? A Systematic Review and Meta-Analysis. <i>British Journal of Sports Medicine</i> . 1-7. https://doi.org/10.1136/bjsports-2014-094157	X	X				
Hattie, J. M., Marsh, H. W., Neill, J. T., & Richards, G. E. (1997). Adventure Education and Outward Bound: Out-of-Class Experiences that Make a Lasting Difference. <i>Review of Educational Research</i> , 67(1), 43-87. https://doi.org/10.3102/00346543067001043	X	X	X	X		
Ho, C.-L., Wu, W.-F., & Liou, Y. M. (2019). Dose–Response Relationship of Outdoor Exposure and Myopia Indicators: A Systematic Review and Meta-Analysis of Various Research Methods. <i>International Journal of Environmental Research and Public Health</i> , 16(14), 1-17. https://doi.org/10.3390/ijerph16142595	X					
Holland, W. H., Powell, R. B., Thomsen, J. M., & Monz, C. A. (2018). A Systematic Review of the Psychological, Social, and Educational Outcomes Associated With Participation in Wildland Recreational Activities. <i>Journal of Outdoor Recreation, Education, and Leadership</i> , 10(3), 197-225. https://doi.org/10.18666/jorel-2018-v10-i3-8382	X	X		X	X	X
Houlden, V., Weich, S., Porto De Albuquerque, J., Jarvis, S., & Rees, K. (2018). The Relationship between		X	X			

REFERENCE

	PHYSICAL	MENTAL	EMOTIONAL	SOCIAL	SPIRITUAL	ECOLOGICAL
ECOHEALTH DIMENSION						
Greenspace and the Mental Wellbeing of Adults: A Systematic Review. <i>PLoS ONE</i> , 13(9, e0203000), 1-35. https://doi.org/10.1371/journal.pone.0203000						
Husk, K., Lovell, R., Cooper, C., Stahl-Timmins, W., & Garside, R. (2016). Participation in Environmental Enhancement and Conservation Activities for Health a Well-Being in Adults: A Review of Quantitative and Qualitative Evidence. <i>Cochrane Database Syst Rev</i> (5), 1-256, Article Cd010351. https://doi.org/10.1002/14651858.CD010351.pub2	X	X		X		
Jabbar, M., Yusoff, M. M., & Shafie, A. (2021). Assessing the Role of Urban Green Spaces for Human Well-Being: A Systematic Review. <i>GeoJournal</i> , 1-19. https://doi.org/10.1007/s10708-021-10474-7	X	X	X	X		X
Jansson, A. K., Lubans, D. R., Smith, J. J., Duncan, M. J., Haslam, R., & Plotnikoff, R. C. (2019). A Systematic Review of Outdoor Gym Use: Current Evidence and Future Directions. <i>Journal of Science and Medicine in Sport</i> , 22(12), 1335-1343. https://doi.org/10.1016/j.jsams.2019.08.003	X					
Kabisch, N., van den Bosch, M., & Laforteza, R. (2017). The Health Benefits of Nature-Based Solutions to Urbanization Challenges for Children and The Elderly - A Systematic Review. <i>Environmental Research</i> , 159, 362-373. https://doi.org/10.1016/j.envres.2017.08.004	X	X				
Kotera, Y., Richardson, M., & Sheffield, D. (2022). Effects of Shinrin-Yoku (Forest Bathing) and Nature Therapy on Mental Health: A Systematic Review and Meta-analysis. <i>International Journal of Mental Health and Addiction</i> , 20(1), 337-361. https://doi.org/10.1007/s11469-020-00363-4		X	X			
Kua, K., & Lee, S. (2021). The Influence of Residential Greenness on Mortality in the Asia-Pacific Region: A Systematic Review and Meta-Analysis. <i>Perspectives in Public Health</i> , 141(6), 342-353. https://doi.org/10.1177/17579139211011496	X					
Lahart, I., Darcy, P., Gidlow, C., & Calogiuri, G. (2019). The Effects of Green Exercise on Physical and Mental Wellbeing: A Systematic Review. <i>International Journal of Environmental Research and Public Health</i> , 16(8). https://doi.org/10.3390/ijerph16081352		X	X			
Laidlaw, J. S. (2000). <i>A Meta-Analysis Of Outdoor Education Programs</i> . [DEd, University of Northern Colorado]. Greeley, CO.	X	X	X	X		X
Lambert, A., Vlaar, J., Herrington, S., & Brussoni, M. (2019). What is the Relationship between the Neighbourhood Built Environment and Time Spent in Outdoor Play? A Systematic Review. <i>International Journal of Environmental Research and Public Health</i> , 16(20), 1-35. https://doi.org/10.3390/ijerph16203840	X					
Li, D., Menotti, T., Ding, Y., & Wells, N. M. (2021). Life Course Nature Exposure and Mental Health Outcomes: A Systematic Review and Future Directions. <i>International Journal of Environmental Research and Public Health</i> , 18(10), 1-28.		X	X			
Li, H., Zhang, X., Bi, S., Cao, Y., & Zhang, G. (2022). Psychological Benefits of Green Exercise in Wild or Urban Greenspaces: A Meta-Analysis of Controlled Trials. <i>Urban Forestry & Urban Greening</i> , 68, 1-8. https://doi.org/10.1016/j.ufug.2022.127458		X	X			
Mackay, C. M. L., & Schmitt, M. T. (2019). Do People Who Feel Connected to Nature Do More to Protect It? A Meta-Analysis. <i>Journal of Environmental Psychology</i> , 65, 1-58. https://doi.org/10.1016/j.jenvp.2019.101323						X
Marsh, P. E. (1999). <i>What Does Camp Do for Kids? A Meta-Analysis of the Influence of organized Camping Experience on the Self Constructs of Youth</i> [MSc, Indiana University]. Bloomington, IN		X				
Mathias, S., Daigle, P., Dancause, K. N., & Gadais, T. (2020). Forest Bathing: A Narrative Review of the Effects on Health for Outdoor and Environmental Education Use in Canada. <i>Journal of Outdoor and Environmental Education</i> , 23(3), 309-321. https://doi.org/10.1007/s42322-020-00058-3	X	X				
McCormick, R. (2017). Does Access to Green Space Impact the Mental Well-being of Children: A Systematic Review. <i>Journal of Pediatric Nursing</i> , 37, 3-7. https://doi.org/10.1016/j.pedn.2017.08.027		X		X		
McMahan, E. A., & Estes, D. (2015). The Effect of Contact with Natural Environments on Positive and Negative Affect: A Meta-Analysis. <i>The Journal of Positive Psychology</i> , 10(6), 507-519. https://doi.org/10.1080/17439760.2014.994224			X			
Menardo, E., Brondino, M., Hall, R., & Pasini, M. (2021). Restorativeness in Natural and Urban Environments: A Meta-Analysis. <i>Psychological Reports</i> , 124(2), 417-437. https://doi.org/10.1177/0033294119884063		X				

REFERENCE	ECOHEALTH DIMENSION					
	PHYSICAL	MENTAL	EMOTIONAL	SOCIAL	SPIRITUAL	ECOLOGICAL
Nicholas, S. O., Giang, A. T., & Yap, P. L. K. (2019). The Effectiveness of Horticultural Therapy on Older Adults: A Systematic Review. <i>J Am Med Dir Assoc</i> , 20(10), 1351.e1351-1351.e1311. https://doi.org/10.1016/j.jamda.2019.06.021	X	X	X	X		
Nisbet, E. K., & Zelenski, J. M. (2011). Underestimating Nearby Nature: Affective Forecasting Errors Obscure the Happy Path to Sustainability. <i>Psychological Science</i> , 22(9), 1101-1106. https://doi.org/10.1177/0956797611418527			X			X
Oh, B., Lee, K. J., Zaslowski, C., Yeung, A., Rosenthal, D., Larkey, L., & Back, M. (2017). Health and Well-Being Benefits of Spending Time in Forests: Systematic Review. <i>Environmental Health and Preventive Medicine</i> , 22(1), 1-11. https://doi.org/10.1186/s12199-017-0677-9	X	X	X			
Ohly, H., Gentry, S., Wigglesworth, R., Bethel, A., Lovell, R., & Garside, R. (2016). A Systematic Review of The Health and Well-Being Impacts of School Gardening: Synthesis of Quantitative and Qualitative Evidence. <i>BMC Public Health</i> , 16, 1-36. https://doi.org/10.1186/s12889-016-2941-0		X	X			
Orr, N., Wagstaffe, A., Briscoe, S., & Garside, R. (2016). How do Older People Describe Their Sensory Experiences of the Natural World? A Systematic Review of the Qualitative Evidence. <i>BMC Geriatr</i> , 16, 1-16. https://doi.org/10.1186/s12877-016-0288-0		X	X			
Osaldiston, R. (2004). <i>Meta-Analysis of The Responsible Environmental Behavior Literature</i> [PhD, University of Missouri-Columbia]. Columbia, MO.						X
Oswald, T. K., Rumbold, A. R., Kedzior, S. G. E., & Moore, V. M. (2020). Psychological Impacts of "Screen Time" and "Green Time" for Children and Adolescents: A Systematic Scoping Review. <i>PLoS ONE</i> , 15(9), 1-52. https://doi.org/10.1371/journal.pone.0237725		X				
Park, B. J., Tsunetsugu, Y., Kasetani, T., Kagawa, T., & Miyazaki, Y. (2010). The Physiological Effects of Shinrin-Yoku (Taking in the Forest Atmosphere or Forest Bathing): Evidence from Field Experiments in 24 Forests Across Japan. <i>Environ Health Prev Med</i> , 15(1), 18-26. https://doi.org/10.1007/s12199-009-0086-9	X					
Parkes, M., Waltner-Toews, D., & Horwitz, P. (2014). Ecohealth. In A. C. Michalos (Ed.), <i>Encyclopedia of Quality of Life and Well-Being Research</i> (pp. 1770-1774). Springer Netherlands. https://doi.org/10.1007/978-94-007-0753-5_4172	X	X	X	X	X	X
Peng, B. A., Naduvilath, T. J., Flitcroft, D. I., & Jong, M. (2021). Is Myopia Prevalence Related to Outdoor Green Space? <i>Ophthalmic and Physiological Optics</i> , 41(6), 1371-1381. https://doi.org/10.1111/opo.12896	X					
Pierskalla, C. D., Lee, M. E., Stein, T. V., Anderson, D. H., & Nickerson, R. (2004). Understanding Relationships Among Recreation Opportunities: A Meta-Analysis of Nine Studies. <i>Leisure Sciences</i> , 26(2), 163-180. https://doi.org/10.1080/01490400490432082	X	X			X	
Pritchard, A., Richardson, M., Sheffield, D., & McEwan, K. (2020). The Relationship Between Nature Connectedness and Eudaimonic Well-Being: A Meta-analysis. <i>Journal of Happiness Studies</i> , 21(3), 1145-1167. https://doi.org/10.1007/s10902-019-00118-6		X	X	X	X	X
Qiu, M., Sha, J., & Scott, N. (2021). Restoration of Visitors through Nature-Based Tourism: A Systematic Review, Conceptual Framework, and Future Research Directions. <i>International Journal of Environmental Research & Public Health [Electronic Resource]</i> , 18(5). https://doi.org/10.3390/ijerph18052299		X				
Rahimi-Ardabili, H., Astell-Burt, T., Nguyen, P.-Y., Zhang, J., Jiang, Y., Dong, G.-H., & Feng, X. (2021). Green Space and Health in Mainland China: A Systematic Review. <i>International Journal of Environmental Research and Public Health</i> , 18(18), 1-22.	X	X		X		
Rautio, N., Filatova, S., Lehtiniemi, H., & Miettunen, J. (2018). Living Environment and Its Relationship to Depressive Mood: A Systematic Review. <i>The International journal of social psychiatry</i> , 64(1), 92-103. https://doi.org/10.1177/0020764017744582		X				
Roberts, A., Hinds, J., & Camic, P. M. (2020). Nature Activities and Wellbeing in Children and Young People: A Systematic Literature Review. <i>Journal of Adventure Education and Outdoor Learning</i> , 20(4), 298-318. https://doi.org/10.1080/14729679.2019.1660195	X	X	X	X		
Rojas-Rueda, D., Vaught, E., & Buss, D. (2021). Why a New Research Agenda on Green Spaces and Health Is Needed in Latin America: Results of a Systematic Review. <i>International Journal of Environmental Research and Public Health</i> , 18(11), 1-16.	X	X				

REFERENCE	PHYSICAL	MENTAL	EMOTIONAL	SOCIAL	SPIRITUAL	ECOLOGICAL
	ECOHEALTH DIMENSION					
Saunders, L. E., Green, J. M., Petticrew, M. P., Steinbach, R., & Roberts, H. (2013). What Are the Health Benefits of Active Travel? A Systematic Review of Trials and Cohort Studies. <i>PLoS ONE</i> , 8(8), 1-13. https://doi.org/10.1371/journal.pone.0069912	X					
Schüle, S. A., Hilz, L. K., Dreger, S., & Bolte, G. (2019). Social Inequalities in Environmental Resources of Green and Blue Spaces: A Review of Evidence in the WHO European Region. <i>International Journal of Environmental Research and Public Health</i> , 16(7), 1-15. https://doi.org/10.3390/ijerph16071216						X
Schutte, N. S., & Malouff, J. M. (2018). Mindfulness and Connectedness to Nature: A Meta-Analytic Investigation. <i>Personality and individual differences</i> , 127(Complete), 10-14. https://doi.org/10.1016/j.paid.2018.01.034					X	X
Stevenson, M. P., Schilhab, T., & Bentsen, P. (2018). Attention Restoration Theory II: A Systematic Review to Clarify Attention Processes Affected by Exposure to Natural Environments. <i>Journal of Toxicology and Environmental Health. Part B, Critical Reviews</i> , 21(4), 227-268. https://doi.org/10.1080/10937404.2018.1505571	X					
Taheri, S., Ghasemi Sichani, M., & Shabani, A. (2021). Evaluating the Literature of Therapeutic Landscapes with an Emphasis on the search for the Dimensions of Health: A Systematic Review. <i>Social Science & Medicine</i> , 275, 1-20. https://doi.org/10.1016/j.socscimed.2021.113820	X	X	X	X		X
Thompson Coon, J., Boddy, K., Stein, K., Whear, R., Barton, J., & Depledge, M. H. (2011). Does Participating in Physical Activity in Outdoor Natural Environments have a Greater Effect on Physical and Mental Wellbeing than Physical Activity Indoors? A Systematic Review. <i>Environ Sci Technol</i> , 45(5), 1761-1772. https://doi.org/10.1021/es102947t	X	X	X			
Tillmann, S., Tobin, D., Avison, W., & Gilliland, J. (2018). Mental Health Benefits of Interactions with Nature in Children and Teenagers: A Systematic Review. <i>Journal of Epidemiology and Community Health</i> , 72(10), 958-966. https://doi.org/10.1136/jech-2018-210436		X	X			
Tremblay, M., Gray, C., Babcock, S., Barnes, J., Bradstreet, C., Carr, D., Chabot, G., Choquette, L., Chorney, D., Collyer, C., Herrington, S., Janson, K., Janssen, I., Larouche, R., Pickett, W., Power, M., Sandseter, E., Simon, B., & Brussoni, M. (2015). Position Statement on Active Outdoor Play. <i>International Journal of Environmental Research and Public Health</i> , 12(6), 1-31. http://www.mdpi.com/1660-4601/12/6/6475	X	X	X	X		
Trøstrup, C. H., Christiansen, A. B., Stølen, K. S., Nielsen, P. K., & Stelter, R. (2019). The Effect of Nature Exposure on The Mental Health of Patients: A Systematic Review. <i>Quality of Life Research: An International Journal of Quality of Life Aspects of Treatment, Care and Rehabilitation</i> , 28(7), 1695-1703. https://doi.org/10.1007/s11136-019-02125-9		X				
Truelove, S., Bruijns, B. A., Vanderloo, L. M., O'Brien, K. T., Johnson, A. M., & Tucker, P. (2018). Physical Activity and Sedentary Time During Childcare Outdoor Play Sessions: A Systematic Review and Meta-Analysis. <i>Preventive Medicine</i> , 108, 74-85. https://doi.org/10.1016/j.ypmed.2017.12.022	X					
Truelove, S., Bruijns, B. A., Vanderloo, L. M., O'Brien, K. T., Johnson, A. M., & Tucker, P. (2019). Corrigendum to "Physical Activity and Sedentary Time During Childcare Outdoor Play Sessions: A Systematic Review and Meta-Analysis" [Pre. Med. 108 (2018) 74–85]. <i>Preventive Medicine</i> , 127, 1. https://doi.org/10.1016/j.ypmed.2019.105814	X					
Twohig-Bennett, C., & Jones, A. (2018). The Health Benefits of The Great Outdoors: A Systematic Review and Meta-Analysis of Greenspace Exposure and Health Outcomes. <i>Environmental Research</i> , 166, 628-637. https://doi.org/10.1016/j.envres.2018.06.030	X					
van den Berg, M. E. L., Winsall, M., Dyer, S. M., Breen, F., Gresham, M., & Crotty, M. (2020). Understanding the Barriers and Enablers to Using Outdoor Spaces in Nursing Homes: A Systematic Review. <i>The Gerontologist</i> , 60(4), e254-e269. https://doi.org/10.1093/geront/gnz055	X	X		X		
van den Bosch, M., & Ode Sang, Å. (2017). Urban Natural Environments as Nature-Based Solutions for Improved Public Health - A Systematic Review Of Reviews. <i>Environmental Research</i> , 158, 373-384. https://doi.org/10.1016/j.envres.2017.05.040	X	X	X			
Vanaken, G.-J., & Danckaerts, M. (2018). Impact of Green Space Exposure on Children's and Adolescents' Mental Health: A Systematic Review. <i>International Journal of Environmental Research and Public Health</i> , 15(12), 1-17. https://doi.org/10.3390/ijerph15122668		X	X			

REFERENCE	ECOHEALTH DIMENSION					
	PHYSICAL	MENTAL	EMOTIONAL	SOCIAL	SPIRITUAL	ECOLOGICAL
Wen, Y., Yan, Q., Pan, Y., Gu, X., & Liu, Y. (2019). Medical Empirical Research on Forest Bathing (Shinrin-Yoku): A Systematic Review. <i>Environmental Health and Preventive Medicine</i> , 24(1), 70. https://doi.org/10.1186/s12199-019-0822-8	X	X				
Wendelboe-Nelson, C., Kelly, S., Kennedy, M., & Cherrie, J. W. (2019). A Scoping Review Mapping Research on Green Space and Associated Mental Health Benefits. <i>International Journal of Environmental Research and Public Health</i> , 16(12), 1-49. https://doi.org/10.3390/ijerph16122081		X	X			
Whear, R., Coon, J. T., Bethel, A., Abbott, R., Stein, K., & Garside, R. (2014). What is the Impact of Using Outdoor Spaces Such as Gardens on the Physical and Mental Well-Being of Those with Dementia? A Systematic Review of Quantitative and Qualitative Evidence. <i>J Am Med Dir Assoc</i> , 15(10), 697-705. https://doi.org/10.1016/j.jamda.2014.05.013		X				
Whitburn, J., Linklater, W., & Abrahamse, W. (2020). Meta-Analysis of Human Connection to Nature and Proenvironmental Behavior. <i>Conservation Biology</i> , 34(1), 180-193. https://doi.org/10.1111/cobi.13381						X
White, M. P., Alcock, I., Grellier, J., Wheeler, B. W., Hartig, T., Warber, S. L., Bone, A., Depledge, M. H., & Fleming, L. E. (2019). Spending At Least 120 Minutes a Week in Nature is Associated with Good Health and Wellbeing. <i>Scientific Reports</i> , 9(1), 1-11. https://doi.org/10.1038/s41598-019-44097-3	X	X				
Wilson, S. J., & Lipsey, M. W. (2000). Wilderness Challenge Programs for Delinquent Youth: A Meta-Analysis of Outcome Evaluations. <i>Evaluation and Program Planning</i> , 23(1), 1-12.		X				
Wolf, K. L., Lam, S. T., McKeen, J. K., Richardson, G. R. A., van den Bosch, M., & Bardekjian, A. C. (2020). Urban Trees and Human Health: A Scoping Review. <i>International Journal of Environmental Research and Public Health</i> , 17(12), 1-30. https://doi.org/10.3390/ijerph17124371	X	X				
Wong, C. W., Tsai, A., Jonas, J. B., Ohno-Matsui, K., Chen, J., Ang, M., & Ting, D. S. W. (2021). Digital Screen Time During the COVID-19 Pandemic: Risk for a Further Myopia Boom? <i>American Journal of Ophthalmology</i> , 223, 333-337. https://doi.org/10.1016/j.ajo.2020.07.034	X					
Xiong, S., Sankaridurg, P., Naduvilath, T., Zang, J., Zou, H., Zhu, J., Lv, M., He, X., & Xu, X. (2017). Time Spent in Outdoor Activities in Relation to Myopia Prevention and Control: A Meta-Analysis and Systematic Review. <i>Acta Ophthalmologica</i> , 95(6), 551-566. https://doi.org/10.1111/aos.13403	X					
Yao, W., Zhang, X., & Gong, Q. (2021). The Effect of Exposure to The Natural Environment on Stress Reduction: A Meta-Analysis. <i>Urban Forestry & Urban Greening</i> , 57, 1-12. https://doi.org/10.1016/j.ufug.2020.126932	X	X				
Yen, H.-Y., Chiu, H.-L., & Huang, H.-Y. (2021). Green and Blue Physical Activity for Quality Of Life: A Systematic Review and Meta-Analysis of Randomized Control Trials. <i>Landscape and Urban Planning</i> , 212, 1-9. https://doi.org/10.1016/j.landurbplan.2021.104093	X	X				
Yeo, N. L., Elliott, L. R., Bethel, A., White, M. P., Dean, S. G., & Garside, R. (2020). Indoor Nature Interventions for Health and Wellbeing of Older Adults in Residential Settings: A Systematic Review. <i>The Gerontologist</i> , 60(3), e184-e199. https://doi.org/10.1093/geront/gnz019		X		X		
Yuan, Y., Huang, F., Lin, F., Zhu, P., & Zhu, P. (2021). Green Space Exposure on Mortality and Cardiovascular Outcomes in Older Adults: A Systematic Review and Meta-Analysis of Observational Studies. <i>Aging Clinical and Experimental Research</i> , 33(7), 1783-1797. https://doi.org/10.1007/s40520-020-01710-0	X					
Zhang, G., Poulsen, D. V., Lygum, V. L., Corazon, S. S., Gramkow, M. C., & Stigsdotter, U. K. (2017). Health-Promoting Nature Access for People with Mobility Impairments: A Systematic Review. <i>International Journal of Environmental Research and Public Health</i> , 14(7), 1-19. https://doi.org/10.3390/ijerph14070703	X	X	X	X	X	
Zhang, Y., Mavoja, S., Zhao, J., Raphael, D., & Smith, M. (2020). The Association between Green Space and Adolescents' Mental Well-Being: A Systematic Review. <i>International Journal of Environmental Research and Public Health</i> , 17(18), 1-26. https://doi.org/10.3390/ijerph17186640		X	X			

DEFINITIONS (underlining added for emphasis)

- **Health** is “a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity.” (World Health Organization, 1948)
- **Health Promotion** “is the process of enabling people to increase control over, and to improve, their health. To reach a state of complete physical, mental and social well-being, an individual or group must be able to identify and to realize aspirations, to satisfy needs, and to change or cope with the environment.” (World Health Organization, 1986)
- **Ecohealth** “is a field of research, education, and practice that adopts systems approaches to promote the health of people, animals, and ecosystems in the context of social and ecological interactions. Health is seen as encompassing social, mental, spiritual, and physical well-being and not merely the absence of disease. As a contraction of ‘ecosystem approaches to health,’ ecohealth emphasizes human agency and systemic thinking to promote well-being and quality of life. As a field of scholarship, ecohealth research draws on the natural sciences, health sciences, social sciences, the humanities, and beyond, often working in collaboration with interested parties and community members to address issues at the interface of health, ecosystems, and society.” (Parkes et al., 2014, p.1770)

SIX DIMENSIONS

DIMENSION	IMPROVEMENTS	PATHWAYS
Physical	antioxidant indices, activity level, play, risk of preterm birth, body weight, diabetes, neuroendocrine indices (cortisol, dopamine, adrenalin, noradrenaline), heart rate, cholesterol, blood pressure, hypertension, inflammation, body fat, body mass index (BMI), cardiovascular and pulmonary disease, risk of stroke and agitation in older adults, mortality, myopia in children, cardiovascular fitness, oxygen uptake, heart rate variability, immunity, life expectancy, and improved sleep	outdoor exercise, active travel, sports participation, exposure to sunlight, phytoncides in the air, and better environmental living conditions
Mental	mental health (e.g. self-acceptance, self-discipline, self-efficacy, self-esteem, self-concept, autonomy, resilience), clinical effects, stress, anxiety, depression, hyperactivity, behavioural conduct, decision-making, personal growth, attitude, attention, memory, level of energy, revitalization, and academic performance	therapeutic adventure experiences, learning, competency development, fresh air, noise reduction, immersion in nature, and less “screen time” for children
Emotional	emotional stability/regulation, empathy, enjoyment, happiness, satisfaction, mood, vitality, vigor, comfort, natural feeling, feelings of control, feelings towards things, relaxation, quality of life, anger/hostility, tension, confusion, depressive mood, and other negative emotions	therapeutic adventure experiences, fresh air, noise reduction, and immersion in nature
Social	cooperation, social behaviours/connectedness/development/competence, family development, interpersonal communication/skills/relationships, anti-social behaviour, social problems, group conflict, crime, recidivism and delinquency;	interaction with one or more people, family, community, and society
Spiritual	transcendence, tranquility, restoration, feelings of spirituality, purpose/meaning in life, moral and spiritual beliefs, religious convictions, spiritual practice, and values	mindfulness, viewing landscapes, flow, peak experience, escaping daily life, and nature-based healing
Ecological	pro-environmental/green behaviors (sensitivity, attitudes, dispositions, competencies, mastery, or stewardship), nature connection, place attachment, knowledge of issues, and action strategies	proximity/access/visits to green and blue spaces, environmental education, intentions to act, goal-setting, and commitments