



Faculty of Design

2022

Braiding Knowledge Systems as Environmental Peacebuilding: A four-dimensional analysis for co-applying Indigenous and non-Indigenous worldviews

Vojno, Natalija

Suggested citation:

Vojno, Natalija (2022) Braiding Knowledge Systems as Environmental Peacebuilding: A four-dimensional analysis for co-applying Indigenous and non-Indigenous worldviews. In: Proceedings of Relating Systems Thinking and Design, RSD11, 3-16 Oct 2022, Brighton, United Kingdom. Available at <https://openresearch.ocadu.ca/id/eprint/4285/>

Open Research is a publicly accessible, curated repository for the preservation and dissemination of scholarly and creative output of the OCAD University community. Material in Open Research is open access and made available via the consent of the author and/or rights holder on a non-exclusive basis.

The OCAD University Library is committed to accessibility as outlined in the [Ontario Human Rights Code](#) and the [Accessibility for Ontarians with Disabilities Act \(AODA\)](#) and is working to improve accessibility of the Open Research Repository collection. If you require an accessible version of a repository item contact us at repository@ocadu.ca.



Relating Systems Thinking and Design
2022 Symposium
University of Brighton, Brighton, UK,
October 13-16, 2022

Braiding Knowledge Systems as Environmental Peacebuilding

A four-dimensional analysis for co-applying Indigenous and non-Indigenous worldviews in Great Lakes water governance

Natalija Vojno

Our Future First¹

Environmental peacebuilding has evolved since Conca and Dabelko's seminal work on peacemaking to now include preventative interventions as well as those that occur post-conflict. In recent years, both practitioners and academics have identified the need to recognise the leadership of women, Indigenous Peoples, youth, and local peacebuilding actors. However, the process of integrating worldviews in the sustainability sciences risks instrumentalising belief systems in a way that perpetuates underlying power and political asymmetries.

Critical water management literature calls for an ontological shift in how epistemologies relate to one another (Ermine et al., 2007; Stefanelli et al., 2017; Taylor, Longboat, and Grafton, 2019; Reid et al., 2021). Ontologies, or worldviews, can validate or invalidate ways of knowing and thereby open or constrain what are deemed to be viable policy responses within water governance and environmental peacebuilding. In response, this paper introduces a non-hierarchical conceptual model for braiding non-Indigenous and Indigenous ways of knowing for the management of the Great Lakes and, in

¹ <https://ourfuturefirst.co/>

turn, applies an ontological and phenomenological approach to environmental peacebuilding.

KEYWORDS: environmental peacebuilding, water governance, phenomenological peace, political ontologies, worldviews

RSD TOPIC(S): Methods & Methodology, Policy & Governance, Society & Culture

Positionality

The author is not a member of an Indigenous community. Further, the term Indigenous is not intended to promote a false sense of pan-Indigeneity as each First Nation, Métis, and Inuit community has distinct cultures and community protocols. The author is a first-generation settler from Bosnia & Herzegovina who was raised within the Kabechenong (Humber River) Watershed in Toronto on the territory of many Nations, including the Mississaugas of the Credit, the Anishnabeg, the Chippewa, the Haudenosaunee and the Wendat Peoples. The land is now home to many diverse peoples and is covered by Treaty 13, the Royal Proclamation of 1763, and the Dish With One Spoon treaty.

Introduction

The field of environmental peacebuilding has evolved from the introduction of environmental peacemaking (Conca & Dabelko, 2002) that utilised shared natural resources as a conflict resolution tool to a broader framework of environmental peacebuilding that encompasses conflict prevention as well as post-conflict peacebuilding (Ide et al., 2021). However, efforts to 'integrate' worldviews in sustainability sciences instrumentalise belief systems and risk perpetuating underlying power and political asymmetries (Cleaver et al., 2021). Without a critical understanding of distinct worldviews, the means of synthesising local epistemologies within environmental peacebuilding and natural resource management risk assimilating one ontology into another. The systematic oppression of the cultures and languages of

Aboriginal peoples as defined under Canadian must be noted (TRCC, 2015) and efforts made not to perpetuate historical violence in the process of working with traditional ecological knowledge. Fortunately, critical water management literature calls for an ontological shift in how epistemologies and peoples relate to one another (Ermine et al., 2007; Stefanelli et al., 2017; Taylor, Longboat, and Grafton, 2019; Reid et al., 2021).

Ontology and worldview will be used interchangeably. A worldview is defined as a set of assumptions about physical and social reality that influence personality traits, motivation, cognition, behaviour, and culture (Koltko-Rivera, 2004). Worldviews are tied to how we gather knowledge about the world (epistemology) and then, in turn, choose to act on that knowledge (axiology).

In response to the need for an ontological shift, this paper aims to identify how non-Indigenous and Indigenous ways of knowing can be co-applied to the management of the Great Lakes & St. Lawrence Ecosystem. Phenomenological peace entails conceptualising different frames of knowing in a non-hierarchical (Behr, 2019) and will inform the approach used in this paper. Recognising that worldviews shape watershed management strategies, a model is proposed for understanding the dimensions by which multiple ontologies – and their related epistemological, axiological, and phenomenological manifestations – can be conceived as co-existing in a pluralistic and dynamic relationship.

Braiding knowledge systems

Many different terms exist that provide a conceptual framework for incorporating transdisciplinary fields and co-applying a plurality of cosmologies to the Earth sciences. The concepts of *braiding* (Kimmerer, 2013), *two-row wampum* (McGregor, 2008) and *Etuaptmumk* or *two-eyed seeing* (Hatcher, Bartlett, Marshall, & Marshall, 2009) represent concepts that originate from the Anishinabek-speaking, Haudenaushonee, and Mi'kmaq First Nations communities, respectively, to represent the complex systems understanding that develops as a result of harmonising distinct worldviews rather than simply integrating one into the other.

Working across multiple knowledge frames

Multiple knowledge frames create ambiguity about what information to consider valid and whom to include (Brugnach et al., 2008). In the previously secularised field of International Relations, 'post-western IR' scholars suggest replacing hegemonic differences with a system of inter-cosmological relations (Shani, 2021). Rather than seeking to influence the "other", the post-Western framing allows the self and the other to co-exist in difference. A pluriverse of worlds with their universality and particularity is possible (Escobar, 2020). Relating back to water management, Wong et al. (2020) call on natural scientists to contribute to reconciliation in Canada by rebuilding trust between researchers and Indigenous communities through an understanding of the socio-political landscape; knowledge co-production; and by engaging as people with humility, honesty, and a willingness to adapt.

Methodology: reconciliation through research

A dual-phase exploratory design process was applied, in which expert interviews were supplemented with secondary data from a survey of professionals engaged in Great Lakes governance (Creswell, Plano Clark, et al., 2003). The questions were designed to capture attitudes towards reconciliation, positive peace, water justice, and environmental peacebuilding. The research sought to abide by an ethic where the means of achieving peace are peaceful by not perpetuating historical injustices and colonial research practices (Schnarch, 2004). Ultimately, following preliminary scoping and out of a desire to avoid placing additional research burdens on Indigenous communities while turning the lens back on colonial society, the study group was defined as other non-Indigenous people engaged in water governance within the watershed. This followed from the understanding that the assumed ethics, perspectives, and values of non-Indigenous people required reflection prior to engaging in a relational approach to ecosystem management across different knowledge systems.

In order to avoid the physical, psychological, social, economic, legal, or relational cumulative effects causing local communities harm, a certificate in the Ownership, Control, Access, and Possession (OCAP®) of First Nations information was obtained from the First Nations Information Governance Centre (FNIGC).

Boundaries of inclusion

Water management in Canada exists in a patchwork of policies and regulations under Federal, Provincial, and Municipal jurisdiction. For most First Nations, the *Indian Act*, administered by the Federal government, controls how reserve lands and resources are managed. However, most water management and protection decisions fall within provincial and territorial responsibility, with drinking water, wastewater and related services being delegated to municipalities and local authorities. This multi-jurisdictional aspect of water governance complicates how the drinking water needs of First Nations communities living on reserve are addressed. Far from a co-existing plurality of worldviews in respectful relationship, existing consultation processes are fraught with procedural concerns: the lack of capacity for Indigenous Peoples to fully participate and the lack of open dialogue spaces for Indigenous values to be expressed. At all scales, who is included in decision-making, what knowledge is considered valid, and which solutions are appropriate expands with an acceptance of co-existing cosmological systems.

Expanding socio-political dimensions of analysis

The three dimensions of analysis common to environmental peacebuilding and water governance are: Cultural; Economic & Institutional Resource Arrangements; and Politics, Power & Social Relations. These complementary dimensions are common to the research of Cleaver et al. (2021) pertaining to water governance and Ide et al. (2021) pertaining to environmental peacebuilding. Contested 'ontological politics' of water have made the cultural political economy more prominent with emphasis on the plural discourses about water (Mollinga, 2019). Missing are conceptions of systems and relations over time. A fourth dimension (4D) analysis is needed to open up the range of possible interventions.

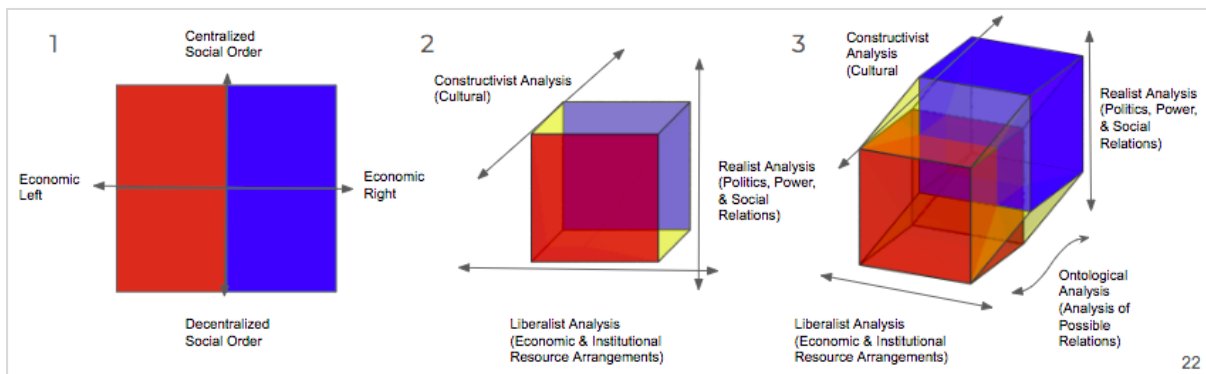


Figure 1. Progression of analytic methods within water governance and environmental peacebuilding.

Figure 1 shows the progression of analytical approaches to understanding socio-political dimensions from left to right. The first image is akin to the 2D political compass representing economic polarities on the x-axis and socio-political organisation on the y-axis. It reflects realist and liberal ontologies. The second 3D image adds the z-axis expanding the Cartesian grid to include cultural theory and social analysis as represented by constructivism. The third image serves as a visual metaphor to convey the added space of possibility for intervention created by extending from space into time. The addition of time allows for the study of relations, including the dynamic between knowledge systems (epistemology), ethics (axiology), and ways of being (phenomenology) as a sequence.

As framing expands to accept Indigenous worldviews on their own terms, “new” dimensions of full body and mind knowing, such as Anishinabek water knowledge or *giikendaaswin*, held for thousands of years, become accessible “spiritual, physical, mental, and social” ways of knowing and acting (Chiblow, 2019, p. 8). Relationships are an example of something which holds a particular form or quality but cannot be seen and, in turn, measured. The visual metaphor is a tool to choreograph possible relationships within and between the human and other-than-human worlds. If our perception is limited to the three-dimensional (3D) space, then by recognising and affirming different ways of knowing (intuition, body-sensing, dialogue etc.), we could begin to sense through the fourth dimension (4D).

Ways of knowing frame water governance

Traditional ecological knowledge is "a cumulative body of knowledge, practice and belief evolving by adaptive processes and handed down through generations by cultural transmission, about the relationship of living beings (including human beings) with one another and with their environment" (Berkes et al., 2000, p. 1252). Merely including local and traditional knowledge within governance processes and decision-making does not dismantle the power imbalances inherent in colonial governance frameworks (Simms et al., 2016). Efforts to increase participatory water governance require a reflexive approach.

Ontologies evade empirical measure but inform epistemological approaches to what knowledge is considered and how it is acquired (Hay, 2011). Epistemology has created an asymmetry between 'outdated' sciences and the 'sanctioned' sciences stripped of context and past (Latour, 1993). Historically, discriminatory attitudes towards "non-Western" knowledge systems have constrained their production (Butler, 2006; Harding, 1998). Values were lost as a result. For instance, the Anishinaabek notion of *zaagidowin* (love) is core to shaping how justice, in an Indigenous framing, is concerned for the wellbeing of people as well as the water (McGregor, 2013). Some Indigenous perspectives, such as the Haudenosaunee knowledge system, further respect water as a sentient being and spirit in contrast to the harm perpetuated by Western perceptions of water as a commodity (Basic Call to Consciousness, 2005).

Political ontology explores to what extent something constitutes a feasible reality and which ideas may legitimately be pursued. A mechanical understanding of the environment would lead to modes of production – be it capitalist or communist – that are extractive and reduce the living ecosystems to units. Extending beyond fixed socio-political binaries, political ontology differs from political ecology by recognising the complex entanglement of human and other-than-human relationships; in other words, the agency of the more-than-human (Blanco-Wells, 2021). The concept of "a world of many worlds" by de la Cadena and Blaser (2018) and the notion of "integrating pluriverses" (Escobar, 2017) speak to a diversity of ontologies. Analysis that does not critically look at the underlying worldviews risks perpetuating existing epistemic inequalities by assuming a hegemonic singular worldview.

In the dynamic system that is earth's ecology, the whole is more than the sum of its parts, and data requires interpretation by those holding tacit knowledge of the system (Bateson, 2000). Noting Ashby's law of requisite variety, if the system is living, then to match the dynamic variety of the issues to be managed, the embodied life of the knowledge holder and their generational knowledge must be present for the full generative capacity of that knowledge to be applied to policy. Within water governance, this translates to ideas being as relevant as who sits at the decision-making table.

Figure 2 illustrates the difference between epistemology (ambiguity) and ontology (uncertainty). The latter is dynamic and sees the limits of knowing across multiple frames of knowledge, e.g. engineering and law. Phenomenological peace pertaining to water management entails dialoguing across sets of values and preferences about a living system. Building a weir or flood control structure is a method of control, whereas a combination of solutions developed alongside multiple stakeholders is an example of adaptive management under uncertainty.

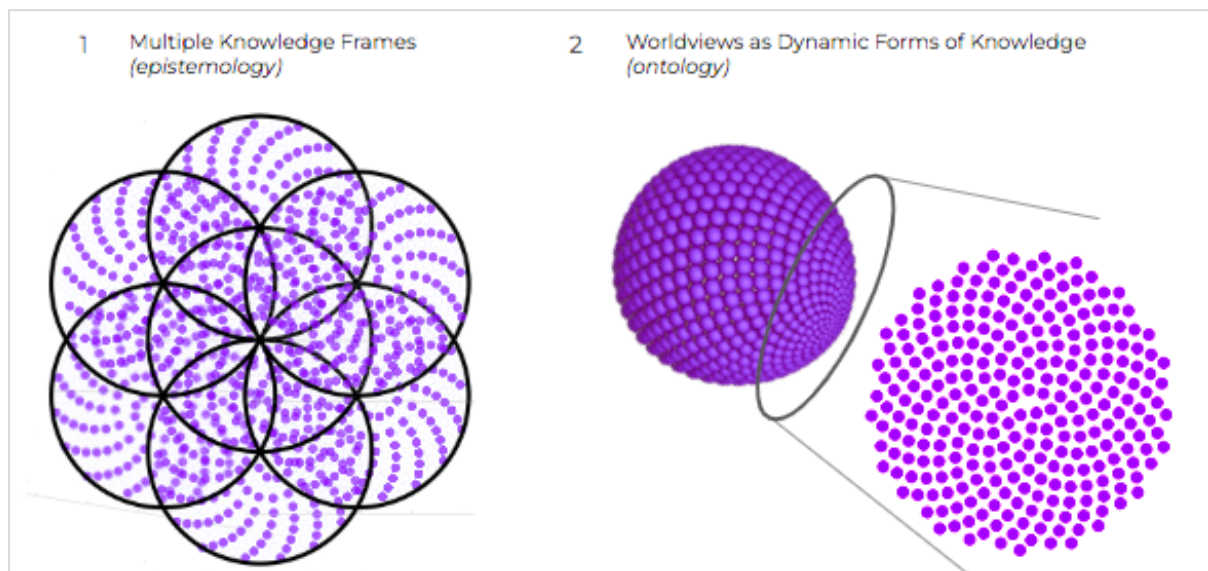


Figure 2. Knowledge Represented within Epistemology and Ontology.

The following model is a response to Behr's (2019) question within phenomenological peace of "how can we conceptualize difference in a nonhierarchical way" (p.174).

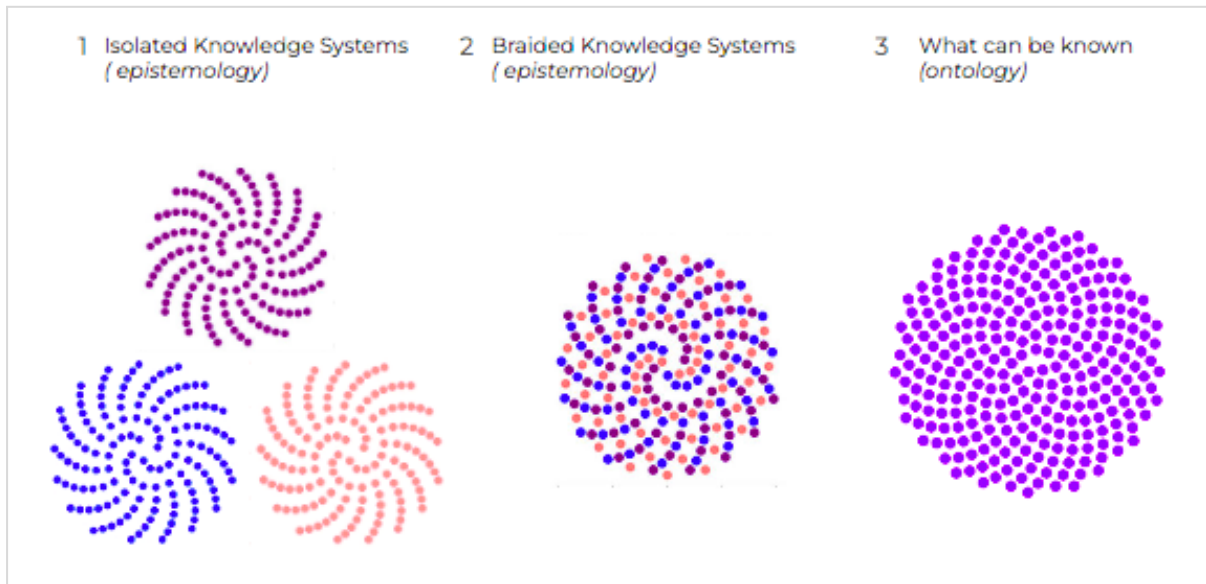


Figure 3. Model of Co-Existing Worldviews.

In Figure 3, the first image represents isolated knowledge systems coloured to reflect different worldviews. The dots represent points of information. The second image reflects a horizontal cross-section of braided worldviews that weaves through time and space to make sense of their distinct, co-existing, and interrelated ecologies. The third image imperfectly represents ontologies and a thin slice of what can be known about the whole.

Conclusion

In contrast to integrating traditional ecological knowledge within fixed epistemologies, a relational approach to water management would entail ongoing interaction for negotiating meaning between different ways of knowing. Framing determines the scope of the problem and who should be involved. Depending on the framing, a water shortage is an issue of supply or excessive demand. The related solutions to uncertain water availability could entail large-scale infrastructure, market mechanisms to incentivise more efficient water consumption or policy approaches like crop diversity.

An ontological shift proposes ongoing interactions that negotiate meaning between Indigenous and non-Indigenous ways of knowing. The paper advocates for environmental peacebuilding and water governance to build upon existing economic, institutional and cultural epistemologies in order to develop phenomenological peace by acknowledging co-existing worldviews and possible relations over time. Visual metaphors were offered to serve as a symbol to “see” into different understandings of the world.

Acknowledgements

Thank you to all those who participated in the research process, including the peer review and editing of the RSD11 proceedings. With gratitude to Anastasia Lintner and Andrew McCammon for also directing me to further individuals with whom to discuss. And, a particular *miigwech* (thank you) to Garry Pritchard ~Giniw (Golden Eagle) from Curve Lake First Nation and Founder of Four Directions of Conservation Consulting for modelling how to mediate between Indigenous and western governance systems and inviting me out on the land. *Niawen* (thank you) to Dr Henry Lickers, who is a Haudenosaunee citizen of the Seneca Nation, Turtle Clan and Canadian Commissioner for the International Joint Commission for sharing knowledge that speaks to a lifetime of bridging worldviews guided by the *Great Way of Peace*. And, finally, *k^wuk^wscémx^w* and *wela'lin* (thank you) to Kasey Stirling for reviewing and providing comments from the perspective of bridging Indigenous and western knowledge systems.

References

1. Bateson, G. (2000). Steps to ecology of mind. Chicago: University of Chicago Press. *Basic call to consciousness*. (2005). Summertown, Tenn: Native Voices.
2. Behr, H. (2019). "Peace-in-Difference: Peace through Dialogue about and across Difference(s) - A Phenomenological Approach to Rethinking Peace", in *Rethinking Peace. Discourse, Memory, Translation, and Dialogue*, ed. by Alexander L. Hinton, Giorgio Shani, and Jeremiah Alberg, Rowman & Littlefield International, pp. 174–190.
3. Berkes F, Colding J, Folke C. (2000). Rediscovery of traditional ecological knowledge as adaptive management. *Ecological Applications*.;10(5):1251–1262.
4. Blanco-Wells, G. (2021). Ecologies of Repair: A Post-human Approach to Other-Than-Human Natures. *Frontiers in Psychology*, p. 12, 633737.
5. Brugnach, M., A. Dewulf, C. Pahl-Wostl, and T. Taillieu. (2008). Toward a relational concept of uncertainty: about knowing too little, knowing too differently, and accepting not to know. *Ecology and Society* 13(2): 30.
<http://www.ecologyandsociety.org/vol13/iss2/art30/>
6. Butler, C. (2006). Historicizing indigenous knowledge: Practical and political issues. In C. R. Menzies(Ed.), *Traditional ecological knowledge and natural resource management* (pp. 107–126). University of Nebraska Press.
7. Cleaver, F.; Whaley, L. and Mwathunga, E. (2021). Worldviews and the everyday politics of community water management. *Water Alternatives* 14(3): 645-663
8. Chiblow, S. (2019). Anishinabek Women's Nibi Giikendaaswin (Water Knowledge). *Water*, 11, 209. <https://doi.org/10.3390/w11020209>
9. Conca, K & Dabelko, G. D. (2002). *Environmental Peacemaking*. Woodrow Wilson Center Press
10. Creswell, J. W., Plano Clark, V. L., Gutmann, M., & Hanson, W. (2003). Advanced mixed methods research designs. In A. Tashakkori & C. Teddlie (Eds.), *Handbook of mixed methods in social and behavioral research*, pp. 209–240. Thousand Oaks, CA: Sage.
11. De la Cadena, M., and Blaser, M. (eds) (2018). *A World of Many Worlds*. Durham: Duke University Press.
12. Ermine, W. (2007). The ethical space of engagement. *Indigenous Law Journal*, 6(1): 193–203.

13. Escobar, A. (2017). "Sustaining the pluriverse: the political ontology of territorial struggles in Latin America," in *The Anthropology of Sustainability. Palgrave Studies in Anthropology of Sustainability*, eds M. Brightman and J. Lewis (New York, NY: Palgrave Macmillan), 237–256. doi:10.1057/978-1-137-56636-2_14
14. Escobar, A. (2020). *Pluriversal Politics: The Real and the Possible*. Durham, N.C.: Duke University Press.
15. Goodchild, M. (2021). Relational systems thinking: That's how change is going to come, from our Earth mother. *Journal of Awareness-Based Systems Change*, 1(1), 75–103.
16. Hatcher, A., Bartlett, C., Marshall, A., & Marshall, M. (2009). Two-Eyed Seeing in the Classroom Environment: Concepts, Approaches, and Challenges. *Canadian Journal of Science, Mathematics and Technology Education*, 9(3), 141–153.
17. Hay, C. (2011). Political Ontology. *The Oxford Handbook of Political Science* (Robert E. Goodin Eds.) DOI: 10.1093/oxfordhb/9780199604456.013.0023
18. Ide, T., Bruch, C., Carius, A., Conca, K., Dabelko, G., Matthew, R., and Weinthal E. (2021). The past and future(s) of environmental peacebuilding, *International Affairs* 97(1): 1-16.
19. Kimmerer, R.W. (2013). *Braiding Sweetgrass: Indigenous Wisdom, Scientific Knowledge, and the Teachings of Plants*. Milkweed Editions.
20. Koltko-Rivera, M.E. (2004). 'The Psychology of Worldviews'. *Review of General Psychology* 8(1), 3–58, <https://doi.org/10.1037/1089-2680.8.1.3>
21. Latour B (1993). *We have never been modern*. (C. Porter, Trans.), Harvard University Press, Cambridge.
22. McGregor, D. (2008). Linking traditional ecological knowledge and western science: aboriginal perspectives from the 2000 State of the Lakes Ecosystem Conference. *Can J Nativ Stud*, XXVIII(1):139–158.
23. McGregor, D. (2013). Indigenous Women, Water Justice and Zaagidowin (Love). *Can. Woman Stud*. Downsview, pp. 30, 71–78.
24. Mollinga, P.P.. (2019). Cultural Political Economy and critical water studies: an introduction to the special themed section. *Water Alternatives* 12(3): 788-801
25. Reid, A. J., Eckert, L. E., Lane, J.F., Young, N., Hinch, S. G., Darimont, C. T., Cooke, S. J., Ban, N.C., Marshall, A. (2021). "Two-Eyed Seeing": An Indigenous framework to

- transform fisheries research and management. *Fish and Fisheries*, pp. 22, 2, 243–261.
26. Schnarch, B (2004). Ownership, control, access and possession (OCAP) or self-determination applied to research: A critical analysis of contemporary First Nations research and some options for First Nation communities. *Journal of Aboriginal Health*, 1, pp. 80–95.
27. Shani, G. (2021). IR as inter-cosmological relations? *International Politics Review* (2021). <https://doi.org/10.1057/s41312-021-00120-2>
28. Simms, R., Harris, L., Joe, N., and Bakker, K. (2016). Navigating the tensions in collaborative watershed governance: Water governance and indigenous communities in British Columbia, Canada. *Geoforum*, 73: 6-16.
29. Stefanelli, R. D., Hart, C., Castleden, H., Cunsolo, A., Martin, D., & Harper, S. L. (2017). Canadian and Australian researchers' perspectives on promising practices for implementing Indigenous and Western knowledge systems in water research and management. *Water Policy*, pp. 19, 6, 1063–1080.
30. Taylor, K. S., Longboat, S. & Grafton, R. Q.. (2019). Whose Rules? A Water Justice Critique of the OECD's 12 Principles on Water Governance. *Water*, 11, 4.
31. Truth and Reconciliation Commission of Canada (TRCC). (2015). Truth and Reconciliation Commission (TRC) Calls to Action. Winnipeg: Truth and Reconciliation Commission of Canada.
32. Wong, C., Ballegooyen, K., Ignace, L., Johnson, M.J., Swanson, H. (2020). Towards reconciliation: 10 Calls to Action to natural scientists working in Canada. *Facets* 5, 769–783. <https://doi.org/10.1139/FACETS-2020-0005>.