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Potential Approaches to Establishing Harmonious River-human Relationships to Avoid Ugly Divorce

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Abstract

This paper responds to a call to address the development and building of river-human relationships in the 21 st Century. Many literatures have identified the historical instrumental exploitation of natural resources underpinning urbanisation and the economic development of industry and society as leading to the wide-spread degradation of environments including rivers. Clearly such relationships can no longer be considered as appropriate in the 21 st Century. This paper intends to present a conceptual rethink to address the following question: Are there potential approaches by which humans can develop harmonious coexistent relationships with riverine landscapes and associated ecosystems? In answering this question, this paper draws on ideas from new materialism thinking. New materialism offers useful guidance in understanding human-river relationships in which river landscapes are not static backgrounds to the performance of the social. River systems and environments are active participants influencing and shaping social performances through multiple and diverse interconnected and complex human-nonhuman relationships and co-productive partnerships. It is concluded that new materialist perspectives provide important guidance for developing harmonious river-human relationships. De-centring the human as the dominant actor in relations with river landscapes and acknowledging rivers as key stakeholders within river-human relationships may enhance the building of harmonious coexistent and mutually beneficial relationships in the 21 st Century. It is further concluded the Nature Futures Framework (NFF) and Human-River Encounter Sites (HRES) frameworks in their capacity to accommodate new materialist thinking provide an opportunity for further exploration and examination of the possibilities for building harmonious coexistent river-human relationships.

1. Introduction

This paper is a response to questions posed by *River Research and Applications* concerning what relationships humans can develop with rivers in the twenty-first century. This is an entirely reasonable query given the importance of river systems, spatially and temporally, to the development of human communities, society, and well-being is undeniable (Schönach, 2017; Wantzen et al., 2016). Historically the relationships humans have developed with rivers have not produced entirely balanced or mutually beneficial outcomes (Gurnell et al., 2016; Tockner & Stanford, 2002). Overwhelmingly the benefits to humans through the development of, for example, urbanisation, industry and agriculture have been at severe cost/s to the river system and associated environment (Albert et al., 2021; Dunham et al., 2018; Schönach, 2017). The historical evidence clearly points to this. This as Wantzen et al., (2016) suggest led to river cultures emerging which included learning how to exploit rivers in ways that underpin the building of communities and social systems as well as fuelling economic development. Based on attitudes that humans can take whatever they want from river systems and their environments without significant consequences from these actions a "separation" of the river-human connectivity further distanced the health of river systems and their environments from society's gaze and concern (Albert et al., 2021; Pereira et al., 2020; Mazur, 2021). This is a historical lesson we need to be reminded of regularly so as not to forget the past over-exploitation and degradation of the environment to prevent continuously repeating disrespectful relationships with river system environments.

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Viewing our relationships with rivers through the lens of economic development and market forces will lead to diminished, if not destructive, outcomes for river systems and society (Alexandra & Riddington, 2007; Dunham et al., 2018). Furthermore, the negative trends associated with climate change, for example more intensive droughts, foreshadows an impending ugly divorce if we do not re-assess and re-configure our relationships with rivers towards a more harmonious coexistence (Alexandra, 2019). Humans cannot continue a "business-as-usual" approach to river-human relationships concerning, for example, the exploitative use of rivers and excessive water allocations, which may lead to degradation of the ecological conditions of river systems (Brierley et al., 2013; Carton et al., 2017; Kortelainen, 1999) or chemical pollution from agricultural runoff (Pretty, 2008). Furthermore, the consequences of direct human actions even if implemented in good faith, for example river restoration (Mant et al., 2012), can lead to unintentionally detrimental impacts due to disruption or interference with the river system's functionality. As Palmer et al. (2007, p. 478) state, the "... restoration outcome depends on the nature of the project within the context of the larger watershed and the site-specific understanding of the geomorphic, hydrologic, and ecological history and future of the river segment." In shifting away from such anthropocentric perspectives and taking guidance from new materialism in which nature, including river systems, is understood as a collective of active agents in (re)shaping of the environmenl, ecological systems, and human lives can offer opportunities to develop and build harmonious coexistent river-human relationships. This means understanding river systems as key agents in harmonious coexistent river-human relationships. As Arias-Maldonado (2013, p. 444) argues, "... the separation between society and nature is increasingly untenable".

Consequently, this paper presents new ways of thinking from new materialism to re-conceptualise what potentially more harmonious coexistent river-human relationships moving throughout the twenty-first century may look like. In this endeavour, humans and human agency are de-centred as the dominant actors or agents influencing river systems and the environment. That is, river systems are acknowledged as active agents as well with capacities in influencing and (re)shaping river systems and environments and, human systems and communities. Perspectives from new materialism commence the following conceptual rethink. This is followed by outlining two potential frameworks, the Nature Futures Framework (NFF) and the Human-River Encounter Sites (HRES), which are presented as aligning with new materialist thought allowing development of harmonious coexistent river-human relationships. A brief conclusion closes this paper's attempts to rethink river-human relationships in the twenty-first century whilst endeavouring to address the questions posed by this special issue.

2. New materialism

Knowing we need to develop better, more harmonious river-human relationships moving into the future, an important question arises; Are there potential approaches by which humans can develop harmonious coexistent relationships with riverine landscapes and associated ecosystems? And if so, how do we go about forming harmonious coexistent relationships with river systems? New materialism thinking, broadly interpreted, may provide some guidance.

New materialism is a shift from notions of the centrality of human agency shaping the world towards a relational interpretation of human-nonhuman explanations of landscape and environmental processes including river systems (Bennett, 2004; 2010; Benson, 2019; Fowler & Harris, 2015; Knappett & Malafouris, 2008). This recognises that human agency is but one aspect of a complex interconnected human-nonhuman relational system, not the dominant aspect (Bennett, 2010; Benson, 2019; Ward et al., 2002). This approach emphasises the interconnected and interdependent relations between humans and nonhumans thus de-centring the human and challenging the notion that humans and nature are separate (Bennett, 2010; O'Donovan, 2019). It further provides opportunities for the potency of nonhuman agency to be acknowledged within relational and complex human-nonhuman relationships and co-productive partnerships (Benson, 2019; Hertz et al., 2020; O'Donovan, 2019; Washick & Wingrove, 2015). A river's water provides an appropriate example of such agential potency through its characteristics of fluidity, its ability to transform and circulate materials, and its connectivity biophysically and socially, as well as temporally. In this sense, water's agency is also active in co-constituting interconnected human-nonhuman relationships as emphasised through hydrosocial

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relationships (Linton & Budds, 2014; Strang, 2014). Thus, de-centring humans as the dominant actor in nature provides opportunities to re-interpret and analyse more closely the role rivers play in human-river relationships, and the dynamics and changes of place and of human communities (Benson, 2019; Plumwood, 2009).

The ongoing demands for river systems to service ongoing human activities places mounting pressure on decision-makers to develop and build harmonious coexistent river-human relationships through developing robust understandings of the connectivity and agencies functioning within river systems (Bernhardt et al., 2006; Tundisi et al., 2015). There may even be an ethical principle associated with the arguments of new materialism in that humanity's ontological embeddedness within and interconnectedness to and with the material world, including rivers systems, underpins a duty of care responsibility to form more harmonious coexistent river-human relations and co-productive partnerships (Hawkins, 2006; Washick & Wingrove, 2015). Yates et al. (2017) furthermore suggest that such ethical obligations are important considerations to recognise and acknowledge the influential agency and connectivity of river systems and water for human-nonhuman coexistence and sustainability. In this context, it will require humans to consider how their actions and practices impact on river systems and, how river systems themselves might respond in turn. As a human-nonhuman interconnected whole, nothing operates in isolation, consequently, impacts may be more broadly dispersed than first assumed (de Loë and Patterson, 2017). Thus, river systems need to be acknowledged as being full of agency and continually undergoing change as internal and external conditions evolve (Bennett, 2010; Plumwood, 2009) emphasising co-productive agency occurs through interconnected human-nonhuman relationships.

The connectivity and interconnected agencies of place and humans are dynamic and ever-changing, (re)shaping ongoing river-human relationships and human-nonhuman relationships more broadly. Thus, there is no one singular river-human relationship (Stark, 2017). River-human relationships are dynamic, ever-changing, ever-developing, ever-evolving in complexity [interconnectedness] (Jones, 2009). A web of interconnected relationships has been built and re-built repeatedly throughout history as river agency and human actions have evolved and developed and responded to change. Floodplains, for example, can be described as a water-landscape fusion containing a web of interconnected human and nonhuman relationships (Allen, 2011). In this context, river systems as a setting for human and nonhuman co-agency and co-functionality facilitate the emergence of relational ontologies within a cycle and re-configurations of meanings and values for the river, water, and the floodplain (Friess & Jazeel, 2017; Yates et al., 2017). Furthermore, a river landscape may be considered as an amalgam of a myriad of interconnected and dynamic biophysical, cultural, and social contexts as one spatially bounded whole (Friess & Jazeel, 2017) together (re)shaping the dynamics and meaning of landscape and duly river systems. Humans, in this context, are not the sole stakeholders or source of agency in or of landscapes, including river landscapes and environments (Allen, 2011; Friess & Jazeel, 2017). This further underpins the importance of new materialism in acknowledging rivers as active stakeholders within human-river relationships and co-productive partnerships (Coole, 2013).

It needs to be noted that by not confronting the complexity and connectivity of river systems, and its agency in human affairs would be an act of hiding from confronting its influence on the social and, importantly, humans' relationships with rivers (Bingham & Hinchliffe, 2008). As Bingham and Hinchliffe (2008, p. 85) make clear, "[w]hilst many natures might work happily alongside a collective without grumble or objection, there will always be those that will demand to be taken into account, things that simply refuse to be ignored ... The missed out or the not quite bargained for that by upsetting the status quo (whether in the form of scientific assumptions or political institutions) generate events which require collective examination." Historical and current river relationships with humans and society exemplify Bingham and Hinchliffe's perspectives through, for example, extreme flooding (Parsons, 2019). Thus, to avoid an ugly divorce by forming more harmonious coexistent relationships with river systems "... humans [will need to] cultivate and negotiate relations with the material world" (Neimanis et al., 2015, p. 81) requiring an inclusion of perspectives from nonhuman entities such as rivers, not just human-based perspectives (Neimanis et al., 2015). This line of thinking is further emphasised by Shotter (2014) when arguing that the consideration of the connectivity and agency of river systems needs to attend to "our being [is] within a *dynamic* reality in ceaseless, unfolding

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movement, in which nothing is separate from anything else . . . " (p. 307, original italics). Thus, the realisation needs to be accepted that humans cannot force river systems to conform to imposed socially, economically, and policy-based management systems (Shotter, 2014). This further emphasises that humans are not above or superior or separate from or outside of river landscapes and the environment more broadly (Bender, 2002).

Broadly speaking, Bennett (2010) suggests that in coming to terms with human-nonhuman relationships, a more horizontal interpretation of human-nonhuman coexistence needs to be developed. As Bennett (2013, p. 151, original italics) argues, materiality "*horizontalizes* the relations between humans, biota, and abiota . . . " thereby emphasising the "connectedness of all things." That is, a river landscape's connectivity is related to the interconnected agencies of the atmosphere, biosphere (including humans), hydrosphere, and lithosphere at various scales (Gurnell et al. 2016; Tockner & Stanford, 2002; Ward et al., 2002). In this, there is no implied hierarchical structure constituted by individual human and other natures. In other words, no actor or agent has full command of other actors or agents or of the outcomes of the human-nonhuman interconnected river-human relationships and interactions (Bennett, 2010). This further emphasises that in developing harmonious coexistent relationships with rivers humans needs to recognise the interconnected connectivity and agencies driving river systems and, thus, influencing the landscape and human systems (Gurnell et al. 2016). Hence, is the importance of acknowledging rivers as stakeholders within any decisions concerning the development of harmonious coexistent river-human relationships.

Taking the lead from the above perspectives, re-interpreting Wantzen et al.'s (2016) river culture concept from a river system's perspective as a "river's" cultural dynamic constituted through the connectivity and agencies of landscape, ecosystems, and water, it is the river system that could be the guiding influence in developing harmonious and coexistent river-human relationships rather than imposed human cultural values or ideals. That is, the river system needs to be acknowledged as an active key agent from which human well-being is derived (Wantzen et al., 2016) albeit within the functioning carrying capacity or peak limits (Gleick & Palaniappan, 2010) of river systems to provide the ecological services, for example water, which support and enhance human well-being and community development (Linton & Budds, 2014; Strang, 2014; Tockner & Stanford, 2002). In this sense, river systems consist of and constitute life in the sense of it being an active interconnected agencies converting material into energy for growth and provides water for environmental and human use and benefit (Ingold, 2010; Karpouzoglou & Vij, 2017). Swainson et al. (2011, p. 16) identifies environmental water flows as "'ecological water demand"' which can be considered relative to human water demands. Importantly, therefore, given the environment and its ecological services underpin human and nonhuman life, ecological water demands require the same, if not more, consideration of its value than does human water demands attract. In other words, environmental flows should be considered as an element of the river system as a stakeholder embodied with agency within river-human harmonious coexistent relationships requiring reassessment of the decision regarding ongoing water allocations (Swainson et al., 2011).

Ingold (2010) argues that the immersion of something within the flows and metabolism of materials underpins the entity being alive. Within a river system through its connectivity and agencies whereby materials flow and are metabolised and used, establishes, and shapes its status as being alive and, thus, an active stakeholder. Similarly, Ryan (2022) applies the concept of hydropoetics to refer to rivers as alive or transformative and frames a river's communicative perspective not through a "human-type voice" but through their agency as performative. This perspective is supported by Plumwood (2009) who argues that the agency of nature can be conceptualised as an "active voice", in terms of being a means of communication and as an expression of purpose. As Everard and Powell (2002, p. 333) argue, "[t]he functioning of the ecosystem [as performance], and not merely human use of it, needs to be central to our thinking."

Broadly speaking, performance, or performativity, focuses on the reproductive capacities and abilities and the relationship's objects have to and with other objects (Lavau, 2011a). In regard to river systems, the river is enacted or emerges through connectivity and their agency within the various relationships with humans and their practices leading to rivers and humans co-producing the (re)shaping of landscape and human communities and practices including, for example, agriculture and river management (Lavau, 2011b). Thus, applying the concept of hydropoetics is, as Ryan (2022, p. 487, original italics) states, "to embrace

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hydrocentricism or, even, what might be called*rivercentricism* ... signifying a river-focused worldview as well as a physical identification with rivers as *bodies* in themselves." From this perspective, rivers are key stakeholders in their own right and, thus, their perspectives need to be incorporated within the place-based decision-making process relative to use and management. It is from such inclusiveness of the river as an active stakeholder or as an influential autopoiesis agent (Ryan, 2022) that harmonious relationships can be built and developed towards management solutions which provide mutually beneficial outcomes. This further emphasises the importance of acknowledging rivers and humans coexist as and within interdependent material, social, and cultural agential systems influencing and shaping landscape and human communities (Zalewski, 2012).

Although each river's connectivity may be broadly similar, the influences of multiple agencies throughout the interconnectedness of river system connectivity (re)shapes according to the dynamics and distinctiveness of local environments and landscapes. Forming harmonious river-human relationships which acknowledges the influence of river system agencies on human life and practices is better served through place-based thinking and approaches (Schönach, 2017). Accepting rivers as place-based stakeholders and agents develops from understanding the purposes of river systems is far more than the narrow instrumental valuing of rivers as mere sources of resources, for example water and floodplains for urbanisation, or navigational routes to transport goods and people (Schönach, 2017; Tockner & Stanford, 2002). In this place-based meanings and understandings of the agencies of local river systems become important for guiding decision-making and experimenting possible solutions for creating and building harmonious river-human relationships (Fox et al., 2017) in terms of understanding rivers as being "rivers-in-place" (Tadaki et al., 2014, p. 360).

3. Nature Futures Framework (NFF) and Human-River Encounter Sites (HRES): Potential Frameworks for Harmonious River-Human Relationships

This section presents two possible frameworks, namely the *Nature Futures Framework* (NFF) and *Human-River Encounter Sites* (HRES), through which new materialist thinking may be implemented in the building of more harmonious coexistent river-human relationships moving forward. That is, the NFF and HRES are introduced as examples of potential conceptual frameworks for developing harmonious coexistent river-human relationships in the 21st Century.

Pereira et al. (2020) proposes that transformative change in the building of harmonious river-human relationships can be supported through the creation of the Nature Futures Framework (NFF). The NFF is considered a heuristic tool in developing "novel scenarios that incorporate diverse intervention towards positive future trajectories for nature and nature's contribution to people" (Pereira et al., 2020, p. 1173). The NFF is further considered a boundary object to facilitate plural policy and knowledge viewpoints and values of nature at multiple levels. The aim of the NFF is to develop multiscale scenarios of desirable futures for nature and humans simultaneously. Thus, the value of the NFF is argued to be its acceptance of multiple knowledges, including new materialist perspectives, in developing multiscale scenarios of desired and mutually beneficial human-river relationships (Pereira et al., 2020).

It is further argued that the NFF as conceptualised is founded by three values/concepts; namely, "nature for nature, nature for society, and nature as culture" (Pereira et al., 2020, p. 1176). However, in light of new materialist thinking, an interpretation of two of this model's concepts/values can be that the "nature for society" and "nature as culture" values retain a very human-centric valuing of a nature-society/culture relationships. Not wanting to throw the baby out with the bathwater, a more aligned re-conceptualisation of NFF with new materialist thinking may be achieved by encompassing the three foundational values of NFF into a holistic de-centred human concept of "nature within society (and) society within nature". Within this concept it is assumed that society encompasses culture and not that culture is separate from society. In this, a nature within society (and) society within nature conceptualisation allows a de-centring of humans as the central influencing agent in river-human relationships and an establishment of rivers as an equal agential force in which rivers and humans act as joint agents and actors in a holistic and interconnected connectivity and dynamic between landscape, environment, and community. The intention is to reflect nature and society as embedded, entangled and interconnected within each other as a complex whole in space and place, mutually

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influencing and (re)shaping the being of the other (Castree, 2003). Acknowledging this embedded, entangled, and interconnected ontology provides a basis for conceptualising pathways towards developing and building harmonious river-human relationships and interactions. Thus, the NFF can facilitate the development of more harmonious coexistent relationships which provides less destructive futures for both river systems and humans.

Re-conceptualising the NFF incorporating a nature within society (and) society within nature as an embedded, entangled, and interconnected whole provides an opportunity to develop a new agenda for decision-makers and practitioners towards restoring healthy relationships between rivers and urban areas as Human-River Encounter Sites (HRES) (Zingraff-Hamed et al., 2021). The intention of HRES is to regenerate harmonious place-based relations with the (river) environment in which human practices and activities acknowledge river systems as key actors and agents influencing and shaping the development of landscape and community (Zingraff-Hamed et al., 2021).

A positive aspect of HRES compared to other frameworks is that it does not promote the human as the dominant partner in river-human relationships (Zingraff-Hamed et al., 2021). The HRES model is built on the pillars of "health [of all living entities of the environment and humans], safety [safe communities including from flooding through the protection offered by the riparian zone], functionality [the multifunctionality and connectivity of the river system needs to be incorporated within planning and decision making by urban designers], accessibility [for all organisms not just for the privilege of humans], collaboration [of all stakeholders including river and ecological systems], and awareness [moral and ethical respect of river systems as key stakeholders in its own management and use]" (Zingraff-Hamed et al., 2021, p. 4). Thus, the HRES provides for the acknowledgement of the river system as a stakeholder within local communities due to its influence and shaping of community development and its social dynamics, for example through hydrosocial relations, including flooding (Linton & Budds, 2014; Parsons, 2019). In this sense, rivers and humans co-produce biological and cultural relationships in which humans and society exist within nature and, simultaneously, nature exists within society as corporeal experiences (Zingraff-Hamed et al., 2021).

Applying a HRES framework which adopts a nature within society (and) society within nature perspective provide a sound foundation to acknowledge the river as a stakeholder and an active agent influencing landscape and human practices. From this position, humans may implement a stewardship of and over their own behaviour approach rather than "imposing" idealised stewardship principles upon the agencies of river systems. This in turn may deliver a better place-based foundation for developing and building local harmonious coexistent river-human relationships into the 21st Century. This can be considered what Arias-Maldonado (2013) identifies as "open sustainability" whereby "[t]here is no single sustainability, but a whole range of different, even simultaneous, possibilities" (p. 441). Such a perspective aligns well with developing and building coexistence harmonious and mutually beneficial river-human relationships in which river systems and humans co-produce landscapes that support human and nonhuman communities as HRES. However, this will require "[a]s a priority, our intimacy with Nature [including rivers] ..." being "... rekindled" (Hosken, 2011, p. 25). And through a rekindled intimacy, the river system's "voice" or performativity, as expressed through agency, tensions, and change can begin to be heard, known, and understood relative to river-human co-agency and harmonious coexistence. In other words, it "... is about places [as a river landscape] working on people" in which the river system speaks, creates, and teachers (Larsen & Johnson, 2016, p. 153) and humans learn to relate to and live with rivers harmoniously.

4. Conclusion

In addressing the two questions posed in this paper, there are two important points to emphasise relative to developing harmonious coexistence river-human relationships in the 21stCentury. The first derives from new materialist perspectives in which the human is de-centred as the central source of agency influencing river systems. New materialism offers opportunities for a re-conceptualisation of river systems as stakeholders and co-agents in the development of landscapes and human communities as new materialist ideas recognise the influencing agencies of natural features. In developing harmonious relationships between humans and rivers humans can no longer be privileged over and above the river and its environment. Acknowledging

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rivers as stakeholders and active agents influencing landscape and human communities is a necessary initial component for building harmonious coexistent and positive visions of river-human relationships into the future. A second important point to emphasise is that significant understandings of river systems may be forthcoming by adopting a river's perspective concerning its relationships with humans. This requires developing understandings of river systems from multiple perspectives which include diverse community values and the influence of river system connectivity and its interconnected agencies. How humans relate to and engage with the natural and ecological entities of active river systems will determine which environmental conditions shape human futures as either harmonious coexistence or as ugly divorce.

In developing relationships with river systems, humans have two choices. One is where humans morally and ethically recognise and respect the connectivity and agencies of river systems and their ecosystems that underpin our continuing existence. Developing more harmonious and coexistent relationships with river systems need to be developed if the environment and river systems are to continue being healthy and, therefore, allow humans to continue enjoying good health and well-being using resources and ecological services provided by river systems and associated environments, for example water, floodplains, and biodiversity. The other choice is where humans ignore the connectivity and agencies of river systems and their ecosystems and blindly continue their exploitative relationships leading to ugly divorce whereby river systems and their ecosystems no longer have the capacity to underpin our continuing existence. Rivers do not require humans to manage or govern them, but rather to view river systems as coexistent stakeholders in which human-river relationships harmoniously co-produce landscapes and communities. Thus, importantly, human attitudes towards rivers systems including the conceptualisation river systems through the lens of instrumental values needs to change. It is an imperative humans rethink their relationships and engagement with rivers. Not to do so may hasten the demise of river systems as well as human communities reliant on the ecological services derived from healthy river systems. As argued by Guerrero et al. (2018), "actions for rivers that offer multiple positive benefits for humans and nature must become the mainstream option" (p. 1). This provides opportunities for which future research to embark upon in which research and testing or experimenting with alternative or novel approaches in which the human is de-centred as the universal or dominant agent or actor and the active agency of river systems in river-human relationships are seriously considered. In such research endeavours, a final worthwhile point to draw attention to is that the NFF and the HRES frameworks are receptive to accommodating new materialist perspectives in support of exploring and examining the potential for developing harmonious coexistent river-human relationships that provide mutually beneficial outcomes for river systems and humans in the 21st Century.

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