www.water-alternatives.org Volume 17 | Issue 2
Vos, J. 2024. River defence and restoration movements: A literature review.
Water Alternatives 17(2): 239-265

River Defence and Restoration Movements: A Literature Review

Jeroen Vos
Wageningen University, Wageningen, The Netherlands; jeroen.vos@wur.nl

ABSTRACT: Since the 1980s, scholars have been documenting protest movements against the building of large hydropower dams. These movements have arisen mainly in communities where people have experienced displacement and loss of livelihood without receiving proper compensation. Less attention has been paid to community action and environmental movements that promoted the restoration of canalised, diverted, depleted and/or polluted rivers. Since the beginning of the 2000s, however, more attention is being paid in academic literature to communities and social movements that propose to remove dams, stop pollution of rivers, restore fish ecosystems, or rewild rivers. There has also been increased interest in movements advocating for the granting of legal personhood to rivers and in those that are opposing dams because they want to protect free-flowing rivers for fish migration or tourism. A systematic literature review was undertaken in order to analyse scientific publications on diverse river defence and restoration movements. A relatively small number (104) of publications was retrieved, but these nevertheless showed a diversity in geographic spread and coverage of river issues and river movement strategies. The attention of the publications shifted from anti-dam protests to a variety of issues including especially river pollution, and to a minor degree issues like indigenous rights and rights of rivers. Most of the publications addressed river movements in the USA and India and the majority did not describe the movements' activities in detail; several, however, described effective activism, advocacy, citizen science monitoring, and litigation. The review suggests that river movements contribute to democratic governance and environmental justice. It also shows that the scientific literature is focused mainly on large anti-dam protests and pays less attention to local river activism and its networks.

KEYWORDS: River activism, environmental movements, dams, social movements, protests

INTRODUCTION

River defence and river restoration initiatives by citizens, grassroots, and social movements – referred to here as 'river movements' – have drawn increasing scholarly attention. Where government environmental regulations for protection of rivers tend to be permissive and monitoring is often slack, and industry and mining businesses prioritise economic gain over environmental considerations, civil society organisations engage in environmental protection of rivers and the environment. Best (2019) provides an overview of the anthropological stresses placed on the world's rivers by large-scale damming, pollution, excessive water withdrawal, introduction of non-native species, fragmentation, and sediment dredging. He concludes that the aquatic ecosystems of big rivers worldwide are collapsing.

Since the 1980s, scholars have documented major protest movements against the building of large dams (Del Bene et al., 2018). These include the movement opposing the Sardar Sarovar dam in India (Baviskar, 2019); the many anti-dam protests in the Mekong River basin, such as against the Pak Mun dam in Thailand and the Lower Sesan 2 and Sambor dams in Cambodia (Green and Baird, 2020); movements opposing the Three Gorges project in China (Wilmsen and Webber, 2017), the Mphanda Nkuwa dam in Mozambique (Sneddon and Fox, 2008), the Ilisu dam in Turkey (Tezcür et al., 2021), the Chixoy dam in Guatemala (Johnston, 2010), and the Belo Monte dam in Brazil (Bratman, 2015). These movements were started by communities that were being affected by displacement and loss of livelihood and where community members were not receiving proper compensation. In these cases, the local

protests grew into multi-scalar river movements with important national and international links; meanwhile, less attention was being paid to community action and environmental movements that promoted the restoration of canalised, diverted, depleted and polluted rivers. Since the turn of the century, more attention is being paid in the academic literature to communities and social movements that propose to stop pollution of rivers, restore fish ecosystems, remove dams, and rewild rivers. There has also been a greater focus on movements advocating for the granting of legal personhood to rivers (Kinkaid, 2019) and on those that are opposing dams because they want to protect free-flowing rivers for fish migration or tourism (Hommes et al., 2023). Attention is also being garnered by the topics of local watershed governance (Kauffman, 2017), citizen monitoring of water quality, river clean-ups, river activism (Yeophantong, 2020), and new water culture movements (including in Spain; see, for example, Hernández-Mora et al., 2015). This goes hand in hand with the academic attention that is increasingly being paid to the worldviews and value systems of riverine communities and their political implications, as expressed in the riverhood concept (Boelens et al., 2023). Specific scholarly attention is also being directed at indigenous value and knowledge systems (Wilson, 2019) and at "rooted water collectives" (Vos et al., 2020). The latter term refers to communities that possess local knowledge of their river and abide by its local management rules while at the same time forging multi-scalar alliances.

In this literature review, the notion of environmental movements was adopted as an ordering device. River movements can be classified by their geographical location, by the river-related problems they address, and by the type of activities they undertake. The notion of 'environmentalism of the poor' expresses the idea that river movements contribute significantly to the protection and restoration of rivers and are a necessary force against slack government and industry environmental care (Guha and Martinez-Alier, 1997). Martinez-Alier (2002) distinguished among three types of environmentalism: the 'cult of wilderness', the 'gospel of eco-efficiency' and, as mentioned above, the 'environmentalism of the poor'.

The cult of wilderness refers to movements that advocate for the conservation of wild nature, that is, places where there is no interference by people. The expulsion of local inhabitants in the Global South by nature conservation organisations from the Global North who are creating nature reserves can be seen as neocolonialism, green grabbing, or green elitism (Büscher et al., 2014; Parkins and Sinclair, 2014). For Martinez-Alier (2002), the gospel of eco-efficiency calls for finding solutions to environmental problems in the form of techno-fixes. That approach is often combined with a perceived need for economic growth and economic regulations to 'get the incentives right'. Martinez-Alier attributes the gospel of eco-efficiency to the wealthier members of society who blame poor people for destroying the environment and who believe that wealthy people (such as themselves) take better care of the environment.

Environmentalism of the poor acknowledges the struggle of poor communities that suffer from environmental problems. Guha and Martinez-Alier (1997) assert that poor people protect their environment in order to protect their livelihoods. In this sense, empowering affected communities would enhance their livelihood and improve the environment. Communities also fight for a just distribution of environmental costs and benefits (see also Schlosberg, 2004). According to Guha and Martinez-Alier, communities affected by environmental problems have more knowledge about such problems than do scientists. This local knowledge – together with differences in value systems – often gives rise to conflicts between community members and those holding a scientific and governmental understanding of the problem. Environmental movements thus claim space in the environmental politics arena. Following Cornwall and Coelho (2007), those claimed spaces can be seen as new democratic arenas (see also Sneddon and Fox, 2008). Sicotte and Brulle (2017) stress that poor people seldom revolt against their disadvantaged situation, so something special needs to happen that gives them hope that mobilising will result in change.

The claims of local environmental activists or grassroots movements are sometimes seen as non-legitimate, unwarranted or non-democratic. For example, when affected groups complain about negative

effects of interventions that affect their wellbeing, while those interventions are democratically planned and generally accepted as desirable, also by the people complaining. Resistance to wind turbines by people living close to planned turbine sites is a more specific example, where citizens are not against wind turbines per se, but do not want them close to their houses. Such groups are sometimes referred to as NIMBY (Not In My Back Yard) organisations. In the case of anti-dam protests, the affected communities can feel that governments place a much lower value on the communities' lives, properties, livelihoods, landscapes, and ecosystems than they do on their own.

This review will look at how scientific literature, as included in Scopus, has related river activism and social and environmental movements to river governance. The goals of this review paper are to: 1) show the breadth of river activism and the changing trends over time in its character and in the topics addressed by those movements as covered in (English) scientific literature, and 2) analyse scholarly approaches to the politics of river movements, particularly with regard to their identification of drivers and their perception of the contributions made by such movements to inclusive river governance.

It can be difficult to distinguish environmental movements from more singular environmental campaigns or protests. Della Porta and Diani (2015) stress the presence of a collective identity in a social movement and its desire to bring about social change. Social and environmental movements usually form long-lasting networks among different campaigning or protesting groups. Movements usually involve a large number of people, although in countries with repressive regimes a small number of activists might be called a movement.

Formulating the right query for the literature review proved to be difficult, as authors use terminology with different definitions. Words from abstracts or keywords thus do not necessarily correspond with the practices of river movements that use similar terms. A quite narrow query was therefore used; this was complemented with some additional searches to find scientific publications on a number of specific topics.

The article first presents the search method that was applied in the literature review. The results are then categorised according to the geographical location of the river movement, the issues addressed, and the activities deployed. The discussion section contains an analysis of river movement literature. It looks first at the scoping of the literature review itself; it then considers the coverage of river movements by the literature; and, lastly, it looks at the literature's valuation of river movements. The article ends by offering some conclusions.

METHOD OF THE LITERATURE REVIEW

The methodology for this systematic literature review on the involvement of citizen collectives in river conservation, restoration and management followed three steps. First, English scientific articles and book chapters published before the end of 2023 were considered. These were selected from the Scopus database on the basis of titles, abstracts and key words containing the terms 'river' and 'social movement(s)' and 'activis*' or 'resistance' or 'advocacy'.[1]

This query yielded 191 publications. A systematic literature review was then used to select relevant articles from among them (Petticrew and Roberts, 2008). Of the 191 publications, 87 were discarded. Some publications were not included because of being duplicates; others did not treat river movements (for example, 'river' was part of the name of a place, but the article did not, in fact, deal with any river); still others were discarded because the publication was not available through the library system. The 104 publications that were selected are shown in Table 2.

[1] The exact query in Scopus (retrieved on 10 May 2024) was: (TITLE-ABS-KEY (river AND {social movement} OR {social movements})) OR ((TITLE-ABS-KEY (river AND activis*)) AND (advocacy)) OR ((TITLE-ABS-KEY (river AND activis*)) AND (resistance)) AND PUBYEAR > 1970 AND PUBYEAR < 2024 AND (LIMIT-TO (DOCTYPE , "ar") OR LIMIT-TO (DOCTYPE , "ch")) AND (LIMIT-TO (LANGUAGE , "English"))

The second step was to categorise the 104 selected publications according to the geographical location of the case study it described, the river issue that was being addressed by the citizens collective, and the strategies the collective had used.

The third step was to complement the review and analysis with additional literature, as it became clear that the query had missed important publications on river movements (see the Discussion Section for a reflection on the scoping of the query).

The articles were published in a wide variety of journals. Those that had most articles on river movements were *Water Alternatives* (4 articles), *Political Geography* (3) and *Geoforum* (3 articles). Two river movement articles were found in each of the following journals: *Antipode*, *Environment and Planning A*, *Social Movement Studies*, and *World Development*. All other publications were published in journals that appeared only once.

RESULTS

Geographical location of the cases

The river movements described in the 104 selected scientific publications are situated all over the world. Most are located in Asian countries, followed by North America, South America and Europe. Only a few of the cases described are in Africa and Australia and there were none in the Middle East (see Table 1).

Some scientific articles described river movements that are operating at the national level; Pešić and Vukelić (2022), for example, studied the jumping of scales of a grassroots movement in Serbia that opposed small hydropower plants. Huneeus et al. (2021) described the responses of Chilean environmental groups to plans for hydro power projects there. They analysed 380 energy projects and found that protests by communities did not affect the approval of the projects, they only made the approval process take longer.

Table 1. Geographical spread of the cases covered in the articles.

Geographical area	Number of articles	Articles by sub-area
Asia	36	India (17), China (5), Mekong River basin (5), Turkey (4), Indonesia (2), Thailand (2), Asia, Myanmar (1 each)
North and Central America	30	USA (21), Honduras (3), Mexico (2), Canada (2), Haiti, El Salvador
South America	14	Brazil (7), Chile (3), Colombia (2), Argentina (2)
Europe	9	Serbia (2), Albania, Finland, Sweden, Netherlands, Bosnia, Spain, Ukraine
Australia and New Zealand	9	Australia (7), New Zealand (2)
Africa	8	Southern Africa (3), Africa, Nigeria, Mozambique, Zimbabwe, South Africa
Global	4	
TOTAL	110	

Note: Of the total of 110 publications, 6 are about river movements in 2 countries.

Most publications described one particular case, though four of the articles took a thematic overview. These included: Sneddon and Fox (2008), who discussed the role of water politics and social movements in fostering democracy in Southeast Asia and southern Africa; Twardek et al. (2020), who described the role of World Fish Migration Day, which has seen events organised in 80 countries to raise awareness about the need to restore fish migration; and Gutierrez et al. (2019), who focused on mega hydropower dams worldwide and on how social movements oppose them. These three articles argue that in movements to oppose hydropower dams and protect fish ecology, worldwide networks of local and national protest movements can influence national policies. The fourth overview article, that by Oh et al. (2020), shows that in countries with better governance and a free press, mining companies that announce the setting up of operations near sensitive water sources face more risk of protests by affected communities.

Issues addressed by river movements, as covered in scientific publications

Overview of the issues addressed by river movements

Table 2 shows the issues addressed by river movements as covered by the 104 publications found by the literature review. The largest issue is anti-dam protests, followed by pollution of rivers. Other themes are much less frequently covered. Figure 1 shows the 1985-to-2023 trend of the issues treated in the literature. It is notable that the number of publications on river movements has increased significantly over that period; the figure also indicates that, whereas protests of large dams dominated the literature between 2010 and 2014, pollution has become increasingly important in more recent publications.

The following subsections provide an overview of the retrieved publications, categorised according to the issue addressed in each case by the river movement. This synopsis will provide an impression of how the authors of the articles described the river movements. It will not describe the publications in detail, but rather will highlight interesting insights and trends, in that way giving only an overall impression of the literature that was found.

Table 2. Issues addressed by river movements.

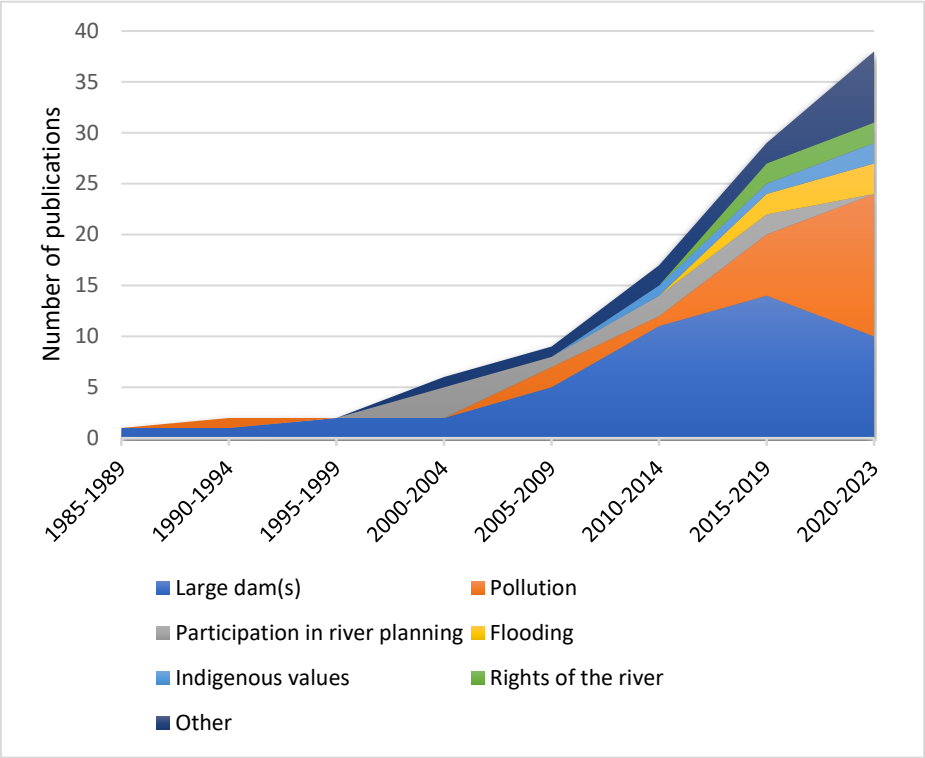
River issue addressed by social movement	Number	Specific issue	Number	Publications found in the systematic literature review
Large dam(s)	46	General	39	Mason (1995), Moore (1998), Routledge (2003a, 2003b), Nilsen (2007, 2008), Sneddon and Fox (2008), Alkon and Norgaard (2009), Mehta (2010), Xie and van der Heijden (2010), Bisht (2011), Matsuzawa (2011), Angelei (2012), Han (2013), Simpson (2013), Chan and Zhou (2014), Drew (2014), Yeophantong (2014), Bratman (2015), Islam and Islam, (2016), Ardón and Flores (2017), Drew (2017), Yaka (2017), Yeophantong (2017), Méndez (2018), Norgaard et al. (2018), Smith (2018), Baviskar (2019), Blair (2019), Gutierrez et al. (2019), Pulla et al. (2019), Green and Baird (2020), May (2020), Branagan (2021), Young and Ear (2021), del Rio Gabiola (2022), Suhardiman et al. (2022), Yong (2022), Puecker and Steger (2023)
		Protection of free-flowing river	5	Easthope and Holloway (1989), Chen and Hay (2006), De Azevedo et al. (2016), Branagan (2020), Blair et al. (2023)
		Resettlement	2	Hall (1994), Mashingaidze (2013)

River pollution	24	General river pollution	6	Vallabh et al. (2016), Radjawali and Pye (2017), Acara (2018), Praskievicz (2021), Kuts (2022), Bhattacharya et al. (2023)
		By industry	5	Norris and Cable (1994), Alcañiz and Gutiérrez (2009), Di Martino (2009), Judge et al. (2016), Warner and Meluso (2022)
		By mining and oil industry (incl. fracking)	10	Harlin (2019), Goeckner et al. (2020), Oh et al. (2020), Tollefson and Panikkar (2020), Artiga-Purcell (2022), Baker et al. (2022), Schroering and Staggenborg (2022), Horowitz (2023), Losekann and Milanez (2023), Meissner (2023)
		Untreated wastewater	3	Ghosh (2011), Mallon Andrews (2015), Milligan et al. (2021)
Participation in river management	8		8	Desfor and Keil (2000), Guldbrandsen and Holland (2001), Oslender (2004), Abers (2007), Fagan and Sircar (2010), Parés (2011), de Freitas (2015), McBeth et al. (2017)
Flooding and flood protection	5		5	Edelenbos et al. (2017), Tuitjer (2019), Rahayu et al. (2021), Bond and Galvin (2023), Elers and Dutta (2023)
Indigenous values	4		4	Hawke (2012), Hansen and Rossen (2017), Davidson (2022), Yan et al. (2023)
Rights of rivers	4		4	Alley (2019), Kinkaid (2019), Spitz and Peñalver (2021), Macpherson (2022)
Other	12	Run of the river hydropower	3	Yaka (2019), Huneeus et al. (2021), Kavak (2021)
		History of river movement(s)	2	Montague and Pellerano (2014), Rudling and Dueñas (2021)
		Small hydropower	2	Silber-Coats (2017), Pešić and Vukelić (2022)
		Water allocation	1	Sneddon (2003)
		Tourism	1	Sithole (2005)
		Fish protection	1	Twardek et al. (2020)
		Fishing rights	1	Salmi and Salmi (2010)
		Water use by large-scale agriculture	1	Eloy et al. (2023)
		Construction of bridge	1	Rajangam (2021)
TOTAL	104			

Large dams

Protests against the construction of dams for hydropower, irrigation and drinking water form the most prominent theme of the literature on river conservation and restoration in the Scopus search. About 44% of the 104 articles (46 publications) dealt with protests against large dams. Of these, nine focused on the Sardar Sarovar dam on the Narmada River in India (Mason, 1995; Routledge 2003 a and b; Nilsen 2007 and 2008; Metha, 2010; Bisht, 2011; Baviskar, 2019; Pulla et al., 2019) and six addressed anti-dam movements in the Mekong River basin: Sneddon and Fox (2008), Yeophantong (2014), Green and Baird (2020), Young and Ear (2021), Suhardiman et al. (2022), and Yong (2022).

Figure 1. Trends in issues addressed by river movements as covered in the 104 publications retrieved.



Source: Author's own elaboration.

Among the first large protest campaigns against a dam was the struggle of the Sierra Club in the 1910s and 1920s against the O'shaughnessy dam on the Tuolumne River in Yosemite National Park in California. The dam was built in order to provide water for the city of San Francisco, but its construction resulted in the submergence of the Hetch Hetchy Valley (Praskievicz, 2021). This protest was followed by many more, worldwide, against large dams. The World Rainforest Movement (2003) reported in detail on anti-dam protests around the world, including 11 in Asia, 4 in Africa, and 9 in Central and South America). This is, however, only a fraction of the disputed dams, as many more dam projects have faced, and are facing, protests. Their report described the diverse protest strategies around the world. These include petitions, formal complaints, court cases, protest marches, occupation of construction sites, networking and forging of alliances.

The most well-known and most published-about case of anti-dam struggle is the large-scale protest against the building of the Sardar Sarovar dam on the Narmada River in India. The dam was planned from 1946, but construction started only in 1961. It was designed to be 138 metres high, to generate 2700 megawatts (MW) of power, to irrigate 1.8 million hectares (ha) of land, and to provide 30 million people with drinking water. In the end, the reservoir flooded 200 km^2 of land and displaced between 0.2 to 1.0 million people (Blair, 2023). The protest movement, the Narmada Bachao Andolan, began in 1985. It concentrated on obtaining compensation for the displaced people, including for hardship caused by forest submergence and ecological degradation; it focused considerably less on possible negative environmental issues such as water-logging in the planned irrigation areas. The protests that started in 1985 culminated in the 1995 verdict of the Supreme Court of India that stalled the construction of the dam (Bisht, 2011; Routledge, 2003b). Many rallies, marches, court cases, fasts and other activities were organised, led by two of its prominent activists, Medha Patkar and Baba Amte. The protests resulted in the World Bank withdrawing from the project in 1993; however, dam construction was resumed in 1999

and completed in 2014. Meanwhile the protests continued, but without any prospect of success. Generally, the defence of the *oustees* (the poor, low caste and tribal people who were to be displaced) was seen as the main driver of the local, national and international protests, however, big landowners in the to-be-flooded area also played a crucial role (Baviskar, 1995; Shah et al., 2021). Blair (2023) concludes that the massive and internally supported protest movement was not successful because of the unanimous support for the dam's construction inside government organisations. Another reason for its failure was the general support for the project in Gujarat, where most of the water from the dam is used (Mehta and Mehta, 2013).

Sneddon and Fox (2008) described anti-dam campaigns in the Mekong River basin and the Zambezi River in Mozambique. The *Southeast Asian Rivers Network* (SEARIN), which opposed the Pak Mun dam in Thailand, was supported by the California-based NGO *International Rivers*, as was *Justiça Ambiental!*, which organised the protests against the Mphanda Nkuwa dam in Mozambique. Both movements campaigned for many years to safeguard the ecological integrity of the respective rivers and to win fair treatment of displaced people. The Pak Mun dam has been in operation since 1994 and its negative effect on fish migration has been evident ever since. On 23 March 1999, some 5000 people occupied the Pak Mun dam site, demanding that the gates of Pak Mun be opened permanently to allow for fish migration. Mozambique's Mphanda Nkuwa dam is still in the planning phase, and there the river movement demands participation in the design of the dam.

In some countries, anti-dam movements are brutally repressed. Del Bene et al. (2018) analysed 220 cases of protests against dams, as reported in the EJAtlas.[2] They found that repression was involved in 32% of the 118 cases in which Indigenous people were involved, while of the 102 cases where no Indigenous people were involved, only 15% reported repression. One example of brutality is the assassination of Honduran activist Berta Cáceres on 3 March 2016. She led the Indigenous environmental organisation COPINH against the Agua Zarca dam in the Rio Blanco, which was planned to generate electricity for mining. The anti-dam movement blocked a road for most of 2013 (Ardón and Flores, 2017; Méndez, 2018; del Rio Gabiola, 2022).

Five articles described river movements that advocate for free-flowing rivers. Three of the papers described the struggle to preserve the Franklin River in Tasmania (Easthope and Holloway, 1989; Chen and Hay, 2006; Branagan, 2020). These campaigns are more in line with what Martinez-Alier (2002) called the 'cult of the wilderness', although Branagan (2020) stressed the involvement of the Aboriginal people of Tasmania in the struggle for the preservation of the free-flowing Franklin River. Another case is from Brazil (de Azevedo et al., 2016) and yet another is from Chile (Blair et al., 2023). These movements to preserve free-flowing rivers are a change from the earlier anti-dam movements, which focused primarily on compensation and resettlement of the villages that would be flooded by the reservoir behind the dam. Anti-dam movements also oppose mega hydro dam projects because of the negative effects of the development of the mining, industry and roads that are associated with hydropower dam projects and the urbanisation that follows. The movements to protect free-flowing rivers, on the other hand, focus on the ecological values of such rivers including fish migration and sediment transport; they also focus on the rhythm, interconnectivity and continuity of free-flowing rivers, which are essential for aquatic ecosystems to thrive. The free-flowing river movement also campaigns in favour of dam removal, which may be in conflict with the interests of the local communities that use water from that dam or regard the dam as part of their cultural and natural heritage (Hommes, 2022).

[2] Environmental Justice Atlas: https://ejatlas.org/

Pollution

Pollution of rivers is a problem worldwide. In many places, groups of citizens have organised campaigns to restore the water quality of polluted rivers. Of the 104 publications yielded by our review of the literature on river movements, a total of 24 were found to be focused on protests against river pollution.

Two studies described river movements in India. Ghosh (2011) focused on the network of environmental groups that forged alliances to work on revival of the heavily polluted Saraswati River in West Bengal, while Bhattacharya et al. (2023) described the plural approaches to bringing about a cleaner Adi Ganga (part of the Hooghly River in the Kolkata area). Acara (2018) analysed gender relations within the organisations campaigning to recover Turkey's heavily polluted Ergene River. Two studies described historic and comparative research on river movements in the USA. Norris and Cable (1994) described the alternating initiatives of elite and non-elite groups in their fight against a paper mill. Schroering and Staggenborg (2022) compared the *Clean Rivers Campaign* with the *Protect Our Parks campaign* in Pittsburgh, Pennsylvania. In Europe the river movements changed their strategies after the promulgation of the EU Water Framework Directive 2000, which set environmental standards for the water quality of rivers (Parés, 2011).

Four scientific publications addressed the subject of river movement campaigns against the industrial pollution of rivers. Norris and Cable (1994) focused on the pollution of a river in Tennessee, USA, by effluent from a paper mill; two papers addressed pollution of the Uruguay River in Argentina (Alcañiz and Gutiérrez, 2009; Di Martino, 2009); and a fourth study described the Defence of Water campaign in Mexico that was opposed to the construction of a US-based beverage production plant (Warner and Meluso, 2020).

In total, 10 of the publications retrieved described campaigns against the contamination of rivers by mining and oil drilling operations. Worldwide attention was drawn to the campaign conducted by the indigenous people of the Standing Rock Reservation in the USA against the Dakota Access Pipeline (DAPL), which threatened to pollute the Missouri River (Goeckner et al., 2020; Horowitz, 2023). A paper by Artiga-Purcell (2022) described the successful campaign against gold mining in El Salvador. Losekann and Milanez (2023) described the organisational innovation and change that occurred in the social movements addressing the consequences of Brazil's 2015 Doce River mine tailings disaster (also known as the Samarco disaster).

Pollution of rivers by untreated wastewater is a big problem worldwide. In many places, when villages and neighbourhoods get connected to sewer systems the wastewater is not treated. While many inhabitants may feel that the sewer system is a step into modernity, the water quality of nearby rivers rapidly deteriorates. While contamination by untreated wastewater can be found in many countries, few examples of river movements against this problem have been covered in the scientific literature. Milligan et al. (2021) addressed the campaign against the structural and institutionalised environmental racism in Atlanta, USA, where Black communities suffer relatively more from untreated sewage in natural waterways. The authors highlighted the differences between the environmental justice narratives of the government and those of the river movement, and how the movement strategically adjusts and uses the government narratives. Mallon Andrews (2015) described the case in Haiti where inhabitants protested against the cholera outbreak caused by contamination of the Artibonite River by United Nations troops.

Participation in river management

Around the world, governments have set-up river basin councils to foster participatory and collaborative management of river basins. Participating in such government organisations could increase the influence of river movements, but it also poses the risk of co-optation for local grassroots environmental groups. The query found six articles addressing this dilemma. Oslender (2004) described the community councils of Afro-Colombians that manage the local "aquatic spaces". Abers (2007) described the interaction between civil society environmental groups and governmental organisations in river basin governance in

Brazil; that cooperation went very well, as after two years the project had allegedly benefited 50,000 people. Sneddon and Fox (2008) examined the ways that participation in water management by social movements can enhance democratic governance in Southeast Asia and southern Africa. In all three articles, the authors are moderately positive about the outcomes of such partnerships.

Guldbrandsen and Holland (2001) were more critical. They described the partnerships between the American Heritage Rivers Initiative (a programme of the US federal government) and local civil society organisations along the New River in North Carolina and Virginia. They found that the local groups became less critical when entering into such partnerships, as they became co-opted into the neoliberal and ecological modernisation ideologies of the government organisations. De Freitas (2015) similarly found that river basin management reforms in the São Francisco River basin in Brazil did not change the power of the elites. Parés (2011) was also not optimistic about the influence of civil society groups in Spain after the introduction of stakeholder participation under the EU Water Framework Directive.

Indigenous knowledge and values

Social movements, particularly in South, Central and North America, Asia and Australia, strive for recognition of indigenous knowledge and values in river governance. Moore (1998) explored the potential of Native American philosophy as a cultural, or 'symbolic', resource in the fight against the New Los Padres dam planned for the Carmel River in California, USA. Hansen and Rossen (2017) described the activism of the Haudenosaunee in relation to the Hudson River in the USA, and Davidson (2022) focused on the art-based activism of the Apsáalooke Crow in relation to the Missouri River, also in the USA. Hawke (2012) and Baker et al. (2022) described the collective action of indigenous groups in Australia around river activism. Baker et al., highlighted the special role of Aboriginal women in the fight against water pollution by nuclear fuel mining. All authors show how the river movements strive for recognition of indigenous valuing of rivers and at the same time use indigenous values as strategy to win support.

Yan et al. (2023) engaged with the recent debates on 'more-than-human worlds'. They followed a campaign where school children were taken on a three-day cross-cultural boat trip with Navajo educators on the San Juan River in the USA. Their finding was that the children reconnected with the land and the river by imagining themselves as animals or flowers. The 'more-than-human' concept is used increasingly in relation to rivers (see, for example, Thomas, 2015).

Flooding and flood protection

Environmental and social organisations have reacted differently to flooding and flood protection infrastructure plans. Bond and Galvin (2023) analysed a variety of narratives related to flooding in Durban, South Africa. They found that civil society organisations had three distinct narratives, that is, solidaristic disaster relief appeals, service delivery failure critiques, and climate adaptation and mitigation failure critiques. Each of these was based on different knowledge and different positions and called for different types of action. Rahayu et al. (2021) asserted that community resilience against flooding in Jakarta, Indonesia, was enhanced by activism.

Edelenbos et al. (2017) described the stakeholder participation in flood management in the Netherlands. The paper looks at the role of social movements in the government's *Room for the River* programme. Elers and Dutta (2023) described the resistance of Māori communities in New Zealand against a planned dike that would take away part of their land. Tuitjer (2019) described the social media based strategies used by environmental activists in Bangkok to oppose the planned construction of flood protection infrastructure. All three articles concluded that local initiatives are important but that government organisations react defensively to local initiatives.

Rights of rivers

Rights of rivers was the topic of four articles on river movements in our review. It is a theme that has gained much traction in the last couple of years. Granting legal personhood to rivers was first done in the USA by local governments, beginning in 2006 (Kinkaid, 2019). Worldwide, legal personhood has since been granted by courts, tribunals, municipalities and national governments (Spitz and Peñalver, 2021). The idea that nature could be a legal person was first proposed by Christopher Stone in his book *Should Trees Have Standing?*, published in 1972. The *Universal Declaration of the Rights of Rivers* was drafted by the Earth Law Center (ELC) in Colorado, USA; it serves as an illustration of the concretisation of the rights of rivers idea. The declaration proposes six basic rights of rivers: 1) the right to flow, 2) the right to perform essential functions within its ecosystem, 3) the right to be free from pollution, 4) the right to feed and be fed by sustainable aquifers, 5) the right to native biodiversity, and 6) the right to regeneration and restoration (ELC, 2024).

Granting of legal personhood to a river can occur after long campaigns and legal battles by civil society organisations, such as those conducted in Colombia, Ecuador and New Zealand; sometimes, however, it is achieved through a legal action taken by a court or government body, such as in Australia and India (Kauffman and Martin, 2018; Alley, 2019). Ecuador, in its 2008 constitution, became the first nation to recognise the rights of nature. The constitution was formulated by an elaborate process of broad citizen involvement, including many roundtable discussions and protest marches (Akchurin, 2015). Two rivers in Ecuador are in the process of obtaining legal personhood, the Monjas and the Vilcabamba. The Atrato River in Colombia is heavily affected by illegal gold mining. In 2017, after many years of struggle by the *Study Center for Social Justice 'Tierra Digna'*, representing riverine communities, the Constitutional Court of Colombia declared the Atrato River to be subject to rights. It installed a 14-member committee of guardians that represented the riverine communities and included one representative of the Ministry of Environment (Chaves et al., 2020). In Spain, the heavily polluted Mar Menor lagoon was granted legal personhood in 2022 by the National Senate after a petition obtained over 640,000 signatures. Campaigns calling for the granting of legal personhood to rivers have also been conducted in many other countries. Examples include: Australia (Murray River, Martuwarra Fitzroy River), Nigeria (River Ethiope), The Netherlands (Meuse River), Hawaii (Hanalei River), the Balkans (several free-flowing rivers), Peru (Marañón River), UK (Frome River), and France (Tavignanu River, in Corsica).

The idea of the rights of rivers contains many contradictions and contestations (O'Donnell and Talbot-Jones, 2018; Clark et al., 2019). In 2017, the New Zealand Parliament enacted the Te Awa Tupua (Whanganui River Claims Settlement) Act. It declared that Te Awa Tupua is a legal person and has all the rights, powers, duties and liabilities of a legal person. Two guardians were appointed, one representing the Crown (the New Zealand government) and one representing the Whanganui Iwi (Māori people). The Act was the outcome of a long struggle by the Māori against the 1873 Treaty of Waitangi which curtailed the territorial autonomy of the Māori people (O'Donnell and Talbot-Jones, 2018; Macpherson, 2022). It is argued by Coombes (2021) and Collins and Esterling (2019) that the rights of the Whanganui River should not have been given to the river itself and that, instead, the rights to govern the Whanganui watershed should have been given to the Māori people.

Other issues

Some issues besides those mentioned above were described in publications yielded by the literature review. Examples of these include: run of the river hydropower, small hydropower, tourism, fish protection, fishing rights, water use by large-scale agriculture, and the construction of a bridge. In some cases, river movements addressed more than one of the above-mentioned topics.

Social movements may be involved in conflicts over water allocation or the transfer of water from a river. Sneddon (2003) described the protests against the large Khong-Chi-Mun (KCM) interbasin transfer project in northeast Thailand; this included a description of the politics of scale of both the government

and the affected communities. Struggles around river water allocation appeared infrequently in the systematic literature review even though struggles around river water for irrigation and drinking water are very prominent worldwide. McKee (2021), for example, described the diverse Palestinian struggles for environmental justice, including for access to water from the Jordan River. The EcoPeace *Save the Jordan* campaign proposed the restoration of the Jordan River.

Types of strategies and actions of river movements

River movements deploy a wide variety of strategies and actions. All of them, however, organise meetings to discuss river issues and strategies, and they all propose and coordinate activities. They also all engage in awareness-raising, recruiting of new volunteers, lobbying and advocacy activities. Often the activities will start small and will follow the official procedures of objection to interventions that are part of democratic policy-making. If, after some time, those actions do not yield results, many movements shift to more activist modes. Most river movements engage in different activities at the same time, doing so with increasing intensity when goals continue to not be met.

Table 3 provides examples of the activities mentioned in the 104 publications identified in the literature review. The examples are only indicative, as the categorisation of deployed strategies and actions depends heavily on the descriptors the authors use. Most publications mention many activities, and so could be included in many of the categories.

Many river movements engage in some form of street protest, such as marches, strikes, artistic manifestations, road blockades and occupations, or even hunger strikes. Awareness-raising may be done through media campaigns using a variety of channels such as newspaper and radio messages, websites and new social media. River walks may be conducted with school children, politicians and riverine communities, and video documentaries may be made and/or shown (see, for example, Easthope and Holloway, 1989; Drew, 2014; Hansen and Rossen, 2017; Tuitjer, 2019; Milligan et al., 2021; Elers and Dutta, 2023). All sorts of artistic campaign tools can also be part of awareness and mobilisation strategies, including murals and poetry festivals (Branagan, 2020; Davidson, 2022). Artiga-Purcell (2022) described the use of painted murals throughout El Salvador supporting the campaign against goldmining in the Lempa River. Those murals, in conveying the message of the national campaign against gold mining, contributed to its success.

Politicians and river authorities can be pressured through letter-writing, lobbying, receiving formal objections or petitions, or the conducting of referenda (Hall, 1994; Chan and Zhou, 2014; Islam and Islam, 2016). Forging alliances in the form of horizontal networks and affiliations is very often a central strategy for combining forces and gaining influence. Examples of horizontal networks from the 104 publications are the Clean the Ganga Movement (Drew, 2014) and the South Asia Network of Dams, Rivers and People (SANDRP) (Baviskar, 2019).

Sometimes grassroots and regional organisations connect to national or international river or environmental NGOs. This can be called 'vertical organisation'. Guldbrandsen and Holland (2001) described the collaboration between local citizens and governmental organisations in the American Heritage Rivers Initiative. Alliances were similarly forged between grassroots organisations and governmental river basin organisations in the Rio das Velhas River basin in Minas Gerais state, Brazil; in that case, within a few years the programme had reached thousands of people who became involved in different projects that ranged from ecotourism to environmental education (Abers, 2007).

Table 3. Methods of river activism mentioned in the publications.

Type of action	Specific methods of action	Examples of publications that described the methodology
Street protests	Rallies, protest marches, protest meetings, strikes, seminars, symposia	Chen and Hay (2006), Bisht (2011), Drew (2014, 2017), Gutierrez et al. (2019), Blair et al. (2023)
	Artistic manifestations	Branagan (2020), Artiga-Purcell (2022), Davidson (2022)
	Road blockades and occupations	Chen and Hay (2006); Di Martino (2009), Branagan (2020), Elers and Dutta (2023), Horowitz (2023)
	Hunger strikes, fasts	Baviskar (2019)
Media campaigns	Newspaper and radio messages	Easthope and Holloway (1989), Drew (2014)
	New social media	Tuitjer (2019)
	Video documentaries, river walks, and kayaking	Hansen and Rossen (2017), Milligan et al. (2021), Elers and Dutta (2023)
Advocacy	Lobbying	Eloy et al. (2023)
	Petitions, referenda	Hall (1994), Chan and Zhou (2014), Islam and Islam (2016)
Networking and forging of alliances	Horizontal networking and alliance formation	Moore (1998), Matsuzawa (2011), Baviskar (2019), Huneeus et al. (2021)
	Vertical (multi-scalar) alliances	Guldbrandsen and Holland (2001), Abers (2007), de Freitas (2015)
Knowledge creation and mobilisation	Civic research	Judge et al. (2016), Vallabh et al. (2016), Radjawali and Pye (2017), Milligan et al. (2021)
	Mobilisation of experts	Ghosh (2011), Edelenbos et al. (2017), Tollefson and Panikkar (2020)
	Proposing of alternative designs, formal consultation	Guldbrandsen and Holland (2001), Edelenbos et al. (2017)
	Objections to Environmental Impact Assessments, etc.	Tollefson and Panikkar (2020)
River clean-ups		Abers (2007), Milligan et al. (2021)
Legal action/litigation		Ghosh (2011), Baviskar (2019), Tollefson and Panikkar (2020)

At the national scale, *Acción Ecológica* supports many grassroots organisations in Ecuador, as well as *CENSAT Agua Viva* in Colombia and *Ecologistas en Acción* in Spain. At the international scale as well, many NGOs support local organisations. One example is the support given to the movement against the Nu dam in China. In 2004, the *China Rivers Network* organised anti-dam activities; their partner organisations, such as *Green Earth Volunteers*, *Friends of Nature*, and *Green Watershed*, were supported by NGOs from more than 60 countries (Chan and Zhou, 2014). Internationally operating organisations that support local river defence groups include: *Environmental Law Alliance Worldwide* (ELAW), *Earth Law Center* (ELC), *Friends of the Earth International* (FoEI), *Global Alliance for the Rights of Nature* (GARN), *Greenpeace*, *International Observatory on Nature's Rights*, *International Rivers*, *International Union for Conservation of Nature* (IUCN), *Konrad-Adenauer-Stiftung*, and the UN's *Harmony with Nature*.

A particular case of vertical organisation is the *Waterkeeper Alliance* (WKA). This is an umbrella organisation based in New York City, USA. It was created in 1999 and now has 344 licensed Waterkeeper

programmes in 44 countries. On their webpage the Alliance states that "Clean water is a basic right for all living beings" and "Waterkeepers are guardians of this right, fiercely defending, enforcing, and promoting just and equitable clean water laws" (WKA, 2024). The WKA grants licences to local groups to use trademarked names such as 'Riverkeeper', 'Waterkeeper', 'Soundkeeper', 'Lakekeeper', 'Baykeeper', 'Bayoukeeper', 'Canalkeeper', and 'Coastkeeper'. Local groups using these names are expected to stick to certain rules, which turns the WKA approach into a 'franchise formula'. The organisation started in the 1970s as a river activist group that campaigned for cleaner water in the heavily polluted Hudson River in New York state. Riverkeeper campaigns have been successful in stopping plans for hydropower development in Chile and in Quebec. In Iraq the Save the Tigris campaign worked together with Waterkeepers Iraq to restore the water flow in the Tigris River and the flow into the severely drained Mesopotamian Marches (Wiktor-Mach et al., 2023).

Knowledge creation and mobilisation is an important activity of river movements. Civic research, or citizen science, can be used to obtain data and raise awareness (Judge et al., 2016; Vallabh et al., 2016; Milligan et al., 2021). In some cases, experts are asked to support the river movement. River movements can also, for example, propose alternative designs, engage in formal consultation and launch objections to Environmental Impact Assessments (EIAs). Tollefson and Panikkar (2020) showed how a local activist group used litigation, influence on EIAs, external experts, and local knowledge to oppose gold mining in Alaska.

Direct actions on rivers such as conducting river clean-ups or staging a kayaking expedition on a still free-flowing river are also used to mobilise support; they are used as tools for learning and awareness-raising and to draw media attention (Abers, 2007; Milligan et al., 2021)

Legal mobilisation is gaining importance worldwide (Lehoucq and Taylor, 2020). Litigation, in the form of filing lawsuits against governmental organisations or private companies, is gaining increasing success (Ghosh, 2011; Baviskar, 2019; Tollefson and Panikkar, 2020). Legal mobilisation can also entail legal support and training or can influence policy-making by organising a binding referendum. More violent actions such as sabotage, threats of violence, or actual use of violence are rare, but do occur.

ANALYSIS, REFLECTION AND DISCUSSION

Reflection on the systematic literature study

The sensitivity (the percentage of all relevant publications that were retrieved) was low, in that, of thousands of relevant publications,[3] only 104 were retrieved. The specificity (the share of the retrieved publications that was relevant) was also not high, with only somewhat more than half of the 191 retrieved publications proving to be relevant. The current query is restrictive, but has sufficient internal validity to show the diversity of the river issues addressed,[4] the regional spread and movement strategies, and the trends over time. The bias is towards publications that have specifically mentioned the concept of 'social movements', implying a river movement that is deemed to be more than an occasional activity.

The narrow scoping of the query resulted in many relevant publications being missed. Eight examples of relevant publications about river movements that were not captured by the query that was used are: the slow resistance against Yuam River diversion in Thailand (Fung and Lamb, 2023), the movement against the gold mining that is polluting rivers in Cajamarca, Peru (Li and Paredes Peñafiel, 2019; Sosa

[3] For example, a query with 'river', 'activism' and 'Mekong' in Google Scholar yielded 11,900 hits, while 'anti-dam' and 'movements' yielded some 4600 hits.

[4] The internal validity was tested by comparing the 104 hits of the query with the results of a broader query in Scopus; for example, the search terms 'river' and 'protest' yielded 625 hits in Scopus. Within these results, the search term 'dam' yielded 291 hits, that is, 47%. This resembles the 44% of publications on movements against large dams found in the systematic literature research. Likewise, within these 625 hits, the terms 'flood' or 'flooding' yielded 34 hits (5%, like in the systematic literature research).

and Zwarteveen, 2012); the struggles against gold mining in Quimsacocha, Cuenca, Ecuador (Valladares and Boelens, 2019); the fight against the re-patterning of the hydrosocial territory by the Sogamoso dam in Colombia (Duarte-Abadía et al., 2015); the protests against two mega dams on the coast of Ecuador (Hidalgo-Bastidas, 2023); the brutal violence against the anti-Chixoy-dam movement in Guatemala (Johnston, 2010), the protest of civil organisations against dams in the Mekong, Nu-Salween and Brahmaputra (Yeophantong, 2020), and the *Prairie Rivers Network* in the midwestern USA (Freeman and Ray, 2001). These are just eight examples of many more relevant cases of river movements described in the scientific literature. A broader literature search should be done to obtain a more complete overview of the literature on river movements. This would better show the magnitude of river movements worldwide, their occurrence by region, the diversity of their strategies, and their impacts. With a wider search, however, the specificity would go down rapidly, implying the screening out of many more articles that would not be relevant, whereas the sample of 104 publications already provided an overview of the geographic spread, diversity of river issues addressed, and strategies deployed.

Many river movements are not in the scientific literature

The literature review yielded 104 publications describing more or less that number of river movements worldwide; there are, however, many more river movements that have been, and are, active worldwide. Even when broadening the scope of the query, for example, by including all publications that mention 'river' and 'activis*' in the abstract, title or keywords (419 publications in Scopus search), not all river movements would be covered, as many river movements have never been studied or been the subject of published scientific publications. Many river movements and cases of river activism also stay under the radar because of political repression, news media restrictions, or lack of the resources needed to get public attention.

One issue that did not emerge in the literature review is the protests against sand mining. Due to the already enormous, and still growing, demand for sand from the construction sector, sand mining from rivers poses a problem in many parts of the world (see, for example, Chen, 2017; Bari and Haque, 2022; Katz-Lavigne et al., 2022). Sand mining from rivers has huge consequences for the river geomorphology; the aquatic ecosystem is also significantly affected, as is bank erosion and the associated flood risks (Ashraf et al., 2011; Piyadasa, 2011; Pandey et al., 2023; Rentier and Cammeraat, 2022). Sand mining from rivers also affects sand replenishment in deltas and on coasts (Masalu, 2002). Protests against sand mining from rivers is reported in Sri Lanka by Athukorala and Navaratne (2008), in India by Bisht and Gerber (2017), and in Vietnam by Runeckles et al. (2023). Often, sand mining is illegal and is run by so-called 'sand mafias'. Citizens actions can be in the form of, for example, petitions, civic monitoring, street protests and roadblocks, or legal action. Runeckles et al. (2023) report on affected communities in Vietnam that engage in openly reporting to the authorities, bankside protests, and use of mass media. Singh Rawat (2020) reports on the 2019/2020 murder in India of 18 villagers who were protesting sand mining and of the five activists or journalists who were reporting on it. Athukorala and Navaratne (2008) report on a Sri Lankan women's organisation that protested against sand mining because it affected their access to drinking water.

To get a better idea of the number of river movements worldwide, the literature review outcome can be compared with environmental conflicts related to rivers in the *Global Atlas of Environmental Justice* (EJAtlas). From 3944 environmental conflicts reported in the EJAtlas, 1169 contain the word 'river', indicating a vast number of environmental conflicts related to rivers (pollution, water distribution, dams, etc). Not all these conflicts involve river movements, but the large number of river conflicts does indicate that more river movements exist than the approximately hundred that were found in the systematic literature review.

Many Goldman Environmental Prize winners were, and are, involved in river movements. Since 1990, 24 (of a total of 219) winners were involved in struggles for the protection of rivers (The Goldman Environmental Prize, 2024).

As another way to get an impression of the number of river movements worldwide, the team of the *Riverhood and River Commons* research projects compiled a database of river movements. This database was made by, 1) recording river movements that were known by the team members from their work experience and from networks such as the *Justicia Hídrica Alliance* (Water Justice Network), and (2) searching on internet news sites with keywords such as 'river activism'. This database does not pretend to be anywhere near complete, it is just illustrative. The examples are shown in Table 4.

Table 4. Examples of river movements that did not appear in the literature research and are also not described in publications that appear in Google Scholar.

Country	River movement	Issue	Link to article or website
India	Jeevit Nadi (Living River Foundation)	Urban riverfront development, Pune	https://www.jeevitnadi.org/
Myanmar	Karen Rivers Watch	Opposing dam projects	https://www.facebook.com/SalweenAsia
South Africa	Water for the Future	Restoring the Jukskei River in Johannesburg	https://www.waterforthefuture.co.za/
Spain	Plataforma de Serpis	Small dams and invasive species in the Serpis River	https://plataformaserpis.wordpress.com/
The Netherlands	Burgercollectief de Dreumelse Waard	River water pollution due to dumping of contaminated soil in river-linked sand mining pits	www.dreumel.burgercollectief.club/
Worldwide (based in The Netherlands)	River clean-up	Organising river clean-up activities worldwide	https://www.river-cleanup.org/en
Slovenia	Balkan River defence	Protecting free-flowing rivers in Slovenia	https://www.facebook.com/balkanriverdefence/
UK	River Action	Addressing health of rivers in the UK, and especially taking action against contamination of the Thames with untreated wastewater	https://riveractionuk.com/
Surinam	ProBios	Working against deforestation by illegal gold mining that also pollutes the rivers	https://www.probios.org/
Ecuador	Piatua Resiste	Opposing hydropower dam	https://www.miradanativa.org/ca/pelicula/piatua-resiste-ca/
Worldwide (coordinated from The Netherlands)	River Cities Network	Conducting advocacy and research on urban river commoning	https://www.rivercities.world/
USA (Colorado)	River Network	Conducting advocacy for diverse river-related issues	https://www.rivernetwork.org/

Source: Author's own elaboration.

There are two remarkable cases of nationwide river movements. The first of these, in Europe, stands out for its longevity, continuity and influence: the *Fundación Nueva Cultura del Agua* (New Water Culture Foundation, FNCA) in Spain and Portugal (Bukowski, 2017; Hernández-Mora et al., 2015). Created in 1998, it was the successor to the *Coordinator of Those Affected by Large Dams and Water Transfers* (COAGRET), which supported victims of forced resettlements that resulted from the building of many dams in Spain in the era of dictator Franco (Gómez Fuentes, 2012). The coordination of FNCA is based at the University of Zaragoza. It is a broad coalition of academics, environmental organisations, and regional river network organisations from the Iberian Peninsula. FNCA functions as a platform for discussion, coalition-building, dissemination and advocacy. It scored an important victory with the abandonment of the major water transfer canal from the Ebro in the north of Spain to the relatively dry south of Spain, which followed massive protest marches organised in Zaragoza, Barcelona and Brussels in 2001 and 2002 (Shah et al., 2021). The FNCA has grown into an influential network organisation on the Iberian water-policy level. Duarte-Abadía et al. (2019) provided an example of the multi-scalar struggle in Spain against new dams, in which diverse local interests are integrated and linked to the regional and national river movement.

The second notable national-level river movement is in Mongolia; it is described in an article by Byambajav (2015). The article was not found by the query used for the literature review, but it does shine a light on a relatively unknown river movement. This river movement started in 2001 with the mobilisation of local communities against the pollution by gold mining of the Ongi River. The movement was supported by the German *Konrad-Adenauer-Stiftung*. It organised local meetings, protest marches, petitions, litigation, radio broadcasts and education and gained further support from some political parties, scholars and journalists. As a result of the campaign, 36 out of 37 licences for gold mining operations were suspended. In 2006, several local river civil society organisations formed a network called the *Homeland and Water Protection Coalition* (HWPC) of River Movements. They were aided by the US-based Asia Foundation. The coalition became divided, however, with one member group favouring "responsible mining" and "multi-stakeholder engagement" and another calling for a ban on mining. After the collapse of the HWPC in 2008, the *Ongi River Movement* set up a new river network called the *United Movement of Mongolian Rivers and Lakes* (UMMRL), which received help from *Friends of the Earth International* (FoEI). It was able to halt the large Oyu Tolgoi copper-gold mining project. In their campaigns, they used litigation (including in foreign countries) against mining companies and exerted pressure that emphasised Mongolian identity, portraying horse riders with bows, and a yurt (traditional round and portable tent); they also conducted a hunger strike (Sneath, 2010). Byambajav (2015) highlighted the success of the movement: under its influence, the area under mining concessions in Mongolia diminished from 44.5% of the country's total area in 2005 to 15.3% in 2011.

Valuation of river movements in scientific literature

Most of the 104 publications on river movements found in the literature review indicate a positive valuation of the movements. The movements are mostly reactive and are portrayed as making justified claims and opening up claimed spaces for policy action, following the 'environmentalism of the poor' concept of Martinez-Alier (2002). The literature on the Sardar Sarovar dam in India has a more mixed valuation of the anti-dam movement. Some authors find the movement did not give adequate consideration to the benefits of the increased irrigation and drinking water.

In the classification of Martinez-Alier, river movements that call for the protection of free-flowing rivers can be linked to the 'cult of wilderness'; river movements that advocate for the 'rights for the river' are calling for riverine communities' autonomous governance of their rivers; and 'guardians' of the river can be indigenous or local communities. None of the publications identified a river movement that advocated for eco-efficiency.

Not all 104 publications provided clarity regarding the success of river movements and often the success is mixed or temporary. In several cases, protests against planned mega hydropower dams

succeeded in stopping the plans (for example, the Tipaimukh dam in the Indian state of Manipur and the Agua Zarca dam in Honduras). The massive protests against the water transfer from the Ebro to the south of Spain in 2001 and 2002 were also successful. In other cases, the protests were portrayed as legitimate but unsuccessful in attaining their goals. Many dams have been built, despite intensive and prolonged anti-dam campaings, such as the Sardar Sarovar dam in India and the Three Gorges dam in China (Wilmsen and Webber, 2017). Artiga-Purcell (2022) described the successful campaign against gold mining in El Salvador.

Most of the literature on river movements portrays them as reactive to external threats. The drivers and goals of river movements are often multiple; for example, a river movement fighting for 'indigenous rights' to fishing salmon and against dams that obstruct salmon migration (Norgaard et al., 2018; May, 2020) is at the same time a self-interested reactive campaign; a claim for fair compensation; a fight to conserve aquatic ecology, human rights and food security; an ideology; and a political empowerment struggle. Drivers of river movements can also be analysed at a more micro and individual level; for example, people can have all sorts of personal motivations for joining a river movement, including community or political leadership ambitions (Mihaylov, and Perkins, 2015). Reactive river protests can grow into environmental movements with broader goals, as in the case of FNCA in Spain (also see, for example, Boudet, 2011; Kang and Jang, 2013).

In cases where water withdrawal from rivers is disputed among different user groups, the struggle for livelihood may conflict with the conservation of the river's aquatic ecosystem. Conflicts have recently arisen regarding dam removal in, for example, Spain; there, one group wants to remove a dam for ecological reasons and another group wants the dam to stay to capture water for irrigation (Hommes, 2022). Struggle over irrigation water allocation and water transfers may also go hand in hand with conservation demands (see, for example, Hernández-Mora et al., 2015).

CONCLUSIONS

A systematic literature review of the diverse community river defence and river restoration movements was done to show trends over time and to analyse the academic coverage of the different types of action undertaken by river defence and restoration movements in different parts of the world. These actions included protests, advocacy, citizen science monitoring, and litigation.

A literature review is like a double layer of lenses that deform, blur, augment and select, in a biased way, certain aspects of the realities studied. The original studies give partial and biased representations of the realities and then the literature review adds another layer of partiality, deformation and bias. These drawbacks notwithstanding, a review of the literature provides valuable new insights into the diversity and similarities among cases. We drew four main insights from the literature research on river movements.

First, most authors described the drivers of river movements as being reactions to proposed projects or already-deteriorated rivers, although some publications described a more diverse range of drivers. *Second*, river movements contribute to democratic governance and environmental justice by successfully advocating for better river governance and by proposing alternative projects. *Third*, much of the literature focuses on the relatively large and visible river movements (especially the anti-dam movements), while the many cases of smaller and local river activism and their networks are much less studied. *Fourth*, and finally, definitions and descriptors associated with river activism and movements are somewhat blurry, and can be interpreted in different ways, which makes comparative analysis difficult.

The trend in topics covered in the academic literature on river movements is towards more diverse issues. Broadly, there is a notable shift from anti-dam movements to a broader spectrum of river issues such as pollution, indigenous values, water allocation, flooding, and rights of the river. River movements

use a wide variety of actions such as street protests, media campaigns, and legal mobilisation. They almost all form horizontal networks and may forge alliances with national and international NGOs.

In many cases, the selected scientific literature showed the impact of river movements on infrastructure plans and river policies. In a number of other cases, however, the river movements did not attain their goals. Overall, the literature is positive about the contribution of river movements to social equity and ecological integrity, thus following the interpretation of the 'environmentalism of the poor'.

FUNDING

This work was supported by the European Research Council (ERC) under the European Union's Horizon 2020 research and innovation programme Riverhood (Grant Number 101002921) and the River Commons project financed by INREF-Wageningen University; see also www.movingrivers.org

ACKNOWLEDGMENTS

The author would like to thank Juan Hidalgo, Bibiana Duarte and Alejandra Peña García for contributing to the Riverhood database with river movement cases.

REFERENCES

Abers, R.N. 2007. Organizing for governance: Building collaboration in Brazilian river basins. *World Development* 35(8): 1450-1463.

Acara, E. 2018. The emergent gender of rural modernities in Turkey. In Staub, A. (Ed), *The Routledge companion to modernity, space and gender,* pp. 288-301. New York: Routledge.

Akchurin, M. 2015. Constructing the rights of nature: Constitutional reform, mobilization, and environmental protection in Ecuador. *Law & Social Inquiry* 40(4): 937-968.

Alcañiz, I. and Gutiérrez, R.A. 2009. From local protest to the International Court of Justice: Forging environmental foreign policy in Argentina. In Harris, P.G. (Ed), *Environmental change and foreign policy,* pp. 129-140. London: Routledge.

Alkon, A.H. and Norgaard, K.M. 2009. Breaking the food chains: An investigation of food justice activism. *Sociological Inquiry* 79(3): 289-305.

Alley, K.D. 2019. River goddesses, personhood and rights of nature: Implications for spiritual ecology. *Religions* 10(502): 17.

Angelei, I. 2012. Not all dams in Africa are developmental: Advocacy perspectives from the African Rivers Network: Ethiopia's Gibe 3 dam endangers Kenya's lake Turkana: An activist's view. In Johnston, B.R.; Hiwasaki, L.; Klaver, I.; Castillo, R.; Ameyali and Strang, V. (Eds), *Water, cultural diversity, and global environmental change: Emerging trends, sustainable futures?,* pp. 344-346. Dordrecht, The Netherlands: Springer.

Ardón, P. and Flores, D. 2017. Berta lives: COPINH continues. *SUR-International Journal on Human Rights* 14: 109.

Artiga-Purcell, J.A. 2022. Hydrosocial extractive territories: Gold, sugarcane and contested water politics in El Salvador. *Geoforum* 131: 93-104.

Ashraf, M.A.; Maah, M.J.; Yusoff, I.; Wajid, A. and Mahmood, K. 2011. Sand mining effects, causes and concerns: A case study from Bestari Jaya, Selangor, Peninsular Malaysia. *Scientific Research and Essays* 6(6): 1216-1231.

Athukorala, K. and Navaratne, C.M. 2008. Shifting sands in Sri Lanka – Mobilizing and networking for collective action by river sand mining affected communities. In *The 12th Biennial Conference of the International Association for the Study of Commons, Cheltenham, UK* (Vol. 1418).

Baker, A.G.; Blanch, F.R. and Tur, S.U. 2022. The weight of river stones. In Rouliere, C. and Egerer, C. (Eds), *Water lore,* pp. 139-151. London: Routledge.

Bari, E. and Haque, S.E. 2022. Legal and illicit sand mining practice in Bangladesh: Exploring supply chain and its value. *Journal of Illicit Economies and Development* 4(1): 44-57.

Baviskar, A. 1995. *In the belly of the river: Tribal conflicts and over development in the Narmada Valley*. New Delhi: Oxford University Press.

Baviskar, A. 2019. Nation's body, river's pulse: Narratives of anti-dam politics in India. *Thesis Eleven* 150(1): 26-41.

Best, J. 2019. Anthropogenic stresses on the world's big rivers. *Nature Geoscience* 12(1): 7-21.

Bhattacharya, S.; Mukherjee, J.; Choudry, A. and Ghosh, R. 2023. Reifying "river": Unpacking pluriversal possibilities in rejuvenation surrounding the Adi Ganga of Kolkata. *Frontiers in Water* 5: 1070644: 15.

Bisht, M. 2011. Conceptualising movements against large dams: Case study analysis of NBA strategies, linkages and state response. *Social Change* 41(3): 397-411.

Bisht, A. and Gerber, J.F. 2017. Ecological distribution conflicts (EDCs) over mineral extraction in India: An overview. *The Extractive Industries and Society* 4(3): 548-563.

Blair, J.J.A. 2019. Splintered hinterlands: Public anthropology, environmental advocacy, and indigenous sovereignty. *Journal of Ethnobiology* 39(1): 32-49.

Blair, H. 2023. Saving India's rivers: Ecology, civil society, religion, and legal personhood. *World Development Sustainability* 3: 100068: 10.

Blair, J.J.; Gutierrez, G. and Ramón Balcázar, M. 2023. From watershed moment to hydrosocial movement: Patagonia without dams and the free-flowing rivers network in Chile. *Human Organization* 82(3): 288-303.

Boelens, R.; Escobar, A.; Bakker, K.; Hommes, L.; Swyngedouw, E.; Hogenboom, B.; Huijbens, E.H.; Jackson, S.; Vos, J.; Harris, L.M. and Joy, K.J.; Castro, F. de, Duarte-Abadía, B.; Tubino de Souza, D.; Lotz-Sisitka, H.; Hernández-Moral, N.; Martínez-Alier, J.; Roca-Servat, D.; Perreault, T.; Sanchis-Ibor, C.; Suhardiman, D.; Ulloa, A.; Wals, A.; Hoogesteger, J.; Hidalgo-Bastidas, J.P.; Roa-Avendaño, T.; Veldwisch, G.J.; Woodhouse, P. and Wantzen, K.M. 2023. Riverhood: Political ecologies of socionature commoning and translocal struggles for water justice. *The Journal of Peasant Studies* 50(3): 1125-1156.

Bond, P. and Galvin, M. 2023. Conflicting narratives of extreme weather events in Durban, South Africa: Politically opportunistic, experiential, and climate-justice epistemologies. In Ahrens, J. and Halbmayer, E. (Eds), *Climate change epistemologies in southern Africa: Social and cultural dimensions*, pp. 95-126. London: Routledge.

Boudet, S.H. 2011. From NIMBY to NIABY: regional mobilization against liquefied natural gas in the United States. *Environmental Politics* 20(6): 786-806.

Branagan, M. 2020. Collaborative wilderness preservation and the Franklin River campaign: Environmentalists, aboriginal people and the creative arts. In Bartel, R.; Branagan, K. and Harris, S. (Eds) *Rethinking wilderness and the wild: Conflict, conservation and co-existence*, pp. 50-67. London: Routledge.

Branagan, M. 2021. Women in environmental nonviolent action. In Standish, K.; Devere, H.; Suazo, A. and Raggerty, R. (Eds), *The Palgrave handbook of positive peace: Volumes 1-2*, pp. 247-269. Singapore: Palgrave.

Bratman, E. 2015. Passive revolution in the green economy: Activism and the Belo Monte dam. *International Environmental Agreements: Politics, Law and Economics* 15(1): 61-77.

Bukowski, J. 2017. A "new water culture" on the Iberian Peninsula? Evaluating epistemic community impact on water resources management policy. *Environment and Planning C: Politics and Space* 35(2): 239-264.

Büscher, B.; Dressler, W. and Fletcher, R. (Eds). 2014. *Nature Inc.: Environmental conservation in the neoliberal age*. University of Arizona Press.

Byambajav, D. 2015. The river movements' struggle in Mongolia. *Social Movement Studies* 14(1): 92-97.

Chan, K.M. and Zhou, Y. 2014. Political opportunity and the anti-dam movement in China: A case study of Nu River. In Hao, Z. and Chen, S. (Eds), *Social issues in China: Gender, ethnicity, labor, and the environment,* pp. 311-330. New York: Springer.

Chaves, I.V.; Rodríguez, G.A.; Figueroa, A.C. and Garzón, S.E.M. 2020. Recognizing the rights of nature in Colombia: The Atrato River case. *Jurídicas* 17(1): 13-41.

Chen, Y. 2017. Construction: limit China's sand mining. *Nature* 550(7677): 457-457.

Chen, H.C.L. and Hay, P. 2006. Defending island ecologies: Environmental campaigns in Tasmania and Taiwan. *Journal of Developing Societies* 22(3): 303-326.

Clark, C.; Emmanouil, N.; Page, J. and Pelizzon, A. 2019. Can you hear the rivers sing? Legal personhood, ontology, and the nitty-gritty of governance. *Ecology Law Quarterly* 45(4): 787-844.

Collins, T. and Esterling, S. 2019. Fluid personality: Indigenous rights and the Te Awa Tupua (Whanganui River Claims Settlement) Act 2017 in Aotearoa New Zealand. *Melbourne Journal of International Law* 20(1): 197-220.

Coombes, B. 2021. Personifying indigenous rights in nature? Treaty settlement and co-management in Te Urewera. In Andersson, R., Cothran, B. and Kekki, S. (Eds), *Bridging cultural concepts of nature: Indigenous People and protected spaces of nature,* pp. 29-60. Helsinki: Helsinki University Press.

Cornwall, A. and Coelho, V.S. (Eds). 2007. *Spaces for change? The politics of citizen participation in new democratic arenas* (Vol. 4). London: Zed Books.

Davidson, J.C. 2022. Cherry River: Art, music, and indigenous stakeholders of water advocacy in Montana. *Case Studies in the Environment* 6(1): 14.

Del Bene, D.; Scheidel, A. and Temper, L. 2018. More dams, more violence? A global analysis on resistances and repression around conflictive dams through co-produced knowledge. *Sustainability Science* 13(3): 617-633.

Della Porta, D. and Diani, M. (Eds). 2015. *The Oxford handbook of social movements*. New York: Oxford University Press.

De Azevedo, R.F.; Miranda, L.E. and Gomes, L.C. 2016. Contesting detrimental dams: A case study from southern Brazil. *International Journal of River Basin Management* 14(2): 205-217.

de Freitas, C. 2015. Old Chico's new tricks: Neoliberalization and water sector reform in Brazil's São Francisco River Basin. *Geoforum* 64: 292-303.

del Rio Gabiola, I. 2022. Proleptic elegy to the Gualcarque River: Submerged perspectives and solastalgia as forms of resistance in the Lenca community of Honduras. *Journal of Latin American Cultural Studies* 31(1): 51-68.

Desfor, G. and Keil, R. 2000. Every river tells a story: The Don River (Toronto) and the Los Angeles River (Los Angeles) as articulating landscapes. *Journal of Environmental Policy and Planning* 2(1): 5-23.

Di Martino, L.A. 2009. Institutional deficit for cross-border conflict resolution: The conflict over the construction of a pulp mill near the Uruguay river. *Journal of Borderlands Studies* 24(3): 115-130.

Drew, G. 2014. Mountain women, dams, and the gendered dimensions of environmental protest in the Garhwal Himalaya. *Mountain Research and Development* 34(3): 235-242.

Drew, G. 2017. The cultural politics of development in an Indian hydropower conflict: An exploration of 'fame-seeking' activists and movement-abstaining citizens. *South Asia: Journal of South Asian Studies* 40(4): 810-826.

Duarte-Abadía, B.; Boelens, R. and Roa-Avendaño, T. 2015. Hydropower, encroachment and the re-patterning of hydrosocial territory: The case of Hidrosogamoso in Colombia. *Human Organization* 74(3): 243-254.

Duarte Abadía, B.; Boelens, R. and Du Pré, L. 2019. Mobilizing water actors and bodies of knowledge. The multi-scalar movement against the Río Grande Dam in Málaga, Spain. *Water* 11(3): 410.

Easthope, G. and Holloway, G. 1989. Wilderness as the sacred: The Franklin River Campaign. In Hay, P.R.; Eckersley, R. and Holloway, G. (Eds), *Environmental politics in Australia and New Zealand*, pp. 189-201. Board of Environmental Studies, University of Tasmania.

Edelenbos, J.; Van Buuren, A.; Roth, D. and Winnubst, M. 2017. Stakeholder initiatives in flood risk management: Exploring the role and impact of bottom-up initiatives in three 'Room for the River' projects in the Netherlands. *Journal of environmental planning and management* 60(1): 47-66.

ELC (Earth Law Center). 2024. Universal Declaration of River Rights, https://www.earthlawcenter.org/river-rights (accessed 01 January 2024)

Elers, C. and Dutta, M. 2023. Academic-community solidarities in land occupation as an Indigenous claim to health: Culturally centered solidarity through voice infrastructures. *Frontiers in Communication* 8, 1009837: 14.

Eloy, L.; da Silva, A.L.; Coelho Filho, O. and Ghiotti, S. 2023. The water frontier: Agribusiness vs. smallholder communities in the Brazilian Cerrado. *Water Alternatives* 16(3): 869-891.

Fagan, A. and Sircar, I. 2010. Environmental politics in the western Balkans: River basin management and non-governmental organisation (NGO) activity in Herzegovina. *Environmental Politics* 19(5): 808-830.

Freeman, R.E. and Ray, R.O. 2001. Landscape ecology practice by small scale river conservation groups. *Landscape and urban planning* 56(3-4): 171-184.

Fung, Z. and Lamb, V. 2023. Dams, diversions, and development: Slow resistance and authoritarian rule in the Salween River Basin. *Antipode* 55(6): 1662-1685.

Ghosh, S. 2011. Protecting natural resources: course of a river movement. *Community Development Journal 46*(4): 542-557.

Goeckner, R.; Daley, S.M.; Gunville, J. and Daley, C.M. 2020. Cheyenne River Sioux traditions and resistance to the Dakota Access Pipeline. *Religion and Society* 11(1): 75-91.

Gómez Fuentes, A.C. 2012. Movimiento social por una Nueva Cultura del Agua en España. *Espacios públicos* 15(35): 96-113.

Green, W.N. and Baird, I.G. 2020. The contentious politics of hydropower dam impact assessments in the Mekong River basin. *Political Geography* 83: 102272: 12.

Guha, R. and Martinez-Alier, J.M. 1997. *Varieties of environmentalism: Essays North and South*. London: Earthscan.

Guldbrandsen, T.C. and Holland, D.C. 2001. Encounters with the super-citizen: Neoliberalism, environmental activism, and the American Heritage Rivers Initiative. *Anthropological Quarterly* 74(3): 124-134.

Gutierrez, G.M.; Kelly, S.; Cousins, J.J. and Sneddon, C. 2019. What makes a megaproject? A review of global hydropower assemblages. *Environment and Society* 10(1): 101-121.

Hall, A. 1994. Grassroots action for resettlement planning: Brazil and beyond. *World Development* 22(12): 1793-1809.

Han, H. 2013. China's policymaking in transition: A hydropower development case. *Journal of Environment and Development* 22(3): 313-336.

Hansen, B. and Rossen, J. 2017. Activist anthropology with the haudenosaunee: Theoretical and practical insights from the two row wampum renewal campaign. *Anthropology in Action* 24(3): 32-44.

Harlin, K. 2019. "How can a river be red?" Violent petroculture in Chigozie Obioma's The Fishermen. *Journal of Postcolonial Writing* 55(5): 685-697.

Hawke, S.M. 2012. Water literacy: An 'other wise', active and cross-cultural approach to pedagogy, sustainability and human rights. *Continuum* 26(2): 235-247.

Hernández-Mora, N.; Cabello, V.; de Stefano, L. and Del Moral, L. 2015. Networked water citizen organizations in Spain: Potential for transformation of existing power structures in water management. *Water Alternatives* 8(2): 99-124.

Hidalgo-Bastidas, J.P. 2023. Understanding anti-dam resistance politics: A historical and territorial study of two megadams in coastal Ecuador. *Water* 15: 4132: 16.

Hommes, L. 2022. The ageing of infrastructure and ideologies: Contestations around dam removal in Spain. *Water Alternatives* 15(3): 592-613.

Hommes, L.; Vos, J. and Boelens, R. 2023. The need to acknowledge, study and engage with new water justice movements. *PLOS Water 2*(5), e0000128: 4.

Horowitz, L.S. 2023. The double movement and the triple-helix: Divestment, decommodification, and the Dakota Access Pipeline. *Environment and Planning A: Economy and Space* 55(6): 1337-1354.

Huneeus, S.; Toro, S.; Luna, J.P.; Sazo, D.; Cruz, A.; Alcatruz, D.; Castillo, B.; Bertranou, C. and Cisterna, J. 2021. Delayed and approved: A quantitative study of conflicts and the environmental impact assessments of energy projects in Chile 2012-2017. *Sustainability* 13: 6986: 13.

Islam, M.S. and Islam, M.N. 2016. "Environmentalism of the poor": The Tipaimukh Dam, ecological disasters and environmental resistance beyond borders. *Bandung: Journal of the Global South* 3(1): 16.

Johnston, B.R. 2010. Chixoy dam legacies: The struggle to secure reparation and the right to remedy in Guatemala. *Water Alternatives* 3(2): 341-361.

Judge, J.M.; Brown, P.; Brody, J.G. and Ryan, S. 2016. The exposure experience: Ohio River Valley residents respond to local Perfluorooctanoic Acid (PFOA) contamination. *Journal of Health and Social Behavior* 57(3): 333-350.

Kang, M. and Jang, J. 2013. NIMBY or NIABY? Who defines a policy problem and why: Analysis of framing in radioactive waste disposal facility placement in South Korea. *Asia Pacific Viewpoint* 54(1): 49-60.

Katz-Lavigne, S.; Pandey, S. and Suykens, B. 2022. Mapping global sand: Extraction, research and policy options. Research report, https://repository.uantwerpen.be/docman/irua/1428b3/183490cc.pdf (accessed 11 January 2024)

Kauffman, C.M. 2017. *Grassroots global governance: Local watershed management experiments and the evolution of sustainable development*. New York: Oxford University Press.

Kauffman, C. and Martin, P. 2018. When rivers have rights: Case comparisons of New Zealand, Colombia, and India. Paper presented at Intl Stud Assoc Ann Conf, San Francisco, http://files.harmonywithnatureun.org/uploads/upload585.pdf (accessed 11 January 2024)

Kavak, S. 2021. Rethinking the political economy of rural struggles in Turkey: Space, structures, and altered agencies. *Journal of Agrarian Change* 21(2): 242-262.

Kinkaid, E. 2019. "Rights of nature" in translation: Assemblage geographies, boundary objects, and translocal social movements. *Transactions of the Institute of British Geographers* 44(3): 555-570.

Kuts, B. 2022. Problems of interaction between government and society on ecological safety In Kharkiv region (Ukraine). *Evropsky Politicky a Pravni Diskurz* 9(2): 12-19.

Lehoucq, E. and Taylor, W.K. 2020. Conceptualizing legal mobilization: How should we understand the deployment of legal strategies? *Law & Social Inquiry* 45(1): 166-193.

Li, F. and Paredes Peñafiel, A.P. 2019. Stories of resistance: Translating nature, indigeneity, and place in mining activism. In Vindal Ødegaard, C. and Rivera Andía, J. (Eds), *Indigenous life projects and extractivism. Approaches to social inequality and difference*, pp. 219-243. Cham, Switzerland: Palgrave Macmillan.

Losekann, C. and Milanez, B. 2023. Mining disaster in the Doce River: Dilemma between governance and participation. *Current Sociology* 71(7): 1255-1273.

Macpherson, E. 2022. Ecosystem rights and the Anthropocene in Australia and Aotearoa New Zealand. In Amiante, D. and Bagni, S. (Eds), *Environmental Constitutionalism in the Anthropocene: Values, Principles and Actions*, pp. 168-186. London: Routledge.

Mallon Andrews, K. 2015. Protest in the time of cholera: Disease and the metaphors of health and politics. *Canadian Journal of Latin American and Caribbean Studies* 40(1): 63-80.

Martinez-Alier, J. 2002. *The Environmentalism of the poor: A study of ecological conflicts and valuation*. Cheltenham, UK: Edward Elgar Publishing.

Masalu, D.C. 2002. Coastal erosion and its social and environmental aspects in Tanzania: A case study in illegal sand mining. *Coastal Management* 30(4): 347-359.

Mashingaidze, T.M. 2013. Beyond the Kariba dam induced displacements: The Zimbabwean Tonga's struggles for restitution, 1990s-2000s. *International Journal on Minority and Group Rights* 20(3): 381-404.

Mason, M.L. 1995. Women's high hopes -- dashed again? *World citizen news: Newsletter of the World Government of World Citizens* 9(2): 5.

Matsuzawa, S. 2011. Horizontal dynamics in transnational activism: The case of Nu River anti-dam activism in China. *Mobilization: An International Quarterly* 16(3): 369-387.

May, T.J. 2020. Toward communicative democracy: Developing salmon is everything. In Kuppers, P. and Robertson, G. (Eds), *The community performance reader*, pp. 153-164. London: Routledge.

McBeth, M.K.; Lybecker, D.L.; Stoutenborough, J.W.; Davis, S.N. and Running, K. 2017. Content matters: Stakeholder assessment of river stories or river science. *Public Policy and Administration* 32(3): 175-196.

McKee, E. 2021. Divergent visions: Intersectional water advocacy in Palestine. *Environment and Planning E: Nature and Space 4*(1): 43-64.

Mehta, M.G. 2010. A river of no dissent: Narmada Movement and coercive Gujarati nativism. *South Asian History and Culture* 1(4): 509-528.

Mehta, N. and Mehta, M.G. 2013. Gujarat beyond Gandhi: Notes on identity, conflict and society. In Mehta, N. and Mehta M.G. (Eds), *Gujarat beyond Gandhi,* pp. 1-13. London: Routledge.

Meissner, R. 2023. Southern African transboundary waters: Non-state actors in the Inkomati-Usuthu water management area and the Okavango river basin. In Batista da Silva, L.P.; Costa Riberio, W. and Battistello, I. (Eds), *New perspectives on transboundary water governance: Interdisciplinary approaches and global case studies*, pp. 81-98. London: Routledge.

Méndez, M.J. 2018. "The river told me": Rethinking intersectionality from the world of Berta Cáceres. *Capitalism, Nature, Socialism* 29(1): 7-24.

Mihaylov, N.L. and Perkins, D.D. 2015. Local environmental grassroots activism: contributions from environmental psychology, sociology and politics. *Behavioral Sciences* 5(1): 121-153.

Milligan, R.; McCreary, T. and Jelks, N.T.O. 2021. Improvising against the racial state in Atlanta: Reimagining agency in environmental justice. *Environment and Planning C: Politics and Space* 39(7): 1586-1605.

Montague, P. and Pellerano, M.B. 2014. History of the US Environmental Movement (Revised 10 January 2012). In *Encyclopedia of Toxicology*: Third Edition, pp. 918-943.

Moore, M. 1998. Coalition building between Native American and environmental organizations in opposition to development: The case of the New Los Padres Dam Project. *Organization & Environment* 11(3): 287-313.

Nilsen, A.G. 2007. On new social movements and 'the reinvention of India'. In *Forum for Development Studies* 34(2): 271-293.

Nilsen, A.G. 2008. Political economy, social movements and state power: A Marxian perspective on two decades of resistance to the Narmada Dam Projects. *Journal of Historical Sociology* 21(2-3): 303-330.

Norgaard, K.M.; Reed, R. and Bacon, J.M. 2018. How environmental decline restructures indigenous gender practices: What happens to Karuk masculinity when there are no fish? *Sociology of Race and Ethnicity* 4(1): 98-113.

Norris, G.L. and Cable, S. 1994. The seeds of protest: From elite initiation to grassroots mobilization. *Sociological Perspectives* 37(2): 247-268.

Oh, C.H.; Shapiro D.; Ho, S.S.H.; and Shin, J. 2020. Location matters: Valuing firm-specific nonmarket risk in the global mining industry. *Strategic Management Journal* 41(7): 1210-1244.

O'Donnell, E.L. and Talbot-Jones, J. 2018. Creating legal rights for rivers: Lessons from Australia, New Zealand, and India. *Ecology and Society* 23(1): 10.

Oslender, U. 2004. Fleshing out the geographies of social movements: Colombia's Pacific coast black communities and the 'aquatic space'. *Political Geography* 23(8): 957-985.

Pandey, S.; Kumar, G.; Kumari, N. and Pandey, R. 2023. Assessment of causes and impacts of sand mining on river ecosystem. In Madhav, S.; Singh, V.B.; Kumar, M. and Singh, S. (Eds), *Hydrogeochemistry of aquatic ecosystems,* pp. 357-379. Wiley Online Library.

Parés, M. 2011. River basin management planning with participation in Europe: From contested hydro-politics to governance-beyond-the-state. *European Planning Studies* 19(3): 457-478.

Parkins, J.R. and Sinclair, A.J. 2014. Patterns of elitism within participatory environmental governance. *Environment and Planning C: Government and Policy* 32(4): 746-761.

Petticrew, M. and Roberts, H. 2008. *Systematic reviews in the social sciences: A practical guide*. Malden, USA: Blackwell Publishing.

Pešić, J. and Vukelić, J. 2022. Europeanisation from below at the semi-periphery: The movement against small hydropower plants in Serbia. *Sociologija* 64(1): 5-27.

Piyadasa, R.U. 2011. River sand mining and associated environmental problems in Sri Lanka. Proceedings of the workshop held at Hyderabad, India, September 2009. *Sediment Problems and Sediment Management in Asian River Basins,* pp. 148-153. IAHS Press.

Praskievicz, S. 2021. From Hetch Hetchy to the Cuyahoga: How rivers shaped the American environmental movement. *The Professional Geographer* 73(1): 26-37.

Puecker, C. and Steger, T. 2023. Protecting the last wild river in Europe from hydropower development in Albania: An environmental movement strategy in a flawed democracy. *Case Studies in the Environment* 7(1), 2018088 https://online.ucpress.edu/cse/article-abstract/7/1/2018088/197745/Protecting-the-Last-Wild-River-in-Europe-from?redirectedFrom=fulltext

Pulla, V.; Jaysawal, N. and Saha, S. 2019. Challenges and dilemmas of civil society movements in India. *Asian Social Work and Policy Review* 13(2): 169-178.

Radjawali, I. and Pye, O. 2017. Drones for justice: Inclusive technology and river-related action research along the Kapuas. *Geographica Helvetica* 72(1): 17-27.

Rahayu, H.P.; Khoirunnisa, D.; Rohman, D.S.; Asman, A.I. and Kombaitan, B. 2021. What are the essentials for community resilience against recurring floods? *International Journal on Advanced Science, Engineering and Information Technology* 11(6): 2233-2239.

Rajangam, K. 2021. Bridging development and heritage: Expert gaze, local discourses, and visual aesthetic crisis at Hampi world heritage site. *Journal of South Asian Development* 16(1): 75-99.

Rentier, E.S. and Cammeraat, L.H. 2022. The environmental impacts of river sand mining. *Science of The Total Environment* 838: 155877.

Routledge, P. 2003a. River of resistance: Critical collaboration and the dilemmas of power and ethics. *Ethics, Policy and Environment* 6(1): 66-73.

Routledge, P. 2003b. Voices of the dammed: Discursive resistance amidst erasure in the Narmada Valley, India. *Political Geography* 22(3): 243-270.

Rudling, A. and Dueñas, L.V. 2021. Liquid graves and meaning activism in the Colombian armed conflict: the 'bottom-up' recovery and memorialisation of victims of forced disappearance. *Journal of the British Academy* 9(S3): 121-137.

Runeckles, H.; Hackney, C.R.; Le, H.; Ha, H.T.T.; Bui, L. and Large, A. 2023. "Local people want to keep their sand": Variations in community perceptions and everyday resistance to sand mining across the Red River, Vietnam. *The Extractive Industries and Society* 15: 101336.

Salmi, J. and Salmi, P. 2010. Fishing tourism, biodiversity protection and regional politics in the River Tornionjoki, Finland. *Fisheries Management and Ecology* 17(2): 192-198.

Schlosberg, D. 2004. Reconceiving environmental justice: Global movements and political theories. *Environmental Politics* 13(3): 517-540.

Schroering, C. and Staggenborg, S. 2022. Volunteer and staff participants in social movements: A comparison of two local coalitions. *Social Movement Studies* 21(6): 782-797.

Silber-Coats, N. 2017. Clean energy and water conflicts: Contested narratives of small hydropower in Mexico's Sierra Madre Oriental. *Water Alternatives* 10(2): 578-601.

Shah, E.; Vos, J.; Veldwisch, G.J.; Boelens, R. and Duarte-Abadía, B. 2021. Environmental justice movements in globalising networks: A critical discussion on social resistance against large dams. *The Journal of Peasant Studies* 48(5): 1008-1032.

Sicotte, D.M. and Brulle, R.J. 2017. Social movements for environmental justice through the lens of social movement theory. In Holifield, R.; Chakraborty, J. and Walker G. (Eds), *The Routledge handbook of environmental justice,* pp. 25-36. London: Routledge.

Simpson, A. 2013. Challenging hydropower development in Myanmar (Burma): Cross-border activism under a regime in transition. *Pacific Review* 26(2): 129-152.

Singh Rawat, B. 2020. 193 dead in river sand mining incidents in India in 2019-20. SANDRP. https://sandrp.in/2020/11/22/193-dead-in-river-sand-mining-incidents-in-india-in-2019-20/ (accessed 18 February 2024)

Sithole, E. 2005. Trans-boundary environmental actors: The Zambezi Society's Campaign for Sustainable Tourism Development in the Zambezi Bioregion. *Journal of Sustainable Tourism* 13(5): 486-503.

Smith, L. 2018. What if Edward Abbey's "Monkey wrench gang" had succeeded? The ghosts of Glen Canyon past, present, and future. *Antipode* 50(5): 1396-1414.

Sneath, D. 2010. Political mobilization and the construction of collective identity in Mongolia. *Central Asian Survey* 29(3): 251-267.

Sneddon, C. 2003. Reconfiguring scale and power: The Khong-Chi-Mun project in northeast Thailand. *Environment and planning A* 35(12): 2229-2250.

Sneddon, C. and Fox, C. 2008. River-basin politics and the rise of ecological and transnational democracy in Southeast Asia and Southern Africa. *Water Alternatives* 1(1): 66-88.

Sosa, M. and Zwarteveen, M. 2012. Exploring the politics of water grabbing: The case of large mining operations in the Peruvian Andes. *Water Alternatives* 5(2): 360-375.

Spitz, L. and Peñalver, E.M. 2021. Nature's personhood and property's virtues. *Harvard Environmental Law Review* 45(1): 67-97.

Suhardiman, D.; Manorom, K. and Rigg, J. 2022. Institutional bricolage (re) shaping the different manifestations of state-citizens relations in Mekong hydropower planning. *Geoforum* 134: 118-130.

Tezcür, G.M.; Schiel, R. and Wilson, B.M. 2021. The effectiveness of harnessing human rights: The struggle over the Ilısu Dam in Turkey. *Development and Change* 52(6): 1343-1369.

The Goldman Environmental Prize (2024). All prize winners. https://www.goldmanprize.org/all-winners/ (accessed 05 February 2024)

Thomas, C.A. 2015. Indigenous more-than-humanisms: Relational ethics with the Hurunui River in Aotearoa New Zealand. *Social & Cultural Geography* 16(8): 974-990.

Tollefson, J. and Panikkar, B. 2020. Contested extractivism: Impact assessment, public engagement, and environmental knowledge production in Alaska's Yukon-Kuskokwim Delta. *Journal of Political Ecology* 27(1): 1167-1188.

Tuitjer, L. 2019. From boats to bikes? Assembling contestations along the Chao Phraya river in Bangkok, Thailand. *Projections* 14*. New uses for old rivers: Rediscovering urban waterways*. MIT Press, https://projections.pubpub.org/pub/9yccatu5/release/1

Twardek, W.M.; Wanningen, H.; Fernandez Garrido, P.; Brink, K.; Royte, J.; Berkhuysen, A.; Geenen, B. and Cooke, S.J. 2020. World fish migration day connects fish, rivers, and people – From a one-day event to a broader social movement. *Fisheries* 45(9): 465-474.

Vallabh, P.; Lotz-Sisitka, H.; O'Donoghue, R.; Schudel, I. 2016. Mapping epistemic cultures and learning potential of participants in citizen science projects. *Conservation Biology* 30(3): 540-549.

Valladares, C. and Boelens, R. 2019. Mining for Mother Earth. Governmentalities, sacred waters and nature's rights in Ecuador. *Geoforum* 100: 68-79.

Vos, J.; Boelens, R.; and Kuper, M. 2020. Rooted water collectives: Towards an analytical framework. *Ecological Economics* 173: 106651: 11.

Warner, B.P. and Meluso, A. 2022. We are fingers of a hand that make a fist": Working class alliances in Colorado River water protests in the Mexicali Valley, Mexico. *Water Alternatives* 15(2): 341-362.

Waterkeeper Alliance (WKA). About us. https://waterkeeper.org/about-us/ (accessed 2 February 2024)

Wiktor-Mach, D.; Skupiński, M. and Salih, K. 2023. "We want to have a positive impact": Fragile ecologies and the Iraqi Kurds' dutiful environmentalism. *Journal of Political Ecology* 30(1): 21.

Wilmsen, B. and Webber, M. 2017. Mega dams and resistance: the case of the Three Gorges Dam, China. In Grugel, J.; Singh, J.N.; Fontana, L. and Uhlin, A. (Eds), *Demanding justice in the global south: Claiming rights*, pp. 69-98. Cham, Switzerland: Palgrave Macmilan.

Wilson, N.J. 2019. "Seeing Water Like a State?": Indigenous water governance through Yukon First Nation Self-Government Agreements. *Geoforum* 104:101-113.

World Rainforest Movement. 2003. Dams, Struggles against the modern dinosaurs. Montevideo, Uruguay. www.wrm.org.uy//wp-content/uploads/2013/04/dams_struggles_against_the_modern_dinosaurs.pdf (accessed 2 February 2024)

Xie, L. and van der Heijden, H.A. 2010. Environmental movements and political opportunities: The case of China. *Social Movement Studies* 9(1): 51-68.

Yaka, Ö. 2017. A feminist-phenomenology of women's activism against hydropower plants in Turkey's Eastern Black Sea region. *Gender, Place and Culture* 24(6): 869-889.

Yaka, Ö. 2019. Rethinking justice: Struggles for environmental commons and the notion of socio-ecological justice. *Antipode* 51(1): 353-372.

Yan, L.; Isaacs, D.S.; Litts, B.K.; Tehee, M.; Baggaley, S. and Jenkins, J. 2023. Learning with the land: How sixth graders restory interactions with the land through field experiences. *Learning, Culture and Social Interaction* 42: 100754.

Yeophantong, P. 2014. China's Lancang dam cascade and transnational activism in the Mekong region: Who's got the power? *Asian Survey* 54(4): 700-724.

Yeophantong, P. 2017. River activism, policy entrepreneurship and transboundary water disputes in Asia. *Water International* 42(2): 163-186.

Yeophantong, P. 2020. River activism, policy entrepreneurship and transboundary water disputes in Asia. In Ho, S. (Ed), *A river flows through it*, pp. 115-138. London: Routledge.

Yong, M.L. 2022. Transboundary environmental publics and hydropower governance in the Mekong River Basin: A contested politics of place, scale and temporality. *Environmental Policy and Governance* 32(4): 292-304.

Young, S. and Ear, S. 2021. Transnational political economic structures: explaining transnational environmental movements against dams in the lower Mekong region. *Third World Quarterly* 42(12): 2993-3011.