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## **River histories: A thematic review**

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### **Abstract**

This review discusses contemporary river history literature of the past two decades. It presents an introduction to the evolution of river history literature and discusses its relation to the scholarly field of environmental history. The review argues that the study of river histories is increasingly sophisticated methodologically, particularly in interdisciplinary breadth and comparative approaches. This article concentrates on selected studies of European and North American rivers during the nineteenth and twentieth centuries and discusses the recent literature on river histories within three thematic frames. First, this paper discusses the spatial dimensions and different spatial scales of river histories, especially rivers as connectors and dividers. The second theme presents three different types of power relations in human-river interaction. Third, this paper will touch upon the temporal questions of river biographies. This review will pay special attention to the growing literature addressing the attempts to re-establish environmentally sound human-riverine relationships and improve the status of rivers through restorative activities. This article shows that a thematic analysis of contemporary river history offers a fruitful frame to understand the complex and intertwined nature of the temporal, spatial, and power-related dimensions in the narratives.

### **Key words**

River history, Environmental history, Nineteenth and twentieth century, North America, Europe

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## Introduction

Throughout history, rivers have been of fundamental importance to humans both in material and mental terms. This reality has also been reflected in scholarly literature, and a special genre of river histories with the river as a historical subject has a long tradition (Armstrong et al 2009, Chap. 1). Both general and academic interest in rivers and history is flourishing. Melosi (2011, p. 204) shows in his bibliography that the number of scholarly river history publications has increased significantly during recent years. Also, wider audiences are targeted by an array of popular river history publications.<sup>1</sup> As this article will show, the increasingly diverse approaches and foci to river histories have broadened the scope of scholarship and introduced novel ways of perceiving the riverine pasts of humankind. Given the dynamism of this stage combined with the broad interest in river histories, a comprehensive review of the recent developments and their contemporary currents are timely.<sup>2</sup> This review essay attempts to answer that call by providing an overview of the scholarship and capturing some recent and emerging trends. This review will also highlight some possible future perspectives in river historiography.

Drawing on Warren (2003, p. 1), I understand that river history investigates the various ways people have lived along and with rivers, and perceived and reshaped them to suit their preferences in life. Changing and changed rivers have motivated people to reshape their cultures, economies, and politics to meet new realities. River histories are narratives that cover a defined time and give a detailed account of some selected developments and junctures that are constitutive of the fate of the river and the people in interaction with the river. While scholarly fields such as historical geography and political history have traditionally been dominant niches for river history research, an emphasis towards the inclusion the non-human world has been evident for some time. This shift must be seen in association with the emergence and maturation of the scholarly field of environmental history<sup>3</sup>.

Given the vast amount of published river histories, the language barriers posed by some of the literature, and the limitations to the size of this article, I cannot comprehensively analyze all the literature within one review. I have chosen to concentrate on a timespan of roughly twenty years and a geographic restriction to Western Europe and North America, which still results in a stunning abundance of river history publications. The geographical focus on the western world excludes the important, growing, and highly dynamic scholarship on non-western rivers.<sup>4</sup> These limitations make this review only a starting point for charting this broad field and hopefully will provide inspiration,

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<sup>1</sup> Ackroyd's (2007) colossal and multi-layered work on the "sacred river" Thames serves as a European example, while Talbott's (2009) piece on the Hudson River shows how the readership of river histories is widened to new audiences, children in this case.

<sup>2</sup> Some monographs and edited volumes on river histories include more rigorous introductory or concluding chapters with reflections on conceptual and thematic choices and their methodological implications in the historiography (Mauch and Zeller 2008; Pritchard 2011; Castonguay and Evenden 2012a, 2012b; Coates 2013). But they draw mainly on the work presented in the edited volumes in question or the thematic subfield of the respective book.

<sup>3</sup> I prefer the term *field* rather than *discipline* as a divergence from the institutional connotations of *discipline*. Scholarly *field* better includes the multiplicity of possible approaches and scholarly traditions applicable in environmental history, which, despite the flourishing scholarship, is still not an academically established discipline in many countries. See Huutoniemi et al. 2010. For the development of the field in general, see e.g. Hughes 2006.

<sup>4</sup> This dynamism is reflected in the amount of non-Western river history publications. As a key contribution, Volume 1 in the Water History Series (Eds. Tvedt and Jakobsson, 2006a) offers an extensive selection of river history cases from all inhabited continents, and predominantly from the non-western world. For the Latin American perspective, see Cleary (2001) for a review of the environmental history of the Amazon.

reference points for comparison, and contrasting and critiquing insights for future review essays on non-western rivers.

The publications selected for closer scrutiny in this piece present a diverse range of geographical distribution within the two continents, and include rivers with varying physical sizes and various degrees of fame or recognition. These works were published during the entire time frame of this review.<sup>5</sup> Because this review is limited to western river historiography, compilations or comparative works that include rivers from both North American and European realms are particularly interesting and have been included in this survey. Since the material of this study includes both condensed articles published both in scientific journals and edited volumes and much more comprehensive monographs, the extent and coverage of individual studies vary. My aim is to provide a thematic overview beyond individual publications and refrain from comparison or qualitative judgments about individual studies.

The review of literature is organized around a methodologically focused section and three overarching topics (space, power, and time). These topics have subthemes that emerged inductively as recurring and central perspectives in the body of the literature. The overarching topics were chosen as to cover the broad essence of river historiography and resonate with the multidisciplinary nature of river histories, which will be described in more detail in the following section (see also Pawson and Dovers 2009).

The choice of the thematic frames is based on the idea that river histories deal with the interdependence and interaction of rivers and humankind in a reciprocal relationship that is inherently spatial and temporal in character and filled with power struggles. While river histories often are attached to some specific, geographically-determined places, the human-river interactions are constant processes that produce and reproduce both natural and cultural spaces. The on-going creation and shaping of socio-natural riverine spaces is associated with different notions of temporality: process, duration, reproduction, change, development, evolution, and transformation (cf. Lehmkuhl 2007). The multiple temporalities attached to the hydrological system and the socio-natural processes of river histories follow the Braudelian tradition of acknowledging different temporal scales and syncing them with geographical scales. Hence, the nexus of socio-natural transformative processes occurs in a multi-layered temporal and spatial sphere (cf. Saikku 2005, p. 15). Historically changing river-human interactions include multiple and often competing visions of rivers at different times when the materiality of nature enters the political domain and rivers become arenas of complex and contested power relations. As Swyngedouw (2015, p. 19-20) puts it, “every political project embodies a process of socio-environmental transformation and every socio-environmental project reflects and materializes a particular political vision.” This notion is at the core of understanding river histories and their power manifestations, the third thematic frame used in this analysis.

The article proceeds with an overview of the field noting particularly the environmental dimension of river histories. The article shows how recent river historiography has taken advantage of the possibilities of broad interdisciplinary inquiry thus widening the outcomes and diversifying the

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<sup>5</sup> The main sources have been the major journals in the field, *Water History*, *Environmental History*, and *Environment & History*. While the thematic foci of this paper guided the choice of monographs for the analysis, it was to some degree influenced by the significance of some works within the field, indicated by citations, and occasionally limited due to resources and availability. Additionally, I have included some works published in less common languages (Finnish and Swedish).

approaches of river histories. The traditional way of investigating river history as single-case studies on individual and unique rivers is increasingly complemented by comparative approaches, which allow new, trans-regional insights that can fruitfully contribute to our understanding of the different fates of rivers based on time and place.

Followed by the thematically divided sections the article, I will discuss the spatiality of river histories particularly the conceptions of rivers as connectors and boundaries. The blurriness of the spatial dimensions of river histories reveals the complexities inherent in river histories and challenges scholars to rethink the spatial scales of their investigations. Second, I will discuss the questions of threefold power relations in human-river interaction, which permeate the material, discursive, economic, political, or cultural power relations that are at the core of the interdisciplinary integration of natural scientific inquiry and socio-political, historical analysis. Finally, I will touch upon the temporal questions of river narratives with special attention to the beginnings and ends of river biographies and their multiple and overlapping temporalities. The increasing environmental awareness of the decades near the turn of the millennium is connected with a future-oriented perspective of river history scholarship, where the many ways of restoring rivers—ecologically and mentally—are a significant part of the narratives. The conclusions summarize the findings of the preceding sections and argues that a thematic analysis of contemporary river history offers a fruitful frame to understand the complex and intertwined nature of the temporal, spatial, and power-related dimensions in the narratives. In the conclusions I additionally specify some underlying trends in river historiography and speculate on future of the field.

## **The evolution of river history**

The role and conceptualizations of *the river*<sup>6</sup> as the main character in river historiography has changed in comparison to historical narratives that were merely framed around the physical setting of rivers (Armstrong et al. 2009, chap. 1). Recent scholarship emphasizes that rivers should not be reduced to inert scenes of human events (see Coates 2013, p. 36-37). Rivers are active agents that shape processes and outcomes as driving forces in history (Mauch and Zeller 2008, p. 7). This agency requires a more pronounced emphasis and understanding of the natural characteristics and processes of the hydrological system the river belongs to. This trend is parallel to the broader question about the place of the physical environment in historical inquiry. River histories are intrinsically bound to their respective localities, and placing river histories in a geographic location with its natural hydro-geological realities is an important part of setting the scene for river histories. At the same time, it is not just the river that is in focus, but also the environments altogether around the river. As Evenden (2004, p. 4) says, the scholar needs in his or her inquiry to “climb up the river banks” since the hydro-social interrelations of a river exceed by far the immediate “liquid ribbon” (Coates 2013, cover page).

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<sup>6</sup> For the sake of clarity, I use *river* as an overarching term, including main rivers, tributaries, and smaller creeks as well, while being aware that *river* terminology is variable and differently defined according to linguistic, scientific, or historical contexts. The appropriate terms may vary by the discharge of the river, the navigability of the river, the size of its catchment area, its geographical location (e.g. in the Swedish language rivers north of the Göta älv and Dalälven are called *älv*, south of them *å* or *ström*, and rivers outside of Scandinavia are called *flod*), or other criteria.

The strong presence of the natural qualities of rivers in the literature is associated with the environmental trend in river historiography since the seminal *Rivers of Empire* (1985) by Donald Worster. There is an increasing—but not exclusive—trend of positioning river histories under the broad umbrella of environmental history. Most clearly this is evident in the headlining in the river history publications, where *The Big Muddy: An Environmental History of the Mississippi and its Peoples* (Morris 2012) and *The River Returns: An Environmental History of the Bow* (Armstrong, et al. 2009) are two of many examples of this shift. The propensity to connect river histories to environmental history seems to be more pronounced within Northern American literature than in European literature. Presumably, this is connected to both the book length publication form, which is more common in northern American scholarship,<sup>7</sup> and the fact that the roots of environmental history altogether rests in Northern America.

The environmental history community has welcomed contributions from scholars with very different backgrounds thus encouraging research without strict disciplinary boundaries. The broad range of possible research approaches within environmental history resonates well with the study objectives of river histories. Most importantly, the contemporary dominance of the environmental historical mindset in river historiography has the methodological implication of an endeavor towards interdisciplinarity<sup>8</sup>.

The interdisciplinarity of river history research is based on a broad range of thematic categories<sup>9</sup> that represent different approaches and emphases. First, the central category of the changes in the dynamics of natural, *living* ecosystems in time means the investigation of the “physical form and behavior” (Tvedt and Coopey 2010, p. 7) of water. Tvedt and Coopey (2010, 7) state that this is the most fundamental analytical layer of watery history research. However, as Swyngedouw (2015, 227) underlines, the physical characteristics and processes of [here: rivers] are not historically absolute or stable. They are shaped by myriad transformations in a complex web of physical, biological, social, political, economic, and cultural processes.

These transformations are at the core of the second thematic category of human-river interactions over time in riverine environments. They include the socio-economic elements that condition and direct human agency towards natural environments, the material devices that are available to humans in the form of technology and know-how, and the political processes, decision-making, and conflicts that are intertwined in these developments.<sup>10</sup> Both the first and second categories are intrinsically associated with the underlying historical inquiry of rivers where much of

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<sup>7</sup> European scholars with their linguistic diversity balance local significance and audience and international accessibility to their research against international academic publishing with an English language dominance. Since article-length contributions can cover only a very small and specific part of river history, terming them “environmental history of river X”, which implies comprehensive coverage of complex histories, may seem inaccurate to scholars. Special journal issues focusing on one river and successfully exemplified by the “Danube-issue” of *Water History* (Vol 5, issue 2, 2013), proves to be one recommendable alternative to bridge these challenges.

<sup>8</sup> I use the term interdisciplinarity as an overarching term for different kinds of research activities that include at least two research fields, in whatever degree of interaction and relatedness, and I will not elaborate on the distinct conceptualizations of interdisciplinarity (e.g. multidisciplinary, transdisciplinarity etc.) See Huutoniemi et al. 2010. For a discussion on the possibilities and challenges of interdisciplinarity in environmental history see Hamilton, et al. (2011).

<sup>9</sup> These are based on typologies for the field of environmental history as presented by Massa (1991), McNeill (2003), and Mosley (2010).

<sup>10</sup> Massa (1991) classifies the political sphere as a distinct, fourth category that also includes changes in the institutional structures.

the history is about the attempt of humans and societies to use and manipulate, control, and govern rivers to their own benefit while, at the same time, depending on the materiality of these rivers for their existence and well-being (e.g. Uekötter 2007). Rephrased by Peter Coates (2013, 9) as narratives of the “river of life,” “river of riches,” and “river of recreation,” the recognition of the politicized nature of this hydro-social relationship and its related power struggles could suggest the addition of a *river of contention*. A third, broad class of river history themes could be labeled as the cultural approach or Coates’ “rivers of inspiration” (2013, 9)<sup>11</sup>. The cultural approach focuses on the history of ideas, conceptions, institutions, values, and consciousness (Mosley 2010; Tvedt and Coopey 2010).

These thematic categories are by no means exclusive or strict since the literature on river histories shows that, to better understand the complexity of interactions between human societies and fluvial systems, we need multiple and novel scholarly approaches. The question is how to combine known source material in new ways and ask new questions to attain a comprehensive and interdisciplinary synthesis (Saikku 2005, p. 10; see also van Dam & Versteegen 2009). Bridging the methodological and discursive differences of the various scholarly fields linked to it and an integration of methods suggests combining historical analysis with various forms of quantitative, qualitative, and spatial analysis. This, however, poses a methodological challenge, since it inevitably means broad disciplinary diversity is needed.

While many river histories are still written by historians, the scholars contributing to river history literature show a great variety in their academic background, which is reflected in the different emphasis in individual works: geography, political science, art history, STS-studies<sup>12</sup> and engineering sciences, to name some examples. The ecological or natural environmental approach to river history is concerned with the physical data and ‘facts’ of the natural sciences. The integration of this approach with context-bound socio-historical analysis shows the kind of broad interdisciplinarity that has gained growing resonance within the scholarship. The integration of natural sciences, such as river morphology, hydrology, biology, and historical analysis has been most specifically performed in work around the Danube<sup>13</sup> and the Hudson River (Henshaw and Dunwell 2011). Utilizing tools such as GIS-based reconstruction (Hohensinner et al 2013) and 3D-modelling of fluvial landscapes (Hohensinner and Jungwirth 2016) allows for the development of new methodological approaches to investigating the rivers. Another example is the reconstruction of historical material fluxes with methodology applied from industrial ecology to investigate the pollution history of a river (Barles 2007). These kinds of examples show how interdisciplinary breadth enables to reach conclusions that most probably would not be possible with the traditional methodological toolkit of the historian.

The abovementioned Barles’ (2007) study of the Seine is an example of how river history scholars have taken advantage of heuristic metaphors and conceptual tools provided by the natural sciences (see Mosley 2010, 3). The concept of metabolism, applied to the historical analysis of urban-riverine relationships, was originally borrowed from biology.<sup>14</sup> Similarly, Pritchard (2011) uses the metaphor “confluence,” originating in river hydrology, to theorize and integrate science and technology studies and history research in fluvial contexts. These studies show the usefulness of

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<sup>11</sup> Henshaw (2011) used the term “River of Inspiration” in his work on the Hudson River somewhat earlier but lacked more detailed elaboration on the nature of this “inspiration”.

<sup>12</sup> Science, technology and society-studies, which itself is an interdisciplinary subject.

<sup>13</sup> Special Issue of Water History Vol 5, issue 2 (2013).

<sup>14</sup> Developed by urban environmental historian Joel Tarr 2002, and applied by e.g. Barles (2007; 2012) for the Seine study and Gierlinger et al. 2013 for the Danube.

unifying concepts as tools for fruitful interdisciplinary integration. Introducing new, bridging concepts as analytical tools highlights both the benefit for the individual study as well as the possibilities of interdisciplinary approaches in river historiography.

The adhesion of river histories to their physical, social, and cultural spaces encourages scholarship that concentrates on place-bound case studies. Each river is different; each region is distinctive and each period involves the uniqueness of both material and societal structures that influence human action and inaction. Hence, river histories are highly context-dependent, and each river possesses its “organic integrity and distinctive identity” (Coates 2013, 10; see also Lehmkuhl 2007; Garcier 2007). River history scholars have followed Carl Ritter’s advice from 1865: rivers “must be examined singly; they must be studied in their real character and individuality” (Ritter 1865, cited in Coates 2013, 10). River history scholars have, however, recently made attempts to transcend the individuality of rivers by looking increasingly at multiple rivers for similarities, parallels, differences, and exceptions. Comparative approaches to river histories are becoming more common, and they are adding valuable new insights that benefit the field as a whole.

Compilations of individual studies within a defined geographical domain represent a general form of comparison and a valuable starting point for deeper insights. *Rivers in History* (Mauch and Zeller, 2008) presents a diverse range of perspectives within North American and Western European river histories. In the edited volume *Urban Rivers* (Castonguay and Evenden 2012), individual river studies with the same intercontinental range are arranged under three focused themes within a more specifically urban-riverine context (industrialization and sanitary reform, spatial structures, and environmental policy) that allows in summary for more comparative insight within the publication.

A narrower thematic focus of the research question and a fixed selection of the specific cases often enables a deeper comparative analysis. Then, an elaborate reasoning for choosing the cases under scrutiny is required for a convincing probative value. Cusack (2010) chose five rivers (Hudson, Seine, Volga, Thames, and Shannon) in early nationalizing countries with distinct geographical, cultural, and political realms for her analysis of rivers as cultural actors. The unifying concept of “national riverscapes” allows her to trace the role of the rivers in the production of nationalistic images and realities. By contrast, Coates (2013), on the other hand, has consciously omitted in his work the over-exposed nationally iconic rivers, but presents in his juxtaposition six rivers (Danube, Spree, Po, Mersey, Yukon, Los Angeles River) with very distinct characteristics.<sup>15</sup> Similarly, Winiwarter et al. (2016)<sup>16</sup> chose four European riverine cities with differing pre-industrialized fluvial settings, and investigate how different patterns of urban transformation has led to similar outcomes. These rigorous examples show how multiple-case studies can transcend the traditional single-case type of river history and offer powerful insights into more general tendencies of human-river interactions without omitting the understanding of the particularities of each context.

Whether the comparison is based on similarities and shared features, or differences between the cases, the initial identification of relevant cases remains a difficult task for the scholar. It’s similarly challenging to balance the contribution of each case to provide powerful overall conclusions. While the difficult task of comparing the cases of multiple rivers seems to suit the exploration of parallels and differences between cases, the analytical depth of the comparisons

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<sup>15</sup> In a rare example from non-western rivers, Hoag (2013) uses the insights from several African rivers (Rufiji, Gambia, Volta, Niger) to explore and explain continuities in African development and the related colonial legacies.

<sup>16</sup> The adjacent articles on each case comprise a special edition of *Water History* 8(3): 2016.

increases with a more focused scope that is plausible when we compare only a two cases. For instance, Zeisler-Vralsted (2008, 2015) looks at the transformations of the Volga and the Mississippi and describes modernization narratives with striking similarities despite two competing and contrasting political and ideological spheres. As an opposing example, Closman (2008) builds his exploration of the effectiveness of different legal frameworks and river management schemes through the comparison of two very similar industrial settings and waterways in Europe (Yorkshire and Ruhr).

The number of scholars who take up the challenge of comparative research has been rare until recently. Many river histories, however, benefit from an implicit comparison. Evenden's (2004) study focuses on the Fraser River in British Columbia, but his research questions were guided by the notion of its exceptionality in comparison with other rivers. One aspect of the Fraser's exceptionality is that it was never harnessed for hydroelectric production like so many other rivers. Similarly, Bonnell's (2014) analysis of the Don River and its valley near Toronto benefits from the description of its counterpart, the Humber River and Valley, which had a very different historical trajectory. While still focusing on one individual river, implicit comparative framing may guide scholars to new kinds of research questions and perspectives and expose otherwise obscured, alternative explanations for the identified similarities and differences between rivers.

As Tvedt and Oestigaard (2006, p. xv) have noted, the peculiar duality of water as a fundamentally unchanging natural character (H<sub>2</sub>O) and its constant flux and ever-changing role and form lends it a unique potential for comparative studies. The increasing number of comparative river histories signals, in my opinion, a new phase with great potential in river historiography. The essence of historical research is the notion of places, events, and processes being unique, and in-depth studies concentrating on individual rivers with their unique settings are necessary. But comparative history, explicit or implicit, can offer scholars many valuable ways to advance in the future. As the multiple thematic foci present in river history scholarship indicate, there are many possible combinations of shared or dissimilar aspects of human-river interactions that provide fruitful starting points for comparative river history studies. The identification of parallels and differences between rivers allows us to draw novel insights and conclusions that would otherwise remain obscure. Comparative histories are particularly valuable for the investigation of transboundary and transregional phenomena when we study global river histories in the repertoire of river history scholarship. Moving across regions and scales is a challenge for river history scholars, especially when river histories are discussed in the frame of spatiality.

### **Spaces and scales of river histories**

The German word for river, *Fluß* is related to *fliessen* (i.e. to flow), and hence underlines the movement of river water in space and between places. The modern English word *river* has its origins in the Latin word *riparia*, which signified the banks of a river and its bordering function as a geomorphological formation. The riverbed creates a boundary between water and land and marks off aquatic and terrestrial ecosystems. These two very different underlying perceptions of the role of river in space (or spatiality of rivers) is the inspiration and motivation for the following discussion of how these different spatial viewpoints have been captured in river history literature. As will be shown, these spaces are fluid and complex, which highlights the significance of different spatial scales in river history.

The spatiality of rivers appears in research in numerous different ways, and, for this article, I will discuss a twofold spatial dimension in river histories. First, through their water flow rivers connect different places. The spatial scale of connectivity may range from localities in immediate vicinity along the river, to connecting places along the river through seas across the globe (see Schner 2005 on the Thames). The connecting property is highlighted in the context of rivers as waterways, transport routes for people, goods and ideas, and recipients and dispersers of waste discharges. In the latter case locations along the river that otherwise might have no other links, become “involuntary neighbours” (Kinnersley 1988, 2; see also Luckin 2001, 209). The spatial connections created through rivers create spatial shifts of material consequences in human-induced transformations along the river.

River history narratives abound with examples of up- and downstream communities experiencing the riverine connection in both quantitative and qualitative terms. Summitt’s (2013) history of the Colorado River tells the story of irrigation and diversion leading to diminishing flow and finally a dried-out channel downstream. Morris’ (2012) study on the Mississippi shows how drainage constructions and persistent reliance on levees for flood control changed the flow patterns of the river with fatal consequences downstream. Both human-induced scarcity and excess water have been carried downstream by the connecting character of rivers. The most typical qualitative issues have occurred when the connected communities’ rely on rivers as sources of water supply and sinks for human sewage and industrial wastewater (see e.g. Armstrong et al. 2009; Bagle 2012; Schönach 2015). River histories show convincingly that the repeatedly occurring human tendency to treat riverine *uses* and *problems* in isolation and without regard to this connecting property of rivers worsens existing problems, or creates new ones.

As places of intensive material fluxes, circulation, and river-based infrastructural networks, cities have had—especially during industrial era—a dominating role in the inter-locational dependencies mediated through rivers. Hence, the role of rivers as connectors between cities and countryside has been highlighted in recent river histories (see Castonguay and Evenden 2012a). These narratives add to the evidence that urban growth and the related urbanization of river water, as described by Swyngedouw (2004, 35-38), has increased the ecological footprint of urban water through a geographical expansion of the transformative impact on faraway places and environments. Acknowledging this riverine connectivity encourages the scholars working on *urban rivers*, a notably popular focus in recent river historiography, to reappraise the spatial boundaries of their work.

The obvious counterpart of the perception of rivers as connectors is the notion of rivers as separators and dividers. Rivers can thus be perceived and examined as borders and boundaries, obstacles and barriers, natural and human-made. Exemplary case studies highlight rivers as physical and concrete boundaries, but also as ideological and mental boundaries that are contested and politicized. Bridges and tunnels are examples of human methods to eliminate the river as a natural barrier while existing at the same time as politicized constructions with spatial and social implications of their own (Winiwarter et al. 2013; Rueck 2011; Fougères 2011). While the seasonal variation in river appearances is often neglected in literature, the notion of ice cover as the natural and concrete carrier of cross-river interaction or the autumnal freezing time and spring breakup of ice as an insurmountable obstacle for crossing is a reminder of the diverse and seasonally changing patterns of riverine spaces (see Armstrong, et al. 2009, p. 72).

Correspondingly, international border and transboundary rivers are powerful examples of the multidimensional nature of rivers as both concrete and negotiated boundaries and connectors.

Transnational negotiations on rivers—in modern terms, environmental diplomacy—as the political bridge attempting to overcome disputes over competing interests along transnational rivers, is exemplified in the cases of Northern Europe (Berg and Jakobsson 2006), the US-Canadian border, and the St Lawrence Seaway and Power Project (McFarlane 2014). Another example is the Colorado River stretching over seven US states and Mexico, with both countries reluctant to share the scarce water resources of the over-allocated river flow (Summitt 2013). Each is fused together by nationalistic and high modernist aspirations. Since over half of the world’s population lives in international river basins (Tvedt 2004, 2), the influences of these dynamically shaped spaces are enormous and deserve careful exploration.

While the above-mentioned examples show relatively peaceful evolved cases of river disputes and solutions, river historiography shows how the impact of warfare is important in the creation of riverine boundaries. When the nationally important Finnish River Vuoksi became, because of war, a transboundary river with Finland’s former enemy, the Soviet Union, the mental image of the river among the Finns also changed. (Korjonen-Kuusipuro 2011; Korjonen-Kuusipuro and Kohvakka 2010). Peter Coates (2013) provides another example of the creation of a striking ideological and violent physical border along the Spree in the divided post-World War II Berlin. Along with the growing interest in the environmental history of warfare in general (see Russell and Tucker 2004), these examples of the changing riverine boundaries as consequences of military conflicts suggest a growing scholarly interest in the explicit historical role of rivers in wars, and the effect of military conflict on rivers and riverine spaces.

A sharp conceptual division of rivers as connectors or separators presents only one side of the story. A river can be characterized through both properties simultaneously. The example of the Irish River Shannon shows how a river contributes to the physical and mental division of space while at the same time creating spaces to anchor collective memory. The East-West division of the country along the river is associated with an important role in shaping the geography of Irish nationalism and the creation of myths in support of it (Cusack 2010, chap. 6). Furthermore, sharp divisions are challenged, since the borderline between the river and riparian area is fluid. Natural river beds are a meandering and historically changing systems of morphological formations directing water flow. Rivers are parts of complex hydrological systems, where flood plains, marshlands, and deltas are elementary parts of river dynamics (e.g. Blackbourn 2008; Lübken 2012; Morris 2012). Thus, rivers are simultaneously creators of social and ecological spaces that are in constant flux. Several river histories attempt to capture the dynamics of these fluid spaces. The history of the Mississippi with its floodplains and battures as “spaces in between” (Morris 2012) reveal the long-standing inability of humans to come to terms with the blurring of the boundary between land and water, dry and wet. The riverbanks and waterfronts are special spaces that reflect the changing conceptions of human control over the ambiguous encounters of water and land (see Kelman 2006, Kibel 2007).

In summary, river history scholarship has presented rivers as both uniting and separating agents in terms of space, but also in ideology and national identity. This analysis underlines the notion of spaces as a historically changing product of material forces as well as political, economic, and cultural contexts. Several scholars have adopted the view of the spaces thus created as social and material constructs that are historically re-created through human-nature interactions where the social, physical, spatial, and historical are intertwined (e.g. Kelman 2006; Korjonen-Kuusipuro 2012). Instead of being objective, stable, and static background settings, these spaces are fluid and blurred, which complicates the mutual coexistence of humans with their rivers. River history narratives tell

the story of humans attempting to come to terms with this blurriness and make sense of and control these riverine spaces. This tendency of river history scholars to capture the varying conceptions of the spatiality of rivers and the related challenges is also reflected in the different scales applied to river history research, which I will discuss next.

One obvious and traditional scale for river histories is the national context, which remains an important frame for river histories. The often nationally determined political and legal context is a crucial component in the river's fate over time (McNeill 2003, 35). Also, regarding some rivers as *national rivers* reflects their role as carriers of national qualities and repositories of collective memories, which in turn craft national identities, often attached to nation-states (Cusack 2010; Zeisler-Vralsted 2015). Examples of rivers that have been attributed strong national sentiments and ideological currents include the German Rhine, the French Rhône, the socialist Volga, or the capitalist Mississippi (Cioc 2002; Cusack 2010; Pritchard 2011; Zeisler-Vralsted 2008). These politically and ideologically entangled spaces are in constant flux of negotiation and imagination.

The jurisdictionally determined scale has some analytical advantages, but it is challenged as well. River histories provide a typical example of how the nation-state is not always a reasonable starting point and geographical scale for a river history. While some rivers serve as naturally determined borders between nation-states, their watersheds show no correspondence between hydrological and historically shifting national and political boundaries. River valleys are natural, hydrologically determined spatial scales that are commonly used as reference points for river histories. The advantage of a river valley approach is that it encompasses the variety of "ambiguous spaces" (Bonnell 2014, xxvi) along the river, without constraints of cultural, political or land use boundaries (see also Tvedt 2004). However, multilevel, man-made modifications to natural water systems shift these hydrological boundaries and make them likewise historically changing and varying. Through infrastructural systems, such as hydroelectric power production and irrigation, the spatial expansion of the riverine hydrological regimes is widening far beyond the natural watersheds. As Richard White (1995) demonstrated in his work on the Columbia River, the river's sphere of influence ranged nearly across an entire continent, and, as Matthew Evenden (2015) shows regarding the hydro-electric development of Canadian rivers as part of World War II efforts, even between continents.

Besides the horizontally aligned scales, human-river interactions play out also within less obvious physical spaces. Disputes over the water resources of the Colorado River between the US states and Mexico, as described by April Summitt (2013), were directly connected to groundwater issues as well. Such disagreements show that vertical spatial dimensions can also be significant in understanding the complex influences of transformed riverine water systems. Another dimension is highlighted in the case of the Congo River, where the river's direct influence extends to vast sub-oceanic areas hundreds of kilometers away from the estuary and thus impacts marine ecosystems and climate parameters on a global scale (Showers 2009). The spatial scales of river histories fluctuate in regard to horizontal and vertical extent, between physical and cultural, social and ideological dimensions and from natural entities to man-made constructions. These entangled different scales are thus forming a complex hydro-social configuration that shapes the human–river interactions.

As shown through the briefly presented examples in this section, the role of rivers in spaces, but also the fluctuations in the spaces of rivers constitute a vastly complex dimension in river history research. The merit of recent scholarship not only reveals the range of complexity of river histories but also introduces and develops conceptual tools, such as riverscape (Cusack 2010) and national

river (Pritchard 2011) to analyze this history. These are important advances since discernment and analytical power regarding spatial complexities will certainly be needed in future scholarship. The challenges and uncertainties related to, for instance, global climate change with its potentially vast consequences to hydrologic conditions and human livelihoods on all levels from local to global, will necessitate conceptual tools to capture the relationships as they materialize among others as new complexities of space. Irrigation schemes in arid regions, yet another re-evaluation of hydropower potential in a context of ever more pressing global energy questions, and increasingly unpredictable fluctuations between terrestrial and fluvial systems are examples of questions over riverine spaces and spaces of rivers that scholars will need to address. While the western world alone shows a wide diversity of future challenges, these questions become even more pressing when a more global perspective is applied. The necessity to think of rivers globally, against the very tradition of a single-river, watershed-wide scope will become more pronounced in the face of future challenges.

In summary, river histories are a showcase for understanding that the intertwined nature of multiple spatial conceptions and the scales of both human action and natural processes are necessary for an adequate analysis of historical change in human-river relations (cf. Saikku 2005, 15). The fluid and mobile character of water as the essence of rivers make them powerful agents with a potentially vast spatial extent. These powers are core parts of river histories, as will be discussed in the following section.

## **Rivers and power**

River histories deal with the reciprocal relationship between humans and their rivers. While rivers create opportunities, and impose limits, they don't determine the eventual paths that are taken (Saikku 2005, 12; Armstrong, Evenden and Nelles 2009). Competing claims are made, and the various actors aspire to different kinds of rivers at specific times and places. Water is political, the riverine waters are political, and the human-river interactions are political (cf. Swyngedouw 2015), which brings explorations in river history down to questions of power.

Rivers can be interpreted as arenas where three kinds of power relations are being experienced, created, contested, negotiated, and lived. First, through their physical characteristics and natural processes, rivers have the power to influence their on-going interchanges with humans. Hence, contemporary scholars tend to acknowledge the active role, or agency, of rivers. The rivers' agency is understood as the capacity to influence processes and outcomes (Saikku 2005, 12; Coates 2013, 25). Second, through the intentional use of technology (in the widest sense) humans have the power to modify the appearance and functionalities of the river to their benefit. The complexity of human-river interactions emerges from the duality of human activities on a river, which at the same time is a hydrological system with its conduct remaining, to some extent, out of human control. Third, rivers are arenas for power struggles between different human groups about the control and use of the river.

Environmental river histories dealing with the fates of rivers during the nineteenth and twentieth centuries can hardly avoid considering the various forms and the unprecedented extent to which humans have physically transformed their rivers. The aim has been to use them to serve better the

needs and wants of humankind, combined with an aspiration to control the riverine powers with potentially harmful effects on human prosperity.<sup>17</sup>

The industrial age in this context has been marked by urbanization, industrialization, and increased economic activity. All these features are connected to the emergence of new, often networked, technologies related to energy, sanitation, industrial production and irrigation, waste (waters), and transportation (e.g. Tarr 2010). As river historiography convincingly shows, rivers have had a crucial role in enabling and constraining these developments.

Environmental river histories of the industrial age tell numerous stories of humans working on rivers to efficiently and economically lucratively utilize them for their benefit. Rivers are functionally complex systems, and the possibilities for material utilization are manifold. A river's recoverable function, moreover, can be based on its very concrete physical features, the water resource itself, the potential energy stored in the flow, its dilutive capacity, and its thermal economy.<sup>18</sup> River water can carry material and, hence, rivers function as routes and conveyors of people and goods. The utilization may also be based on the biological features of the river and ultimately the riverine ecosystem. These riverine benefits include aquatic life forms, especially fish, as a resource. The recreational uses of rivers are usually based both on their physical features and the more abstract aesthetic experiences that they provide.

To take advantage of these riverine qualities for different purposes, humans have altered rivers and their waters in different ways:

- changing the quantity of water in different places and times (damming, irrigation, channelization, and rectification)
- modifying the composition and quality of the water (sanitation, waste disposal, agricultural runoff, temperature), and
- reworking the river-shore interface (harbors, docks, levees, channelization).

Besides the functional alterations through human agency, these power manifestations have altered the sensations of rivers: the visual looks of the riverscape and the smell and sound of the river. In the monitoring reports of the Finnish River Vantaa large scale pollution was pointed out through more than 50 characteristic odors, such as “ammonia, medical smell, tar, machine oil and offal” (Schönach 2004, 34). As for the changing soundscapes of rivers, the “silenced river” epitomizes the effect of damming (McCully 2001).

These transformations are essentially connected to the development and utilization of different technologies. While technology is driven by human intent, however, it is also conditioned by the hydrological laws of the riverine system. Technology creates a junction or point of interaction between humankind and nature and, hence, has a crucial role in creating riverine socio-natural spaces. Technology is a tool to master, not just nature (here: rivers), but the human-nature relationship (Pritchard 2011, 244; Williams 2010, 20-21). For instance, Sara Pritchard has underscored the

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<sup>17</sup> Several histories of earlier periods show that human induced alterations of riverine environments are by no means an invention of the late modern period nor exclusive to the North American or European spheres (see Wilson 2010; Hoffmann 2010). However, the scale and geographical extent of human activity constitute a landmark of the modern exploitation of rivers.

<sup>18</sup> While the issue of cooling water used for the generation of electricity has been addressed by some scholars (e.g., White 1995, 81; Pritchard 2011), it has so far remained a somewhat neglected topic in environmental river histories.

importance of technology's role in the myriad transformations of the French Rhône by labeling it an enviro-technical landscape (Pritchard 2011). River histories abound with narratives of human power over the rivers, enabled by technology. The taming, fettering, or harnessing of rivers all tell the tale of subjugation to human power and technological triumph.

Scholars have applied several different concepts as tools to describe and analyze this human power and the activities imposed on rivers. The concept of “industrializing of rivers” has been introduced by Eva Jakobsson (1996) for rivers harnessed for hydroelectric power production.<sup>19</sup> She particularly attributes the industrialization of rivers to the breaking of the natural, seasonally variable rhythm of the river and the changes of flow into a rhythm that is dictated by and subordinated to the demand for electricity. Applied in a somewhat wider sense, the concept has been used to describe a “simplified, regulated and disciplined nature” (Pritchard and Zeller 2010, 79) that served as a condition for the industrialization of society from the nineteenth century onwards until the latter half of the twentieth century. This view of the “simplified” river is related to the tendency of humans to disassemble the multifunctional river as individual, service-providing parts (White 1995, 110). Rivers are controlled to gain a maximum of human benefit, and this control is associated with rationality, homogeneity, predictability, normalization, intensity, and large scale (Jakobsson 2002, 44).

While the concept of industrialization of rivers emphasizes the intensity of river transformations, the concept of rivers as (part of) infrastructure highlights the inclusion of rivers as functional parts into a networked socio-natural system that is built for the “smooth functioning” (Collins, Muller and Tarr 2008, 41) of societies, especially cities. Infrastructure is often defined as both the material, hard objects, such as pipes and roads, and the soft, institutional components that support human prosperity. Their task is to control natural processes, extract natural resources, regulate material fluxes, and convey them over distances. Water-related infrastructures are among the most critical for modern societies, with rivers and riverine environments being integral parts of several of these important systems. Rivers as infrastructure embody the use of rivers by humans for different kinds of functions, benefits, and services (Tarr 2002, 511; Doyle and Havick 2009, 350). Achieving the inclusion of the river into infrastructure requires rationalized control and functional management over it (Carse 2012, 540). River history literature shows how infrastructures are built *for* the stabilization of a river and a river is stabilized *for* a smooth and predictable functioning of other infrastructures (Jakobsson 2002, 44; Winiwarter et al. 2013). River management and the adoption of large-scale infrastructures attempt to reduce fluctuations in river functioning and prevent unexpected events.

Mature infrastructures become standardized background processes, taken for granted by the public until the occurrence of failures or even collapse (Graham and Marvin 2001). Such infrastructure failures can be interpreted as the intersections of both human power over the river, and mutually, the independent and natural power of the river to respond to human-induced changes. The inclusion of a natural riverine element exposes the infrastructural system and its engineering logic to the disruptions caused by changes in ecology, flow patterns, and chemical feedback processes (Castonguay and Evenden 2012a, 3). These disruptions, in turn, have had either unintended or neglected and uncontrollable consequences—the “bad habits”<sup>20</sup> of rivers. These “bad habits” are ways

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<sup>19</sup> She credits Ted Steinberg’s (1991) work for influence in the development of the concept.

<sup>20</sup> A panel at the congress of the American Society for Environmental History in 2014 was titled ‘Rivers with bad habits.’

in which the rivers' power is materialized for humans. Floods<sup>21</sup>, ice jams, excessive silting, fish deaths, algal blooms, and the bad smells of the river water are examples of riverine powers with negative consequences for human utilization of the river.

The reciprocal relations of human and riverine power indicate the duality of non-human nature and human-made culture. While environmental history aims to investigate the changes in the interactions between nature and man, river history scholars tend to advocate the impossibility of separating these two. The most common point of reference for scholars is Richard White's phrase describing the Columbia River as an "organic machine," where the human and the natural, the mechanical and the organic are merged into a hybrid (White 1995). Other recent conceptualizations that attempt to grasp this inseparable nexus include rivers as socio-natural sites (Winiwarter et al. 2013) and enviro-technical systems (Pritchard 2011).<sup>22</sup> These concepts share the common core of an intrinsic connection of the ecological and human realities; however, they differ in their emphasis on the role of technology as part of the culture side of this dichotomy. While these differences justify the introduction of new concepts, they have been applied to only a few studies and their potential as a more widely useful analytical tool within the scholarship remains uncertain. The variety of these concepts show there is potential for conceptual development of the field and, in my opinion, this would be one strand of research which would benefit from comparative studies. Applying the concepts to different kinds of cases would enable the testing of their analytical power.

The methodological challenge is to introduce and apply these concepts effectively in an analysis that aims to increase our understanding of a duality while attempting to bridge this very same duality. The success of river history scholars in overcoming the nature-culture dichotomy has been questioned. Per Jakobsson (2008, 59), every contemporary environmental historian is too deeply rooted in twentieth-century ideological views of the river and thus, often inadvertently, embodies these experiences in his or her research.

The third kind of power relations prominent in river histories are the ones between human groups. Environmental river histories abound in stories of struggling groups and coalitions with varying practical preferences and ideological mindsets about the preferred use of the multifunctional rivers (e.g. Winiwarter et al. 2013, 109). A typical pattern is shown in Bagle's (2012) case from Norway, where economic profit from industrial utilization of the Akerselva River clashed with the municipally led initiatives of using the river as a water supply. On the other hand, as Ute Hasenöhr's (2008) study shows, even a jointly shared idea of a river use can produce tensions between different groups. At the German Lech the conceptions of an ideal waterscape for tourism differed radically between conservationists who advocated a "natural landscape" of the river and the energy companies that promoted mass tourism at the reservoirs of the dammed river. However, as Matthew Evenden (2004) shows in the dispute about the free-flowing Fraser contrasted with damming it for hydroelectricity, the outcome of the debate not necessarily proves the supremacy of one group, rather than the entangled nature of riverine uses with other hydro-social configurations. The salmon didn't win the struggle, because its proponents were more powerful than the hydropower advocates, but through the realization of power generation goals elsewhere. Politicized rivalry on the desired uses of a river reflects the respective values shared by different interest groups. Societal and context-bound

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<sup>21</sup> See special issue of *Environment and History* 19 (2), 2013.

<sup>22</sup> See also Reuss and Cutcliffe 2010.

power relations are determined by choices made from colliding ideas and are indicative of the dominant currents within the human-river interactions. During the nineteenth and twentieth centuries, the industrial scale and the increasing diversity of ways of river exploitation intensified conflicts about the actual and potential uses of the river (Pritchard and Zeller 2010, 79). As David Blackbourne (2006, 7) puts it: “The human domination of nature has a lot to tell us about the nature of human domination.” The hydrological sphere of a river transforms it into a field of competing interests and their advocates, and implementations of acts of power.

These acts of power, the ability to shape outcomes, draws attention also to the opposite—those without power, the subjugated and suppressed. The viewpoint of the (stereo)typical main owner of transformative power, such as the white male engineer, has been diversified in river historiography and the perspective of the deprived has become more pronounced. Examples include the African slaves on the Mississippi (Morris 2012) and the barge haulers and serfs on the Volga (Zeisler-Vralsted 2015). The inclusion of the less-dominant and less-powerful groups into the river history narratives is an indispensable step forward that allows us to see the contentious power manifestations that ways shape the lives and fates of people and their environments. Considerations of dominance and oppression are closely connected to questions of (environmental) justice, which as an independently strengthening scholarly field is influencing a widening scope of river history scholars.<sup>23</sup>

Human-river interaction implies constant processes of socio-environmental change that, per Swyngedouw (2004, 23), are neither socially nor ecologically neutral, but thoroughly permeated with power relations, be they material, discursive, economic, political, or cultural. These processes create a constitutive power geometry that shapes and conditions the eventual outcomes. Hence, the three modes of power manifestations are at the core of the interdisciplinary integration of natural scientific inquiry and socio-political analysis. The multidimensional power relations materialize on different levels including individuals and coalition groups, institutions, and the workings of the material world (here: the river). These processes are neither static nor straightforward but interrelated, recurrently negotiated, politicized, and highly contextual.

### **Temporal dimensions of river history narratives**

Rivers have been given distinctive human-like characteristics, and they are viewed as biological entities that have a life and a life story to be told (Cioc 2002). For this reason, river history research has been recently portrayed as *river biography*. However, while birth and death are inherent in human biographies, so far the temporal dimensions of a biography have been scarcely explicated within the concept of river biography.<sup>24</sup> Inspired by this observation, I will discuss in more detail some temporal

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<sup>23</sup> For an introduction to the roots and differences of historical environmental justice scholarship, see Massard-Guilbaud & Rodger 2011). Questions of justice has resonated in river history scholarship as well, and the perspective of the less-powerful in these struggles has become more present in the narratives. This is a significant theme in river histories of the non-western world, as well, as colonial legacies remain influential in present day challenges.

<sup>24</sup> With the exception of Mark Cioc’s “Eco-Biography of the Rhine” (2002), scholars have passed over specifying what they mean, or what temporal specifications they attribute to ‘river biography.’ See the section entitled “River biographies” in Tvedt and Jakobsson 2006, where river biography as a term is neither introduced by the editors nor by the individual contributors; see also Coates 2013, 86.

dimensions of river histories, with special attention to the beginnings and especially the closures of river-history narratives.

River histories trace back changes in the human-river interactions both over time and at specific times (cf. Pawson and Dovers 2003, 66). Per Ursula Lehmkuhl (2007), the development of the field of environmental history has contributed to a more pronounced understanding of different intertwined historical time dimensions, which also implies shifts in the respective foci of analysis. River histories show the simultaneous presence of different temporal layers, ranging most importantly from momentous triggering events occurring in a specific time to historical trajectories over time (Saikku 2005, 15). These Braudelian categories, however, need to be complemented with nature's time, which in the case of river histories mean cyclically occurring, tidal and seasonal times, or other rhythmicities, such as sporadic, recurring floods and droughts.

The multiple temporal layers of river histories materialize in trajectories and snapshots intertwined in the analysis and interpretation. Whether of non-human or anthropogenic origin, pronounced or unexpected events that mark ruptures in the customary flow of a river's course are often fruitful starting points for a river biographer.<sup>25</sup> River histories of the nineteenth and twentieth century abound with large, industrial scale transformations of rivers that flourish at such junctures. They can be interpreted as constitutive events or event series that mark turning points in the river history or momentous indicators that reveal more fundamental developments on longer timescales. Examples range from legal debates (Kelman 2006) to large-scale river engineering projects (Cioc 2002) or natural hazards (Lübken 2014), such as weather extremes (Morris 2012) or landslides (Evenden 2004). When interpreting the beginning of a new era, the historian balances between giving weight to certain ruptures at a specific time and the historical developments whose origins must be interpreted in a longer-term perspective (Winiwarter et al. 2013; see also Cioc 2002, 36-37). While these alternate beginnings of river biographies require a justification from the researcher, determining the ending of a biography is even more challenging.

As William Cronon (1992, 1352) points out, the *outcome* of history is inherently bound to choices made by the researcher. Influenced by the time frame chosen for the research, the perceptions regarding the initial and final *scenes* of the narrative and the evaluation of the directions of environmental transformations, the interpretation of sequences of historical events may vary significantly. One branch of river history narratives studies a degraded river as an outcome of human influences on it. Histories dealing with the nineteenth and twentieth century reflect the unprecedented scale of human-induced alterations in rivers and abound with destruction narratives, which will be scrutinized more closely in the following paragraphs.

Eva Jakobsson (2008, 55-56) has described two types of "Histories of the Dead River." The first type, the "Exterminated River," appears as a physically and ecologically degraded river. For instance, Marc Cioc has in his river biography defined the *death* of the Rhine when the biological habitat became degraded to an extent that it had lost its previous capacity to sustain the life of other organisms (Cioc 2002, 4, 6). The second type, the "Conquered River" narratives are based on the perspective of exploitative action and human domination over nature.<sup>26</sup> This kind of categorization has two different foci: the process of degradation and the degraded outcome.

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<sup>25</sup> From a practical point of view, sudden exceptional events are also often the historical repositories of evidence and important source bases for the analysis.

<sup>26</sup> Jakobsson 2008, 55-56, see the references for examples.

While the process of riverine degradation can successfully be interpreted in the context of the human power to transform it, as discussed in the previous section, the resulting state of a river is interesting as a river biography or narrative closure. Recent historiography shows that a more nuanced perspective of the exterminated river is possible. As will be shown, besides a river *lost* in a physical sense, its loss can also be abstract. A very concrete loss of a river occurs in histories, where the river has been eliminated of defining elements, both the (visible) boundary between land and water and the flowing water. Rivers that have been covered and canalized into subterranean concrete have disappeared in a visual sense. Examples include such rivers as the Los Angeles River (Gumbrecht 2000; Coates 2013), the Senne and Maelbeek in Brussels (Deligne 2012), and rivers in Nantes, France (Massard-Guildbaud, forthcoming). Dammed rivers lose the dynamic character of flowing water and by implication, the essence of rivers, and are converted into standing reservoirs, the “antithesis of a river” (McCully 2001, 10).

While still existing as flowing water in a riverbed, a river can be lost for people on a psychological level due to new spatial arrangements. Accessibility and visibility for people and the distance of riverine functions from lived experiences are important factors contributing to the loss and discovery of rivers. A mental loss of a river can result if access to it is cut off by a motorway on the river bank (Backouche 2008) or through the creation of new concrete and mental borders following a military conflict (Korjonen-Kuusipuro and Kohvakka 2010). Also, the functional simplification of a river to a one-purpose object and its transformation into infrastructure, as discussed in the previous section, has been identified as a mental loss of a river (see Rosenberg 2015).

The death or loss of a river, whether because of pollution, construction work, or people giving new meanings to the river, is an example of the *declensionist narrative*, which has, however, been increasingly critiqued and challenged.<sup>27</sup> Following Cronon’s (1992, 1352) notion of the problematic tendency of straightforward degradation narratives excluding some twists in the plot, reducing river transformations into mismanagement by humans is a stale simplification that obscures the much more complex and intertwined historical, environmental, social, and political circumstances and decisions that are part of human-river interactions. (Hoag 2013; Coates 2013, 21) The partly one-sided interpretations of all environmental transformation as harmful has been contradicted in several river histories that highlight the positive and beneficial sides of river transformations (see e.g. Blackbourn 2006; Armstrong, Evenden and Nelles 2009).<sup>28</sup> And finally, some scholars critique the idea of calling a river *dead*. As stated by Richard White (1995, 59), “it’s not dead, only altered.” No matter how great the alterations, the river remains a hydrological entity that embeds natural and human-made features that interact in a continuous and recurrent process of re-creation, which implies that the river’s life story, the biography, does not have an ending. The temporal scope of environmental river histories broadens towards the multiple futures of rivers.

In the prosperous regions of North America and Europe, these futures are negotiated and re-imagined in a context of stricter clean water regulation, the end of the “Big Dam Era,”<sup>29</sup> increasing

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<sup>27</sup> This critique concerns the field of environmental history. See e.g. McNeill 2003, 35.

<sup>28</sup> This is an important feature in non-western river historiography as highlighted by Hoag (2013) in a study on African rivers. The many sides of river management to development of the global South is a topical theme.

<sup>29</sup> The Big Dam Era is often said to have started with the construction of the Hoover Dam (early 1930s) and it depicts the construction boom of large dams in North America, which lasted until the second half of the twentieth century (see e.g. Melosi 2011 for more). The (global) history of damming rivers is a vast and complex field as such, and deserves its own review.

environmental awareness, and an ideological shift raising the environmental values of rivers and riversides comparable with economic development.<sup>30</sup> The view of rivers as economic assets has broadened from a widely dominant “industrial mindset” (Collins, Muller, Tarr 2008, 55) into a perception adding more pronounced recreational and aesthetic values to rivers. Together with possibilities for people to reconnect in new ways with their qualitatively improved and more accessible water courses, these societal changes diversify the discussions about rivers and highlight new balances (and new kinds of clashes) between different future uses of rivers (Armstrong, Evenden, Nelles 2009). The improved water quality of many rivers has enabled the onset of ecological recovery, and humans have a major role in aspiring, enabling, and accelerating this recovery. This transition appears in river history literature as well.

In river historiography, most attention has been directed towards the physical state of the river, its rescue, recovery, and improvement. Scholars using phrases such as revitalization, rebirth (Gumbrecht 2000), and resuscitation (Cioc 2002, 4) of rivers have thus emphasized both the devastating, near-death conditions of rivers, but also the beginning of a new, environmentally aware era. Restoration in general and river restoration, in particular, are the institutionalized ways to reframe the *degradation* story of river histories. Restoration of aquatic environments is defined as the “re-establishment of important missing or altered processes, habitats, concentrations and species [...] to attainable approximation of pre-disturbance conditions” (Cooke et al. 2005, 14). This definition already includes several focal points that challenge environmental river historiography.

Most obviously, ecological restoration activities are entangled with the questions of adequate reference points in the past and for the future. It has been argued that there is no baseline of riverine naturalness—a moment untouched by human-induced disturbance. The conservationist ideal of a pristine nature that should be re-made is only a selected state between sets of human interventions, where the more distant point has acquired a “patina of naturalness.” (Blackbourn 2008, pp. 25)<sup>31</sup> This issue has inspired discussion on the essence of river restoration. It has been argued that perhaps the question is more about *re-designing* rivers to improve their aesthetic appeal and their ability to serve ecological and human functions than just attempting to re-create a river’s natural setting.<sup>32</sup>

Besides the ecological and natural scientific, restoration is a highly complex objective that includes significant economic, political, and ideological considerations. Some environmental river histories have grasped this view of river redesign and widened the examination of river restoration into approaches that could be labeled as the cultural restoration of rivers. Exemplified by discussions about the accessibility of rivers and the waterfront or the imagery of a river as a personally meaningful, aesthetic, recreationally valuable water body, scholars have used phrases like the “reinvention” (Collins, Muller and Tarr 2008) or the “reconquering” (Backouche 2008) of the river. As the twenty-first century has been proclaimed the “Century of Restoring Earth” after centuries of degradation (Hall 2005), it is just to presume that future environmental river histories will also include a variety of (re-) interpretations of rivers and their historical, contemporary, and future place amidst human societies.

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<sup>30</sup> I refrain from labeling the current time as post-industrial since, despite some shifts in emphasis, industrial production and the exploitative use of rivers remains a backbone of economic success in the global north.

<sup>31</sup> For the historical baseline problem of ecological restoration in general, see e.g. Hall 2005.

<sup>32</sup> McCool 2010, 281-282. This also comes close to Sara Pritchard’s (2011) emphasis on “light-green” efforts to reconcile technology and nature.

The various re-phrasings imply a reference to past conditions and situations, whether material or cultural and remain subject to different interpretations. Evidently, the remade or invented river is always a new river, bridging its inseparable ties to past developments and creating preconditions for future developments. There is always a new story to be told in the context of new kinds of human interests shaping their interactions of humans with their rivers (cf. Blackbourne 2008), which also pinpoints the future-oriented relevance of river histories.

## Conclusions

River histories tell stories about the fascinating and ever-changing water bodies winding across diverse landscapes and settlements. As Peter Coates (2013, 23) remarks, “Rivers are works in progress.” And so are river histories. They increase our understanding of the relationship of humans to their natural and imagined environments and the role of rivers in shaping human action. Similarly, as Eric Swyngedouw (2015, 227) has associated water and its flows as symbols for society, river histories have been equaled with microhistories of environmental history (Blackbourn 2008, 12). The fascination and relevance of river histories lie in these fluctuating socio-natural, hybrid, water bodies that allow us to make interpretations about humankind and patterns of socio-natural change between and across societies as large (cf. Saikku 2005, 15). The human-river relationship has been proclaimed a microcosm that mirrors our values, beliefs, lifestyles and our relationship with the past (McCool 2012, xiv).

The importance of rivers to humans and human understandings of their pasts is reflected in the large amount of river histories that continue to be published. While the popular histories on rivers serve the public in a valuable way by connecting them with the past of rivers, their environments, and cultural significance, the scholarly works on river histories show an increasing amount of sophistication in terms of concepts, approaches, and methodologies that add to the academic rigor of an entire scholarship.

In this article, I reviewed a selection of recent literature investigating European and North American rivers within three broad thematic frames. The spatial, temporal, and power dimensions were chosen to capture the nature of rivers as hybrid socio-natural entities, blending the natural and cultural and hence covering broadly intersecting thematic frames within river history literature. The application of these the thematic frames helps us to identify and analyze some contemporary currents in the historiography. However, the choice of these themes shows at the same time how intimately intertwined the temporal, spatial, and power-related dimensions are in river history narratives. This review’s limited scope on a few selected themes of solely European and North American rivers invites future writing that covers other relevant or emerging themes and perhaps most importantly, focuses on other, non-western regions. The field needs more contributions that together capture the contemporary status of the dynamic river historiography and will allow us to form a global overview of the scholarship and our riverine pasts.

The dynamic stage of contemporary river historiography and the analysis presented in this review allows some speculation about the future of river historiography. The emergence and maturation of environmental history as a broad and inclusive scholarly field has influenced the river historiography especially in raising the physical environment into a more pronounced position for interpreting the evolution of human-river interactions. Given the rise in popularity of environmental

history,<sup>33</sup> it seems plausible to expect this tendency to continue. Mirroring the broadening scopes of environmental history in general, perspectives on the role of rivers in regards to military conflict and questions of justice have gained attention among river history scholars as well. These insights have great potential to strengthen and diversify the field. While river historiography is greatly influenced by the currents of environmental, historical scholarship, the opposite kinds of influences are likewise decided. River histories contribute in an important way to the overall advances in the scholarly field of environmental history. The two noteworthy trends identified in this review—the widening interdisciplinary breadth of river histories and the increasing efforts to conduct comparative studies—are examples of tendencies with great potential to contribute positively to the future of the scholarly field of environmental history.

A broadening of the interdisciplinary range of river histories can encourage novel combinations of new methodologies to river histories, and thus diversify the field and its findings even more in the future. Research on individual rivers and river historiography, in general, should happen in the context of a broad scholarly understanding about the need to develop and enhance interdisciplinary inquiry to find new tools to grasp the increasing complexities of the world. Co-authoring publications is indicative of the level of interdisciplinary breadth. Since individual researchers cannot usually master several disciplinary fields in an adequate manner, research integrating the natural and social science/humanities will inevitably rely on the contributions of several scholars. I assume that the river history scholarship will witness more of this kind of interdisciplinary cooperation in the future.

Another probative yet challenging approach that is becoming more common is conducting comparative river history studies. While studies focusing on individual rivers are still important, there are illuminating new insights to be gained through multiple-case approaches that so far show a varying degree of sophistication in regard to comparative depth. Comparative river histories have a great potential to contribute to the field in terms of the questions to be addressed and the findings to be revealed. This could be particularly significant in future works that will seize upon the challenge of conducting comparative studies on a global level.

Following the apparent shift in Europe and North America towards new forms of appreciation for rivers and riverscapes, most notably discernible through the increasing endeavors in river restoration and accessibility (e.g. dam removal), the messages delivered through river histories is growing in importance. Greater understanding of the multiple histories of human encounters with their rivers can ideally provide tools for imagining possible futures. More inclusive processes where the diverse interests of human groups are considered and the natural limitations set by rivers and their hydrological logic acknowledged may perhaps lead to the creation of hydro-social realities that sustain a polyphonic human–river relationship. Providing new insights to these futures of rivers and the peoples bound to them is a challenge and opportunity for contemporary river history scholars.

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<sup>33</sup> Environmental history has been found to be to single most increased sub-field within history during the past 4 decades, see <http://historians.org/publications-and-directories/perspectives-on-history/december-2015/the-rise-and-decline-of-history-specializations-over-the-past-40-years>.

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