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## Source-To-Sea River Journeys and their Politics of Scale and Knowledge Production: Examining Colorado River Expeditions from the United States through Mexico

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**ABSTRACT:** In this article we examine an increasingly popular form of water activism – the source-to-sea river journey and its associated narrative – in order to understand its proliferation and implications for water discourse. We focus on source-to-sea journeys on the Colorado River because of the robust dataset that this river provides. On the Colorado, we find that, in addition to producing a compelling adventure tale, the source-to-sea journey has evolved to become an unofficial methodology for assessing the cumulative environmental impacts of human development on the river. This bootstrapped methodology challenges the epistemological status quo in the Colorado River Basin by establishing an alternative way of knowing the river and a new type of river expert. It does this by repositioning the observational scale at which the river is known: downscaling the resolution of environmental knowledge production to the scale of the individual body, while also upscaling it in extent to the scale of the full river basin. We discuss the implications of these journeys and narratives for water discourse, with an emphasis on what they render visible and what they leave invisible.

**KEYWORDS:** Knowledge production, scale, narrative, activism, Colorado River

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### INTRODUCTION

In the realm of water politics and activism, there is one narrative that seems to be everywhere lately. It is the story of the source-to-sea river journey. Typically told by a single intrepid adventurer, the narrative describes an expedition along a river from headwaters to sea, undertaken to better understand the river's current condition and tell the rest of the world about it. The growing popularity of this narrative caught our attention in relation to the Colorado River, which in the last decade has been the subject of six of these widely publicised journeys. The narratives have appeared in the form of books and films published by major media outlets, and more recently, dedicated expedition websites linked to social media platforms (see Figure 1 and Table 1). But this particular endeavour is by no means limited to the Colorado River. Even a cursory Internet search quickly reveals similar stories of recent source-to-sea journeys on every continent but Antarctica. At least 71 of them have been conducted on 49 different rivers, large and

small, over the last decade.<sup>1</sup> While some of these expedition stories are cast simply as adventures, many indicate a desire to use this particular type of river trip and storytelling to inspire change in human-water relations. From the Ganges to the Gambia and the Thames to the Tuolumne, these source-to-sea river narratives appear to be proliferating – in some cases supported by environmental organizations, grant programs, or news outlets (e.g.; National Geographic, n.d.; Rivers for Change, n.d.; Nuchols, 2014; Schlegel and McDonald, 2014, Sutter, 2014; Riverkeeper, 2019), and in other cases pursued by individuals who either cobble together a mix of sponsors, secure a publishing deal, and/or self-fund their expedition (e.g.; Hanson, 2014; Hutton, 2011; Schlyer, 2018; Weymouth, 2018).

The proliferation of this particular narrative is counterintuitive for two reasons. First, source-to-sea expeditions are difficult. Travelling the length of any river is arduous, time-consuming, and sometimes dangerous. Second, for most rivers, somebody else has already completed the whole endeavour, eliminating any new claim to the fame of a first descent. And yet these excursions are being conducted – and widely broadcast – anyway, sometimes repeatedly on the same river. This puzzle inspires our overarching research objectives, which are: (1) to try to understand the proliferation of these source-to-sea journeys and stories by examining expeditioners' reasons for conducting them, and (2) to consider their implications for water discourse by contemplating what they bring into view and what they overlook. We pursue these objectives by analysing source-to-sea stories about the Colorado River because it provides a robust and coherent dataset of ten of these narratives published across more than 100 years (see Figure 1 and Table 1). Moreover, the fact that six of these stories have been published in the last decade alone is especially useful for interrogating their proliferation in this river system. Based on a close examination of these stories, we push back against the simple reasons for their existence and repetition. For example, it would be easy to conclude that their circulation is a product of the political economy of publishing (because adventure stories are engaging, they are likely also to be profitable). Or these stories could be spreading because of the tidy narrative framework the source-to-sea journey provides storytellers (it does offer a built-in beginning, middle, and end, as well as a clear protagonist and obvious conflicts). While these factors are surely at play, they alone do not seem sufficient to explain the effort that goes into source-to-sea journeys and stories, or their frequent repetition and retelling.

Based on our analysis, we argue instead that these journeys keep being repeated because they produce more than just a compelling narrative. On the Colorado River at least, the source-to-sea journey has become a *methodology* – a particular way of measuring and evaluating environmental change in the river basin. This methodology has grown increasingly salient with time as the river has become increasingly overdrawn and source-to-sea travellers have become more concerned as to the reasons why. We argue further that these narratives' biggest consequence for water debates – both in policy settings and in academia – is the way they challenge long-held norms of water knowledge production. As will be discussed in more detail below, these journeys and associated narratives attempt to re-scale the production of water knowledge by making the case that rivers are best understood by individual travellers who are capable of seeing a river 'whole' by inspecting it from headwaters to terminus with their own eyes and bodies. This approach runs contrary to the ways of knowing rivers that dominate water politics today. On the Colorado River, for example, the knowledge that circulates with the most authority in decision-making contexts is produced by federal agency scientists and engineers who divide the river system into segments based on entrenched legal boundaries and assess them using large-scale

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<sup>1</sup> To illustrate, a search for media about source-to-sea expeditions conducted in English in February 2021 via Google, Google Books, and Amazon (books) yielded a total of 83 expeditions on 53 rivers worldwide since 2000. The vast majority of journeys are more recent (72 expeditions since 2010). These results are not exhaustive (e.g., YouTube was not included, all results are influenced by search engine algorithms, etc.). Due to space constraints, we list only the rivers here. Contact the first author for a table with citations. North America (Altamaha, American, Anacostia, Androscoggin, Chattahoochee, Columbia, Connecticut, Delaware, Feather, Hudson, James, Klamath, Lamprey, Los Angeles, Merced, Missouri/Mississippi, Mokelumne, Rio Grande, Russian, Sacramento, Salinas, San Joaquin, Truckee, Tuolumne, Yuba, Yukon); South America (Amazon); Africa (Congo, Gambia, Nile); Europe (in United Kingdom: Bristol Avon, Conwuy, Derwent, Don, Fal, Forth, Frome, Mersey, Severn, Tees, Thames, Trent, Tyne; in continental Europe: Danube, Dordogne, Volga); Asia (Amur, Ganges, Mekong); Oceania (Murray, Torrens, Barwon).

hydrological models. The challenges that source-to-sea narratives present to this epistemological status quo are interesting in their own right, and also for the lessons they offer for water governance scholarship. The politics of scale have become a lively theme in the water literature. This research has demonstrated that the geographic scaling of water governance (e.g. via the river basin, province, nation, etc) has major implications for power dynamics, institutions, social networks, and ecologies – and vice versa (Swengedouw and Heynen, 2003; Perreault, 2005; Norman et al., 2012; Cohen and Bakker, 2014; Norman et al., 2018). Relatively unexamined, however, is the relationship between scalar politics and a thing that ties into all of these social dynamics: *the production of water knowledge*. These stories encourage us to pay attention to implications of scalar politics for fundamentals of how water knowledge is produced and by whom, as well as what that knowledge reveals and obscures.

The paper proceeds in six parts. Next we review and engage with major concepts in the literature on the politics of scale and the politics of environmental knowledge production. We then provide essential Colorado River context. A brief methods section follows, which informs an analysis of source-to-sea journey narratives and a discussion of our findings. A conclusion section wraps up the paper.

Figure 1. Covers of the source-to-sea books, films, and websites examined in this study.



**LITERATURE REVIEW**

Literatures about environmental discourse, the politics of scale, and ways of knowing water provide useful context for investigating the proliferation of source-to-sea stories and their implications for water discourse. Turning first to the environmental discourse literature, one would find it generally unsurprising that many of these source-to-sea journeys and narratives have an environmental agenda. It is well known that environmental narratives are crucial for defining environmental problems and framing potential solutions, in part because they simplify complex socio-ecological realities into accessible storylines (Hajer, 1995; Forsyth, 2003). It is also clear that environmental narratives do important political work by unsettling and/or reinforcing existing power relations and by helping to draw together networks of environmental activists (Peet and Watts, 1996; Leach and Mearns, 1996; Castree and Braun, 1998; Ingram et al., 2013). What is much *less* clear about the emergence of source-to-sea narratives as a form of water-

oriented environmental activism is how they engage with geographic scale, and to what effect. By choosing to venture from source-to-sea, all of these storytellers have explicitly selected the same geographic scale in which to operate (that of the river basin). Because source-to-sea narratives have not previously been analysed, it is unknown what this choice of scale means for how these narrators come to know rivers and how they talk about them. The relationship between scale and knowledge is also an underexplored area of water theory. As will be discussed below, the water governance literature has recently recognized the importance of scale in water politics (Norman et al., 2018), and the importance of different ways of knowing in water politics (Mukhtarov and Gerlak, 2015), but the connections between these dynamics have not received as much attention.

### Scale and water governance

Questions of geographic scale have become increasingly important to scholars of water governance in recent years, prompted in part by a desire to better understand efforts afoot in many parts of the world to reform water management by re-scaling it to align with watershed boundaries rather than political jurisdictions. A key initial insight of this growing literature is the confirmation of human geographers' well established conclusion that scale should never be taken for granted as simply a given.<sup>2</sup> In other words, the many scalar constructs that are active in the way people think, act, and govern are fluid and contestable, and are the products of political struggle and other historically contingent social processes that deserve careful attention (Smith, 1992; Delaney and Leitner, 1997). In water terms, hydrologic scales such as the watershed are not apolitical even if they are 'natural' and, relatedly, adopting the watershed scale as a unit of governance is not in itself a panacea for water policy problems (Molle, 2009; Cohen and Davidson, 2011; Norman et al., 2012; Cohen and Bakker, 2014; Huesker and Moss, 2015; Norman et al., 2018). Moreover, because water dynamics are not limited to the watershed scale, concepts in addition to 'the watershed' are important for understanding contemporary water relations in all their complexity. These include the 'hydrosocial', which acknowledges that water is simultaneously a material and social entity (Linton, 2010; Linton and Budds, 2014); the 'waterscape' and 'hydrosocial territories' which call attention to linkages between people, water, technologies, and ecologies rather than scale per se (Budds and Hinojosa, 2012, and Boelens et al., 2016, respectively); and the 'problem shed', which aims to describe a geographic area that encompasses a water problem at a decision-making scale that is effective for its resolution (Griffin, 1999; Cohen and Davidson, 2011).

Examinations of how the politics of scale ('scalar politics', per MacKinnon, 2011) play out in natural resources issues have also revealed that scalar constructs shape political power and participation (Jones, 1998; Kurtz, 2003; Swengedouw and Heynen, 2003; Moore, 2008; Neumann, 2009). This is often because of the ways that scalar constructs work to highlight some things (or people) and minimize others in environmental debates and governance processes. Inherent to scalar politics are issues of who is centred and who is marginalized in governance processes, and consequently, what problems are rendered visible or invisible (Sze et al., 2009; Budds and Hinojosa, 2012; Cohen, 2012; Cohen and Bakker, 2014). In sum, the politics of scale are at work within water management even in concepts that appear to be neutral (such as the watershed), and they have important consequences for what priorities and relationships are acknowledged in decision-making processes.

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<sup>2</sup> A full review of the human geography literature that theorizes the politics of scale is beyond the scope of this paper, but it has been distilled nicely into the following three theoretical principles by Brown and Purcell (2005): "1) scale is socially constructed, 2) scale is both fluid and fixed; and 3) scale is fundamentally a relational concept". For reviews of the scale debates in human geography published since 2000, see also Marston (2000); Smith (2000); Brenner (2001); Howitt (2003); Sheppard and McMaster (2004) and Neumann (2009).

## Scale and water knowledge

Frequently tied up in scalar politics within water governance, but much less frequently investigated, are questions of how the politics of scale and the politics of knowledge interconnect. The water governance literature has previously recognized that there are different ways of knowing water, such as via direct experience, scientific methods, and/or spiritual traditions – all of which are co-produced with political, economic, and cultural conditions (Birkenholtz, 2008; Bolin et al., 2008; Feldman and Ingram, 2009; Lave, 2012; Linton and Budds, 2014; Bouleau 2014; Mukhtarov and Gerlak, 2015; Kinchy et al., 2016; Cousins, 2017; Sneddon et al., 2017; Wilson and Inkster, 2018). But scant attention has been paid thus far to how scalar politics influence the production of water knowledge (Movik and Stokke 2015; Lukas and Flitner, 2019).

The epistemic moves that accompany scalar politics deserve more attention because knowledge claims are fundamental to the internal dynamics and outcomes of environmental governance (Goldman et al., 2011; Lave et al., 2014), including water governance (Kinchy, 2014; Lane 2014). Thus far underexplored in the water governance literature are questions such as: How do taken-for-granted scalar constructs shape how water knowledge is produced and by whom? How are different modes of knowledge production challenged or reified in political struggles over scale in water governance? And when scalar constructs are contested or reimaged, how does that change what we think we know about water and on what basis? A recent study that asks questions in this vein by Lukas and Flitner (2019) examines how particular understandings of the Segara Ankan Lagoon in Indonesia have been 'fixed' in place by environmental narratives that establish particular scales of observation and intervention as the norm. The analysis focuses on the production of watershed science, revealing how formal scientific data are produced and embraced in relation to scalar discourses. Building from Lukas and Flitner (2019), it is important to also examine how entirely different ways of knowing – e.g.; non-scientific methodologies such as source-to-sea expeditions – factor into scalar struggles over water. We do so here by further deploying the concept of 'scale of observation' (a.k.a.; observational scale), which is central to both the Lukas and Flitner study and ours. We take up observational scale specifically to engage with the ways that scalar politics adjudicate between competing epistemologies of water.

Sayre (2009) defines observational scale per its use in ecology as a matter of determining the *extent* and *resolution* of one's view. Choices in observational scale are extraordinarily influential because they shape what can be asked, and therefore what can be known, about whatever environmental system is under examination. The *extent* of one's observational scale sets the boundaries of the analysis, determining what will be included and what will not. For example, in an analysis of environmental impacts to a river delta, decisions must be made regarding where 'the delta' begins and ends. A more limited extent similarly limits the inventory of influences incorporated into the analysis (biophysical and social), with consequences for the results (Sze et al., 2009). Relatedly, the *resolution* of one's observational scale determines what dynamics will be legible within the geographic area in view. For example, the fine-scale dynamics of urban hydrology would disappear when considered from a regional watershed scale, and vice versa (Bakker, 2009). In other words, patterns that are visible at one extent and resolution may be invisible at another. The influence of observational scale on environmental knowledge production cannot be understated (Sayre, 2009). Consequently, observational scale and power are deeply entwined. For example, the state builds authority in part by applying observational scales (including the observational scale of 'the state'), and then normalizing them such that they become taken-for-granted (Jones, 1998; Bocking, 2004). As a result, issues of observational scale are frequently at the core of environmental debates and activism.

In the words of Lukas and Flitner "scales of observation are themselves contestable, and they play a critical role in challenging established interpretive framings, expertise, and related modes and scales of political intervention" (Lukas and Flitner, 2019: 6). Indeed, environmental activists often work to make new (or at least previously ignored) problems visible by making claims based in alternative observational

scales (Kurtz, 2003; Budds and Hinojosa, 2012). Embodiment – or the physical use of the body in developing knowledge – has been key to some of these alternative ways of knowing and related observational scales. This phenomenon has been most fully described by feminist scholars of science studies, who call into question the validity of knowledge claims made from a disembodied perspective, arguing to the contrary that all knowledge claims are "situated" in social, material, and even biological and physical conditions (Haraway, 1988; Murphy, 2006). Adventure writers have also begun to explore the contrast between embodied and disembodied ways of knowing rivers (Fedarko, 2013). Because the source-to-sea narratives that we analyse are grounded in the physical movement of bodies through a river basin, these stories are especially valuable for revealing how embodiment, alternative ways of knowing, and observational scale intertwine in a water context.

### **COLORADO RIVER CONTEXT**

The Colorado River is the primary water source in the arid American West and northwestern Mexico. These regions rely so profoundly on the Colorado River system that the successes and failures of their economies, cultures, and political systems are fundamentally linked to the status of the river's flows. While the full history of the Colorado River is beyond the scope of this paper, it is important to establish that the time period captured by our dataset includes an effort led by the US federal government over many decades to control the Colorado River's flows via massive dams and water diversions built on the river's mainstem and major tributaries, as well as the development of associated laws and institutions. These institutions include the 1922 Colorado River Compact, which devised rules for how the river would be shared among the seven US states that intersect the river basin (and, later, Mexico).<sup>3</sup> In the present day, the cumulative ecological impacts of development within the Colorado River Basin have been rendered highly visible via the drying of its formerly lush and biodiverse Delta region in Mexico. Since the 1960s, the river has rarely reached its terminus at the Sea of Cortez. The major mainstem US reservoirs of Lake Mead and Lake Powell have also been shrinking visibly over the last two decades due to over-allocation of the river's waters, as exacerbated by an extended drought and climate change. These conditions have prompted the arrival of a new politics of scarcity in the Colorado River Basin, wherein users of the river in both the US and Mexico have negotiated, and continue to update, a voluntary framework for reducing water usage (Fleck, 2016).

A visual representation of the history of the river's development is provided here by way of the map of the basin that is featured on the US Bureau of Reclamation's website (Figure 2). The map is illustrative for basic geographical purposes, and also because it reflects the jurisdictional fragmentation that is common in today's Colorado River discourse and which the source-to-sea narrators aim to unsettle. The map depicts the hydrologic river basin in the United States (US) and the urban and agricultural regions outside the hydrologic river basin that receive Colorado River water via large-scale water diversions. Several well-known jurisdictional boundaries are also clearly depicted. These include the border between the US and Mexico, areas in the US designated as the Upper and Lower river basins by the 1922 Compact, plus state lines, the names of several large water projects, and key river-reliant cities in the region. Notably, Mexico and the river's Delta were seldom included on earlier USBR maps, which historically have ended abruptly at the US-Mexico border.<sup>4</sup> Still missing from the present day basin map are sovereign tribal lands, even though several Native American tribes have federally recognized reservations in the basin and rights to Colorado River water.

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<sup>3</sup> Well-known Colorado River histories include, but are certainly not limited to Stegner (1953), Worster (1985), Reisner (1986), and Hundley (1991).

<sup>4</sup> Rare exceptions to this were maps that showed Mexico and the Delta because they were making the case for river development near the US-Mexico border (Porterfield, 2018a). An even more recent USBR map improves upon the one pictured here by showing the boundaries of the hydrological basin extending into Mexico (Fleck, 2015), but it is not included here because it is not yet prominently displayed on USBR websites.

Figure 2. Colorado River Basin.



Source: Map available online from the US Bureau of Reclamation ([www.usbr.gov/lc/images/maps/CRBSmap.jpg](http://www.usbr.gov/lc/images/maps/CRBSmap.jpg)).

It is also noteworthy that the most recognized map of the Colorado River Basin was authored by the Bureau of Reclamation because it reflects federal agencies’ continuing influence over the production of Colorado River knowledge. The basin’s most famous scientists and engineers of the late nineteenth and early twentieth centuries – John Wesley Powell, Robert Brewster Stanton, E.C. La Rue, and others – all were in the employ of the US government in various capacities for the purpose of colonizing and developing the river basin (Stegner, 1953). As the twentieth century progressed, Colorado River expertise became ensconced primarily in the Bureau of Reclamation, which presided over the vast majority of water development projects in the arid American West and continues to manage most of the region’s large-scale water infrastructure (Kuhn and Fleck, 2019). These epistemological conditions are to be expected. In natural resources management, it is common for federal agency scientists to play a

particularly formative role in knowledge production because of their "capacity to shape basic categories of thought and language and thereby to influence people's perception of what exists, how it should be understood, how it can be controlled" (Bocking, 2004: 22). In the water governance context in particular, federal agency hydrologists and engineers have been especially crucial for establishing now taken-for-granted truths, observational scales, and associated power relations (Molle, 2009; Linton and Budds, 2014; Sneddon, 2015). Today, the Bureau of Reclamation's authority in Colorado River knowledge production is demonstrated by the fact that it spearheads major studies about the river and its management and several large-scale hydrologic models of the river. These models include, for example, the Colorado River Simulation System, which is used to simulate river flows and reservoir operations decades into the future for long-term planning purposes, and the Mid-Term Probabilistic Operations Model, which is used for simulations within a one- or two-year planning window (USBR, 2020). The contemporary source-to-sea narratives challenge this framework for knowledge production in ways that we will discuss below.

## METHODS

This analysis of source-to-sea journey narratives is focused on the Colorado River. Our inclusion criteria were two-fold. First, in order to qualify as a source-to-sea narrative, each journey must have captured the vast majority of the river, running from somewhere in its upper headwaters to its delta. Second, because the popular telling of these narratives is essential to their political salience, the stories must have been widely broadcast via popular media. We did not include private expedition journals in our analysis. These two criteria yielded a larger dataset than anticipated. In total, we found ten source-to-sea narratives published over more than 100 years (1914-2019) (Table 1).

Table 1. Colorado River source-to-sea journey narratives included in the dataset.

Year	Title	Author	Publication format	Primary mode of travel
1914	<i>Through the Grand Canyon from Wyoming to Mexico</i>	Kolb, Ellsworth	Book + Film	Boat
1946	<i>The Colorado</i>	Waters, Frank	Book	Unclear
1968	<i>A River No More: The Colorado River and The West</i>	Fradkin, Philip	Book	Unclear
1997	<i>River: One Man's Journey Down The Colorado, Source to Sea</i>	Fletcher, Colin	Book	Boat
2010	<i>Running Dry: A Journey from Source to Sea Down the Colorado River</i>	Waterman, Jonathan	Book	Boat
2011	<i>Chasing Water</i>	McBride, Peter	Film	Boat
2012	<i>Remains of a River</i>	Stauffer-Norris, Will and Podmore, Zak	Film	Boat
2017	<i>Where the Water Goes: Life and Death Along the Colorado River</i>	Owen, David	Book	Rental car
2019	<i>The One River Expedition</i>	Fiebig, Mike and Jenny	Website + Social Media	Boat
2019	<i>Ana's Way with the Colorado River</i>	Zirner, Ana	Website + Book*	Boat

\*Zirner's book is forthcoming and was not included in the dataset.

The temporal span of the dataset from 1914 to 2019 is impressive because it demonstrates the tenacity of the source-to-sea journey over time. To assess why these environmental narratives were produced, how they work, and what they mean for water discourse (Mels, 2009), three researchers conducted a close reading of them with attention to several features: each traveller's purpose for conducting their source-to-sea journey, the obstacles each traveller highlighted on their expedition, and how each journey concluded (physically and in terms of a takeaway message). In addition to these a priori categories, we left room for emergent variables. The research group closely read each narrative and qualitatively coded for the features mentioned. We then discussed each narrative and our coding to ensure consistency and reliability. The lengthy timeframe of our dataset allowed assessment of the changes in the narratives over time, as well as what remained consistent among them. This was done by comparing the coded variables across stories. Selected quotes included in the results are representative of the patterns we found.

## RESULTS

### Overview of the dataset

The ten Colorado River source-to-sea narratives that make up our dataset are similar in many ways, and different in others (Table 1). The bulk of the source-to-sea stories appear in the form of full-length books published by popular presses, though documentary films and Internet platforms have become increasingly common since 2010 (see Table 1 and Figure 1). The narrators' starting points differ because the Colorado River has two major upper tributaries (the Green River in Wyoming and the Upper Colorado River in Colorado), and the river's 'real' mainstem has been the subject of historical dispute. The narrators use different forms of transport. One narrator travels primarily via automobile, two narrators use mixed transit strategies and rarely discuss them, while the rest mostly move via different types of watercraft – rafts, kayaks, and dories – and call upon other modes of travel when they must (e.g. by foot, hitchhiking). Their emphasis on the importance of traveling with the river by watercraft occurs primarily in narratives published in the latter half of the dataset. This coincides, particularly on the Colorado River, with the growing voice of the whitewater recreation sector in river management in recent decades, as well as improvements in gear that make this type of river trip more feasible (Fedarko, 2014; Porterfield, 2018b). The significance of these choices will be discussed in more detail below. Most of the narrators of these stories are established authors or filmmakers. The amateur storytellers in the dataset tend instead to be experienced boaters. An evolution in authorial perspective is also obvious. After an initial first-person account published in 1914, authors shifted to favour histories written in a more omniscient tone, and then returned to first-person narration in the late 1990s as memoirs boomed as a genre (Yagoda, 2009) and later as the growth in storytelling platforms on the Internet made it easier to publish first-person adventure stories.

### From adventure to method: The evolving purpose of the source-to-sea journeys

The Colorado River is more than 1,400 miles long and drains a largely unwelcoming terrain of high mountains and deserts, so it stands to reason that any journey along the river's entire length would need to be motivated by a meaningful purpose. We assess river travellers' motivations primarily because they provide a window into the reasons why source-to-sea journeys and narratives are proliferating. The goals stated by the narrators are revealing because they demonstrate that most of these narratives are not merely empty action stories, and also because they evolve with time. In brief, the source-to-sea journey does not begin as a methodology – as a series of steps for assessing and diagnosing the river's cumulative environmental problems – but it becomes one over time. The river traveller's purpose starts out in the early twentieth century as a desire to introduce the river to the rest of America while enjoying a fun adventure. The young photographer and early Grand Canyon tourism entrepreneur Elsworth Kolb marks the beginning of the dataset and also the most light-hearted approach to source-to-sea adventuring with

his book *Through the Grand Canyon from Wyoming to Mexico*, published in 1914.<sup>5</sup> In its early pages, Kolb declares that what he is after is "a pictorial record of the entire series of canyons on the Green and Colorado rivers... a record of the Colorado as it is, a live thing, armed as it were with teeth, ready to crush and devour" (Kolb, 1914: 17-19).

While documenting the river 'as it is', the Kolb journey foreshadows change through encounters with dam engineers, miners, and ranchers – although these meetings did not phase the author when they occurred. The major transition point in the purpose of the source-to-sea journey comes in between the 1946 publication of *The Colorado* by writer Frank Waters and the 1968 book by journalist Philip Fradkin titled, tellingly, *A River No More*. The gap of more than two decades between these two books is the second longest hiatus in our dataset. The gap also coincides with the period known as 'the Big Buildup' of the Colorado Plateau (Wilkinson, 1999) – a timeframe in which massive infrastructural development of large hydroelectric dams, highways, coal-fired powerplants, mines, and suburbs turned the region from largely undeveloped desert to a modernized and heavily populated destination. During this period the river also saw dramatic changes by way of the Colorado River Storage Project, an enormous federal water development effort that included six major dams and reservoirs built in the Upper Basin on the river's mainstem and major tributaries (USBR, 2018). These dams were constructed in addition to the existing Hoover Dam, which set records for its size when it was built in the 1930s (Worster, 1992). By the time Fradkin published *A River No More* in 1968, the modern American environmental movement had begun and the primary goal for Fradkin's journey had become increasing public awareness of, and participation in, how the river's waters were being used. The preface to his book concludes with: "For too long, a narrow group of men has distributed the ultimate source of water in the West with a diminishing wisdom. It is my hope that from a widened debate fair and rational solutions will emerge" (Fradkin, 1968: xxiii).

The journey's shift toward an environmental assessment methodology developed more fully after the 2000s. This timeframe also marked the beginning of a serious (and ongoing) period of drought in the basin. By the time well-known National Geographic author and adventurer Jonathan Waterman published the story of his source-to-sea journey in 2010, its early pages lamented the river's "overdrawn" status and framed Waterman's purpose as an effort to diagnose the river's problems and develop a prognosis for its future. He writes in the early pages of his book: "I wanted to let the water carry me from source to sea so that I could understand the extent of the crisis, get to know the river, rethink my family's water use, and see what might be left for the future" (Waterman, 2010: 10). A similarly well-known environmental author, *New Yorker* staff writer David Owen, repeated the journey for a 2017 book aptly titled *Where The Water Goes: Life and Death on the Colorado River*. In doing so, Owen (2017: 8-10) went one step further in establishing journey-as-method by making the case for universalizing the approach, saying:

I had decided that a useful way to think about water issues of all kinds would be to trace the course of a single river, to see where the water came from and where it went. The Colorado provides an especially useful introduction to water issues because we literally use it up.

Owen's emphasis on the fact that "we literally use [the river] up" is illustrative. The reality that the river's waters no longer reach the sea became particularly compelling for river travellers in the 2000s and beyond. Tellingly, many authors' narrative starting points changed as well. Rather than beginning with a high mountain headwaters scene, latter narrators foreshadowed the end point of the dry Delta at the beginnings of their source-to-sea stories and in the titles of their published works (e.g. Waterman's *Running Dry*). From the start of the journey, the focus is on its disappointing ending. Said Owen in his introduction (2017: 9):

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<sup>5</sup> The Kolb brothers also memorialized the Grand Canyon section of their journey by being the first ever to film it with a newly invented motion-picture camera.

My journey ended in Mexico, in a truck belonging to someone else. In that truck, a Mexican environmentalist drove... me across an expanse of sand to a point where the river ceased to exist. Where had the water gone? By then, I had a pretty good idea.

The ontology of the river – what the river *is* – is also reworked as river travellers' journeys take on the trappings of environmental assessment over time. Beginning with Fradkin in 1968, the Colorado River is reframed as a "plumbing system", a metaphor that carries on throughout future source-to-sea journeys and is popular in regional water discourse to this day. Wrote Fradkin: "The complex of dams, reservoirs, tunnels, and canals spreading out from the Colorado River system to embrace much of the West has become the most complicated plumbing system in the world" (Fradkin, 1968: 42-43). For some, the plumbing metaphor is merely an abstraction until the source-to-sea journey makes it real. Filmmaker and photographer Pete McBride suggested as much in the first minutes of his documentary *Chasing Waters*, which placed him in the dry river Delta, slogging along by foot through mudflats and sand dunes with all of his paddling gear on his back. "A friend once told me that this river is just a Western plumbing system, nothing more", he said, adding: "I didn't really understand what he meant at all until I marched 90 miles across this forgotten, ancient landscape – this dry river cemetery" (McBride, 2011).

In summary, the source-to-sea adventurer's purpose evolves with time. As the Colorado River changes, the river travellers' overarching goals shift from the relaying of an adventurous overview of the river in the early twentieth century to – 100 years and one 'Big Buildup' later – standardizing an approach to understanding the reasons why the river runs dry before reaching its natural terminus in the Sea of Cortez. Put another way, the river travellers' goals are essentially the questions they are asking and answering through their journeys and published narratives. These range from a simple "can I do this?" at the beginning of our dataset to eventually asking "why the Delta is dry and what might the future might hold for a once-mighty river and its human and non-human dependents?"

### **An unofficial methodology: Reworking observational scales and knowledge politics**

The remainder of this analysis will focus on the narratives published after the 'Big Buildup' of the Colorado River Basin and the initiation of the modern environmental movement in the US, from Fradkin (1968) onwards, in order to examine the politics of scale and knowledge production that have emerged as the narrative has evolved into a methodology of environmental assessment. Concentrating on the latter narratives also means emphasising the journeys that operate by way of watercraft. Of the eight narratives since 1968, seven travellers incorporate some amount of boating into their excursions and five commit to boating exclusively unless prohibited by river conditions. In addition to their travels along the river's mainstem, most narrators also depart the river channel at key points to see where its waters are being diverted to. In general, the trend toward rafting or kayaking down the river parallels the rise of the whitewater recreation industry on the Colorado River, which has grown steadily in its economic and political influence since the 1950s (Fedarko, 2014; Porterfield, 2018a). It also has ramifications for observational scale. The physical effort that it takes to travel with the river's flows and along its full length has the effect of simultaneously downscaling and upscaling the status quo observational scale at work in the Colorado River basin by downscaling in *resolution* to the scale of the individual body, while also upscaling in *extent* to the full river basin. This combination of observational scales has important implications for what can be asked about the river; it also challenges dominant ways of knowing the Colorado.

#### *A particular observational scale: Scaling down and scaling up*

The very nature of the source-to-sea journeys sets up the river traveller to learn about the river in personal terms, which scales down knowledge production to the level of the individual body. The storytellers venture from headwaters to delta largely alone or with a partner, sometimes stopping along the way to view infrastructure, follow water diversions, and talk with various river stakeholders one-on-

one. Observing the river this way generates a bootstrapped expertise developed from a perspective that is significantly downscaled relative to formal scientific or engineering-based methodologies for knowing the river. The river travellers argue for the validity of this particular way of knowing both implicitly and explicitly. Owen, for example, says that his extensive on-the-ground travels yielded him "a graduate-level education in the river and its many dependents, human and otherwise" (Owen, 2010: 10). These claims to a hard-won and individual-scale mode of learning are just the beginning of the river travellers' assertions of competence. The act of physically traveling the length of the river, they argue, also allows them to see the river in a particularly revelatory way: on the river's own terms.

The recent One River Expedition (2019) travellers argued that accomplishing the trip at a pace set by the river would allow them to "tell the story of the river system more fully" (One River Expedition, 2019: [onerivermanyvoices.com](http://onerivermanyvoices.com)). By committing to moving with the river, they and other narrators aim to execute and promote a particularly embodied way of knowing, one in which the river travellers themselves become instruments of river flow measurement since the obstacles they encounter serve as an indicators of water's presence, absence, and movement. What gets in the river traveller's way – dry sections, dams, more than 350 miles of flat reservoir – is also what gets in the river's way. The watercraft they use serve as key proxies for the amount of water present in the river channel. When the water is high, the river is navigable by a rubber raft, wooden dory, canoe, or kayak. When the water is low, such as in headwaters sections, below major water diversions, or near the Delta, most narrators opt for a packraft – a small rubber raft that can be deflated and folded into a backpack when foot travel becomes mandatory. Boat choice is so important to how these narrators observe the river that the One River Expedition website even includes an interactive map of the source-to-sea journey that highlights the type of boat used in each section ([onerivermanyvoices.com/interactive-river-map](http://onerivermanyvoices.com/interactive-river-map)).

The embodied way of knowing that the river travellers promote challenges dominant ways of knowing the river, which have traditionally been based in water resources engineering and hydrology. Waterman articulates this most clearly when he writes:

Despite the best intentions of Colorado River Basin scientists, number crunching water operators, and reclamationists, the best way to come to grips with a river is to sleep on its banks, swim in it (water conditions permitting), and travel its length no faster than the current. If we can't understand that the river is a living resource, rather than a mere resource, then the delta and its waters from here to the source are doomed (Waterman, 2010: 265).

When he invokes reclamationists and their technical peers, Waterman is acknowledging the long history of river expertise spearheaded by the Bureau of Reclamation. And when he places traveling the river's length "no faster than the current" above "number crunching" as a way of knowing the river, Waterman is critiquing disembodied ways of knowing, such as hydrological modelling. Waterman and other river travellers challenge the river basin's epistemological status quo through the physicality of their excursions: their commitment to seeing the entire length of the river with their own eyes, paddling and swimming in it, and sleeping on its banks. In doing so, these narrators echo critiques of administrative agency science that have been a touchstone of American environmental politics since the late 1960s (Bocking, 2004), as well as feminist critiques of disembodied knowledge production (Haraway, 1988). Their common cause with the latter is somewhat ironic, however, given that the hero's journey narrative framework that they utilize has historically been gendered as a male right of initiation tale (Campbell, 1949) and that, until very recently, the source-to-sea narrators have all been men.

The downscaling that occurs in these journeys and stories is paired with a simultaneous scaling up of observational scale to the full extent of the river basin. For the narrators, following the Colorado from source-to-sea provides a comprehensive view of the entire river – not just individual jurisdictions such as the US or Mexico, or the Upper Basin or Lower Basin, but the whole thing. Filmmakers Will Stauffer-Norris and Zak Podmore (2012) also acknowledge that the source-to-sea methodology brings into view the portions of the river that are not well-known by whitewater enthusiasts, saying: "It's cool to see the

whole course of the river as opposed to just the scenic wilderness parts. It makes you appreciate the river as a whole, more than just the parts that everyone wants to see".

The observational scale of the river basin is not a new one, of course. In fact, the river basin scale is a stronghold for traditional state-driven forms of water knowledge production (Molle, 2009; Linton and Budds, 2014; Sneddon, 2015). On the Colorado, the observational scale of the basin has long been used to plan or justify water development (Reisner, 1986; Kuhn and Fleck, 2019). Source-to-sea narrators re-appropriate this observational scale for different analytical ends, however, by applying the basin-scale perspective to an assessment of the river's environmental condition. Whether intentional or not, each time the river travellers re-appropriate the observational scale of the river basin for themselves, they also step into a very real measurement gap that has long been a subject of debate on the Colorado River. Fradkin is the only author to address this gap explicitly in his narrative. In the updated version of his book published in 1996, Fradkin explains that, in the 1970s, a group of environmental organizations pushed for a comprehensive environmental impact assessment to be conducted on the entire Colorado River. According to Fradkin, the cumulative impact assessment was never pursued because members of Congress were concerned that a basin-scale environmental analysis could potentially pave the way for federal control of the river system, in addition to generating bad news about when water shortages would occur and who would suffer. The absence of a basin-wide environmental assessment meant, for Fradkin, that in environmental terms "the Colorado River system would remain fractured, with no one *official* document stitching it together" (Fradkin, 1996: 12; emphasis added).

Through their journeys and storytelling, the source-to-sea narrators generate *unofficial* documents that attempt to stitch together the river's fragmented jurisdictions and diagnose its environmental problems (primarily water quantity issues, but also some water quality issues) from a basin-scale perspective. In the last two decades, cumulative environmental assessment has become more formalized in the regulatory realm, but the fledgling practice is still troubled by challenges related to scoping, data aggregation, and the logistics of collaboration (Baxter et al., 2001; Canter and Ross, 2010). In a sense, then, the river travellers attempt to devise a methodology for a kind of comprehensive basin-scale environmental analysis that regulators and the scientific community have yet to figure out how to do. A conversation between paddler Colin Fletcher (1997) and a Bureau of Reclamation official puts this in sharp relief. Says the Bureau of Reclamation official, encountered during the latter half of Fletcher's journey: "I guess there's a sense in which you know more than anyone about the river. The whole river, I mean. The river as a whole" (Fletcher, 1997: 309).<sup>6</sup>

### *The obstacles they see and feel: Diversions and the dry Delta*

The river travellers venture to assess the river in a cumulative fashion by physically experiencing all of it, including personally examining the parts of the 'plumbing system' that sit on the river's mainstem, as well as some others at further distances. Pieces of water infrastructure serve as key inflection points for narrators' downscaling and upscaling of observational scale. In terms of downscaling, each obstacle in the river traveller's path is interesting and powerful on its own, as river travellers figure out how to portage around or slog through dams, spillways, reservoirs, canals, and the likes. These individual experiences gain even more importance when they are seen collectively across the span of the entire source-to-sea journey. The full basin perspective is crucial for understanding, in particular, why the river disappears before it reaches the sea and why the Delta region is dry. The river traveller's unique observational scale is also particularly useful for making visible a particular kind of water project that is highly impactful to river hydrology but is sometimes neglected in popular discourse: the water diversion.

In most narratives of the Colorado River basin, dams play a starring role. This is particularly true because of the Hoover Dam's stature as largest-in-the-world when it was built and the Bureau of

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<sup>6</sup> Aside from this interaction and a few other moments of contemplating the river's condition, Colin Fletcher's 1997 narrative stands out as much more self-centered than the rest of the dataset.

Reclamation's export of this high-dam technology abroad (Worster, 1992; Sneddon, 2015), as well as the role that later dams played in catalysing the US environmental movement (e.g. the Glen Canyon Dam, as well as dams that were proposed but never built in Echo Park and the Grand Canyon) (Reisner, 1986). In more general terms, dams are big, they contrast starkly against their natural surroundings, and the reservoirs they create are politically salient; on the Colorado, water levels in Lake Powell and Lake Mead have been visibly shrinking in recent decades to produce stark white 'bathtub rings' that are regularly featured in local and national media. While dams and reservoirs are certainly crucial components of the source-to-sea narratives – reservoir crossing demands days of difficult paddling, followed by portaging logistics – they compete for attention with the typically much less visible points at which major diversions of water occur.

The conspicuousness of water diversions in these stories is apt, as the current politics of water scarcity in the region have increasingly brought into focus the removal of water from the river and its hydrological basin. In the river's headwaters, every modern source-to-sea traveller is crestfallen by a major diversion of water for agriculture that they did not expect to be so large or to come so soon on their journey. On the upper Colorado River in Colorado, this is the Grand Ditch. On the upper Green River, it is the Canyon Ditch. Filmmakers Stauffer-Norris and Podmore, taking the Green River route, pause to document the Canyon Ditch at the foot of the Wind River mountains. Says Stauffer-Norris, "I'm standing here at the first point where water is taken out of the Green River, and a lot of this water is being funnelled into that irrigation canal. Just when we thought we would have enough water to start kayaking [instead of packrafting], a bunch of it gets sucked out" (Stauffer-Norris and Podmore, 2012).

The lower half of the river is the real turning point for the river's flows. Downstream of Nevada, along the California-Arizona border, the river is depleted by three of its biggest diversions: the Colorado River Aqueduct, which sends water to Los Angeles and southern California; the Central Arizona Project, which sends water to Phoenix, Tucson, and other parts of Arizona; and the All-American Canal, which takes water to the Imperial Valley, a major agricultural region in California. For nearly all of the source-to-sea travellers, the latter of these diversions provokes a major crisis. This is where Fradkin begins to talk about the Colorado as "a river no more", referring to it instead as "a mere canal, rising and falling at the whim of remote men" (Fradkin, 1968: 321). In more visceral terms, Stauffer-Norris, standing confounded below the Imperial Dam, says of the highly engineered and significantly shrunken waterway, "There are canals going every direction. It's the first time we haven't known where the river is this whole trip. It should be obvious. What is that? Is that a river, or is that a canal?" (Stauffer-Norris and Podmore, 2012). Ana Zirner of the Ana's Ways Expedition (2019) expresses similar shock. She writes: "Below, there is a little green lake, and then a small creek exiting it shyly in between some high reeds. The Colorado River? Really? The same river that has washed me through raging rapids in Grand Canyon only a few weeks ago?" (Zirner, 2019: [anasways.com](http://anasways.com)).

Ultimately, we see the accumulation of all these diversions as embodied by the river travellers' struggles in the dry Delta region. Getting all the way to – and for some, through – the Delta is the last step in extending the narrators' observational scale to the full river basin. Doing so also requires crossing the border into Mexico, which means acknowledging that the river spans two countries – something upstream US-based river stakeholders have not always done. When narrators after Fradkin (1968) reach the Sea of Cortez, it is by foot because the river ends well short of it. Several choose not to walk all the way across the desiccated Delta because they cannot bear it. Those who do make the trek (Waterman, McBride, Stauffer-Norris and Podmore) struggle intensely, both physically and emotionally, as they cross the barren and labyrinthine landscape. Writes Waterman (2010: 291-292): "The delta cracks up into a crusty old mud puddle that stretches as far as we can see... We scrape the sticky mud off our feet and the rafts, and then we shrug it all back onto our shoulders and walk south. This time the weight is almost too much to bear". When the members of the One River Expedition arrive at the dry Delta, the basin-scale perspective they have developed allows them to see how the Delta got this way: not because of any single water diversion, such as that made by the last dam on the river, but because there have been so

many of them along the river's length. They write: "It is heartbreaking to see the river turn into a tiny stream fed by irrigation runoff, and then end at a concrete and steel plug on the border. Morelos Dam merely finishes the job started far up river by far larger impoundments. It's the thousandth cut" (Feibig and Feibig, 2019).

## DISCUSSION

In addition to examining the evolving goals of these journeys and narratives as a window into why they are proliferating, as well as how their chosen observational scale works and what it brings into view, it is important to contemplate the larger implications of these expedition stories for Colorado River water discourse.

Turning first to what the source-to-sea excursion renders visible, it is important to acknowledge and celebrate that these narratives bring a great deal of complex water dynamics into view for their audiences. This takes hard work by narrators who conduct gruelling excursions down a major river in order to tell others about it. Over time these narrators have established a methodology for the cumulative assessment of the river's environmental health, which either explicitly or implicitly fill a formal measurement gap that has existed since environmental groups failed in their efforts to legally compel such an analysis in the 1970s. In the absence of an "official document", in Fradkin's words (1968), that stitches the Colorado River system together and weighs the sum total of the river's overallocation, the source-to-sea travellers offer an unofficial methodology for such an assessment. In terms of observational scale, the methodology they have developed operates at the extent of the river basin via a source-to-sea transect as well as at the resolution of the individual. At this resolution their own bodies (and, by extension, their watercraft) serve as instruments for measuring the presence or absence of water. In addition, while most narrators spend the majority of their time examining the river's mainstem, several also make the effort to follow major diversions to their off-channel urban and agricultural destinations in order to provide a sense of the larger regional 'waterscape' and/or 'hydrosocial territory' (Budds and Hinojosa, 2012; Boelens et al., 2016).

These journeys have an inherent politics of scale and knowledge to them: the narrators make the case that you cannot really know the river without feeling and seeing it for yourself, and that you can't know the river whole without traveling its entire length. It takes a full in-person trip down the river to experience first-hand the many diversions of water from the river's mainstem that cumulatively presage the dry Delta at its end. The observational scale of the whole river basin matters because it allows the mostly American narrators (and therefore also mostly American audiences) to see the dry Delta region for themselves, even though it has often been forgotten because it lies across an international border in another country (Mexico). It also makes obvious that the absence of water in the Delta is not the product of a single 'bad guy' (common antagonists include California, Las Vegas, the agricultural sector writ large, or the operators of the last dam on the river in Mexico). Rather, it is the product of, in the Fiebig's words "a thousand cuts" that began in the highest headwaters reaches with big ditch diversions to farmers in Wyoming and Colorado (2019). These are all valuable insights about the river's material and social complexities, and they are compellingly packaged into an adventure story that appeals to the general public.

We can identify at least three positive implications for regional water discourse that stem from these narratives, and what they illuminate for their audiences. First, these source-to-sea accounts produce an embodied 'hydrosocial' picture of the Colorado River (Linton, 2010; Linton and Budds, 2014). This is a whole basin view that is both personal and multi-stakeholder, that crosses jurisdictions and international borders, and that illuminates the interlinked nature of the material and social conditions of the river system. This picture illustrates the presence and absence of river flows, and their human-induced causes, in ways not done by dominant modes of water knowledge production such as the basin's prominent hydrological models. Second, the fact that the Colorado River's waters are increasingly overallocated and

that the river no longer reaches the sea has made the river travellers' methodology more relevant with time. From an environmental perspective, it has indeed become increasingly important to ask "where the water goes", in Owen's words (2017), and that is the central question that drives these expeditions. Third, these stories establish and announce a new kind of expert capable of diagnosing the river's problems and, in the words of one Bureau of Reclamation official, speaking for the river "whole" (Fletcher, 1997: 309). These experts are not federal agency water resources engineers or hydrologists. Rather, they are scrappy, self-educated members of the public – likely also to be professional writers and/or boaters – who have patched together an understanding of the Colorado River by asking simple but important questions and toiling daily to see and feel the answers for themselves. This is an important step toward democratizing river expertise.

Of course, all narratives – and, importantly, observational scales – leave or make some things invisible. These invisibilities have consequences for water discourse as well. While the source-to-sea methodology developed through these narratives pushes back against the expert culture of Colorado River technocrats, it creates another somewhat exclusive way of knowing, given that conducting a full source-to-sea journey is out of reach for most readers and viewers. Although the river travellers try to make this point moot by doing the expeditionary work for the rest of us and then weaving together an accessible story about it, they have, in effect developed another expert culture with a high barrier to entry. Perhaps more importantly, the source-to-sea methodology carries with it a politics of passing through that unintentionally obscures some important things simply through the act of perpetually moving forward down the river's mainstem. While many (but not all) narrators actually live in the Colorado River Basin and are committed to making sense of the river's present and future because they are rooted there, their decision to put together a basin-scale perspective demands a continuous plodding forward that keeps them on-the-move in a way that shapes what comes into their view (and therefore also ours). Because their stops are brief, the river travellers are more likely to provide overviews of the river's social and material complexities than to explore them fully. We wish to highlight two resultant invisibilities that are especially consequential: the sidelining of indigenous voices and the absence of political remedies to the river's problems.

The methodology of moving downriver on an expedition has colonial undertones that are never acknowledged by the source-to-sea travellers. The exploration of river corridors has long been a tool of conquest and empire-building, and the Colorado River is no exception to this history (Stegner, 1953; Worster, 1985; Reisner, 1986; Hundley 1991; Wilkinson, 1999). The echoes of imperialism that are inherent in the source-to-sea framework are made more pressing and problematic by the ways in which indigenous voices are sidelined in most of the Colorado River stories. Despite the fact that there are 22 federally recognized Native American tribes in the Colorado River Basin, and that they have direct claims to the Colorado River's flows via senior water rights, mentions of tribes in the source-to-sea narratives are brief. (Fradkin's book (1968) and the *Ana's Ways* blog (2019) are exceptions). When tribes *are* discussed, they are usually being talked about, rather than spoken with or heard from. Moreover, not a single narrator acknowledges the fact that their narratives and chosen observational scale are not novel to Anglo-American storytellers, but rather that they date back to indigenous narratives of the river. For example, the Hopi have their own source-to-sea story, which features a young man who ponders where the river's water's go and embarks down the Colorado River on a quest to figure it out, eventually reaching the sea and the underworld (Balenquah and Talaswaima, 2011).<sup>7</sup> The sidelining of indigenous voices is a longstanding problem in the Basin (Cordalis and Cordalis 2014; Colorado River Research Group, 2016; Karambelkar and Gerlak, 2020). Even as recently as 2012, a major Bureau of Reclamation-led water supply and demand study omitted tribes and tribal water claims (USBR, 2012). Recent tribal interventions respond to this systemic marginalization (Ten Tribes Partnership, 2018). However, the source-to-sea narratives largely represent a continuation of the region's legacy of conquest, rather than a forceful

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<sup>7</sup> See also Fewkes et al. (1894), Mullett (1991), Patterson-Rudolph (1997).

reckoning with it, which would require "meaningful consideration of Indigenous thought and practice, including legal and governance elements, in light of settler colonialism" (Wilson and Inkster, 2018).

The source-to-sea methodology is also much better at revealing water problems than it is at illuminating potential solutions, especially political solutions. The basin-scale perspective is well suited for bringing into view a long list of river maladies and the complex relations among river stakeholders that are entangled with them. This is meaningful because it brings nuance to oversimplified 'us versus them' environmental thinking. But it does not directly lead readers directly toward ideas about how Colorado River stakeholders might come up with solutions for the river's challenges. Because the narrators are focused on physically following the river's flows, they do not explore the (relatively more boring) locations of stakeholder-based problem-solving in the Colorado River Basin, such as the many non-descript hotel conference rooms and restaurants where collaborative governance frameworks have been hashed out in recent years (Fleck, 2016). Of course, it is not fair to expect these narrators to forward a single all-encompassing solution to the river's multifaceted challenges, since one does not exist. This is demonstrated by Owen (2017), who provides the closest thing to a call to action with a final chapter that lays out 20 factors to consider when pondering remedies to the river's issues. It is still confounding, however, that the other narrators do not articulate any ideas for responses to the river's overallocation, particularly because they have done so much work to develop and claim river knowledge. One could read between and beyond the lines to say that, by showing the river to be a 'living thing', the narrators are making the case for personhood for the Colorado River – a legal strategy which has thus far failed (Fendt, 2017); or that by highlighting the dry Delta in Mexico from a basin-scale perspective, they are making the case for more bilateral US-Mexico efforts and federal interventions to promote the river's health; or that the multi-stakeholder view they forward generally promotes more collaborative governance efforts in the basin. But we really cannot say for sure, because the style of expertise they have ultimately chosen to claim is one of exposition, not prescription.

## CONCLUSIONS

This analysis of source-to-sea stories on the Colorado River sought to discern the reasons for the proliferation of this particular style of river activism by examining narrators' goals. We also consider the implications of these narratives for water discourse by contemplating what they reveal and obscure. We argue that, in the Colorado River Basin, source-to-sea travellers have established a new methodology for assessing and evaluating environmental change, which fills a very real measurement gap that continues to exist in formal scientific and state-based ways of knowing rivers. This methodology challenges dominant ways of knowing the river by employing a new observational scale for producing water knowledge, one that operates simultaneously at the resolution of the individual and the extent of the full river basin. These source-to-sea stories encourage us to pay attention to the implications of scalar politics for the fundamentals of water knowledge: what it is, how it is produced, who produces it, and what it brings to light. The source-to-sea framework renders visible the complex dynamics of a modern and multi-stakeholder waterscape, but thus far it has largely left invisible both indigenous voices in the river basin and solutions to the river's many problems.

These results prompt additional research questions – for the Colorado and the many other rivers that have been, or may soon be, the subjects of similar adventure narratives. To begin, it is worth wondering whether our findings about Colorado River source-to-sea journeys and their associated narratives are matched by expeditions on other rivers, or if the purposes of these stories are different in other locales, and why. A comparative analysis would be insightful on this front. Future research could also examine how this narrative circulates in water discourse and whether it produces identifiable effects on water politics. It is also important to question whether this type of story is capable of evolving to address the shortcomings just discussed – sidelining indigenous voices and leaving solutions unaddressed – or whether entirely different kinds of storytelling are needed to make progress on these fronts. From a more

theoretical perspective, by encouraging a deeper understanding of the links between the politics of scale and the politics of knowledge in a water context, these narratives highlight for scholars the importance of taken-for-granted scales of observation for what forms of river knowledge are centred in water discourse, as well as how activists work to challenge these dynamics.

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