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RESEARCH ARTICLE

River and watershed organizations in the U.S. Intermountain West: key actors in social-ecological resilience

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Abstract
River and watershed organizations are important local and regional actors working toward the resilience of rivers and watersheds. Social ecology and relational frameworks guide our assessment of these organizations and their contributions across the U.S. Intermountain West. From 2020 to 2022, 237 semi-structured interviews were conducted with representatives of river and watershed organizations. These organizations varied in scope, mission, scale, and capacity. Key findings included the following: (1) These organizations are multitasking, often working on more than one project or goal at a time, even with limited resources; (2) These organizations work across geographic, social, and temporal scales; (3) These organizations rely heavily on incorporating diverse knowledges to their work; and (4) These organizations have complex relationships built through partnerships and collaborations that enable them to address issues and conflicts and to carry out their missions. Insights from river and watershed organizations offer evidence for their key role in river and watershed resilience and provide recommendations to others working in this practice arena.

Keywords Non-governmental organizations · Water · Rivers · Collaboration · Knowledge · Resilience

1 Introduction

Looking back as well as forward, rivers and watersheds are clearly critical social-ecological systems[1] (Dunham et al. 2018, p. 2 of 10); Parkes et al. 2010, p. 694). Such systems are complex, interactive, and interdependent biophysical, socio-cultural, and technological processes nested across spatial and temporal scales (Delgado-Serrano et al. 2015, p. 810; Bouamrane et al. 2016, p. 4–5; Beckley 1998, p. 102–103). People and societies depend on the ecosystem services provided by river systems (Böck et al. 2018, p. 414–415), and their actions also have profound influence on river and watershed integrity (Fagan 2011; Flotemersch et al. 2016, p. 1655; Vörösmarty et al. 2010, p. 555).

As we look for strategies to enhance the resilience of rivers and watersheds, it is valuable to consider the actors working at the front line, so to speak, in these social-ecological systems. Not discounting the actions of individuals, governmental entities, and scientific endeavors, this paper focuses on water-related non-governmental organizations and partnerships that operate at local to regional watershed scales. The key role of water organizations has been highlighted in extant U.S.-based literature in general terms (Freeman 2000, p. 489), case studies (Stedman et al. 2009, p.181; Habron 2003, p. 30–31), and systematic assessments of collaborative watershed management or partnership entities (Sabbatier et al. 2005; Biddle 2017). Other early publications on watershed groups highlight the emergence of watershed initiatives in the 1990s (Kenney 1997, p. 6 of 138) and considerable variability in watershed group origins, goals, structures, and participants (Griffin 1999; Kenney 1997). The wider array of organizations beyond formally established councils is even more varied now, decades later. Kenney (1997, p. 57–60) highlighted criticism in the late twentieth century about the legitimacy of the goals and effectiveness of watershed initiatives as well as concerns about resources to support such efforts and pessimism about "reliance on

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[1] We use the term social-ecological instead of socio-ecological to imply equal importance of the social and ecological aspects of systems (Berkes 2017).

consensus decision-making" that might lead to exclusion of some perspectives.

This study seeks to assess the contributions of these organizations from a contemporary vantage point. We seek to add to the growing literature and understanding of broadly defined river and watershed organizations and their roles through a systematic assessment of river and watershed organizations (broadly defined) in the context of the Intermountain West of the United States. Furthermore, we seek to bridge research and practice by sharing of recommendations and guidance from established professionals to those just entering the river and watershed action arena or seeking to enhance organizational efforts.

Viewing rivers and watersheds as social-ecological systems help to articulate practice-based strategies for maintaining or enhancing their resilience in the face of complex drivers of change, including climate change, changes in societal values, and rapid development, growth, and land use change. The ecological complexity, diverse goals and needs of human stakeholders in these systems, and their intrinsic interrelationships require a framework that avoids macro-level disconnect from place-based contexts (Ashmore 2015, p. 150). Social ecology provides, "a basis for understanding and enhancing the quality of people-environment relationships" (Stokols et al. 2013, p. 1). Stokols et al. (2013, p. 3 or 12) outlined four core principles of social ecology that, reinterpreted here, provide a structure for applied inquiry:

(1) Human–environment relationships have multidimensional structures, including natural, social, and built features and processes as well as objective and subjective aspects.
(2) Multiple levels of analysis and diverse methodologies are key to assessing resilience.
(3) The integration of diverse knowledges enhances the resilience of social-ecological systems.
(4) Complex systems of influence with dynamic relationships shape outcomes.

We investigate the extent to which the information provided by river or watershed organizations follow these principles.

The multidimensionality and multiple layers opened up through a social ecology approach and the integration of knowledge provides the platform for shared learning across complex systems. A relational approach adds to this framework, highlighting the importance of relationships—those between individuals and groups as well as between people and natural or built aspects of ecosystems (Lejano 2018; Kan and Lejano 2023)—in getting things done that maintain or enhance resilience. Inquiry that appreciates the role of relationships in the dynamic processes of social-ecological systems gets beyond material and objective dimensions into intersubjective realms and focuses attention on the capacity for collective actions or agency by diverse actors within these systems (Kan and Lejano 2023). We posit that a qualitative research approach "opens up the analytical space" (Lejano 2018, p. 6) to allow people and organizations to speak for themselves about situations, actions, and relationships that enable or constrain efforts to enhance social-ecological resilience.

Drawing on the social ecology and relational frameworks described above, we set out to address several questions. Where, and at what scales, are river and watershed organizations working within the Intermountain West? What dimensions of river and watersheds are these organizations focused on in terms of their missions and actions? How do these organizations contribute to the resilience of the rivers and watersheds they focus on? What knowledges do these organizations draw upon in their work? What enables and constrains their actions? What recommendations do representatives from these organizations have for others working in these arenas? In the spirit of practice research, this paper synthesizes the input from a wide array of organizational perspectives in the hope that the findings from this inquiry will inform the collective efforts of these organizations as well as larger-scale non-governmental or governmental entities that seek to empower and enable watershed-based efforts. While this effort is situated in the Intermountain West of the United States, we suspect that the general findings may relate to other regional contexts around the world given the ubiquitous importance of human-river relationships and their resilience. However, we highlight the importance of place-based context in understanding the interactions of actors in watersheds, their impact on social-ecological resilience, and enabling and constraining factors (Ashmore 2015, p. 150).

2 Methods

2.1 The study area

The Intermountain West includes parts or all of eleven states in the United States that spans from the Cascade and Sierra Nevada Mountains in the West to the Rocky Mountains in the east and from the Canadian border to the border with Mexico (see Fig. 1a). Despite considerable heterogeneity in landscape and cultural context, this region shares characteristics such as a large proportion of public land and open spaces, rugged terrain with many headwater streams, and a generally arid climate, making water a critical focus across regional societies. There are 476 HUC8 watersheds, or watershed sub-divisions, in the Intermountain West region using the regional delineation from the Intermountain West Joint Venture (see Fig. 1b). The region is home to ecoregions

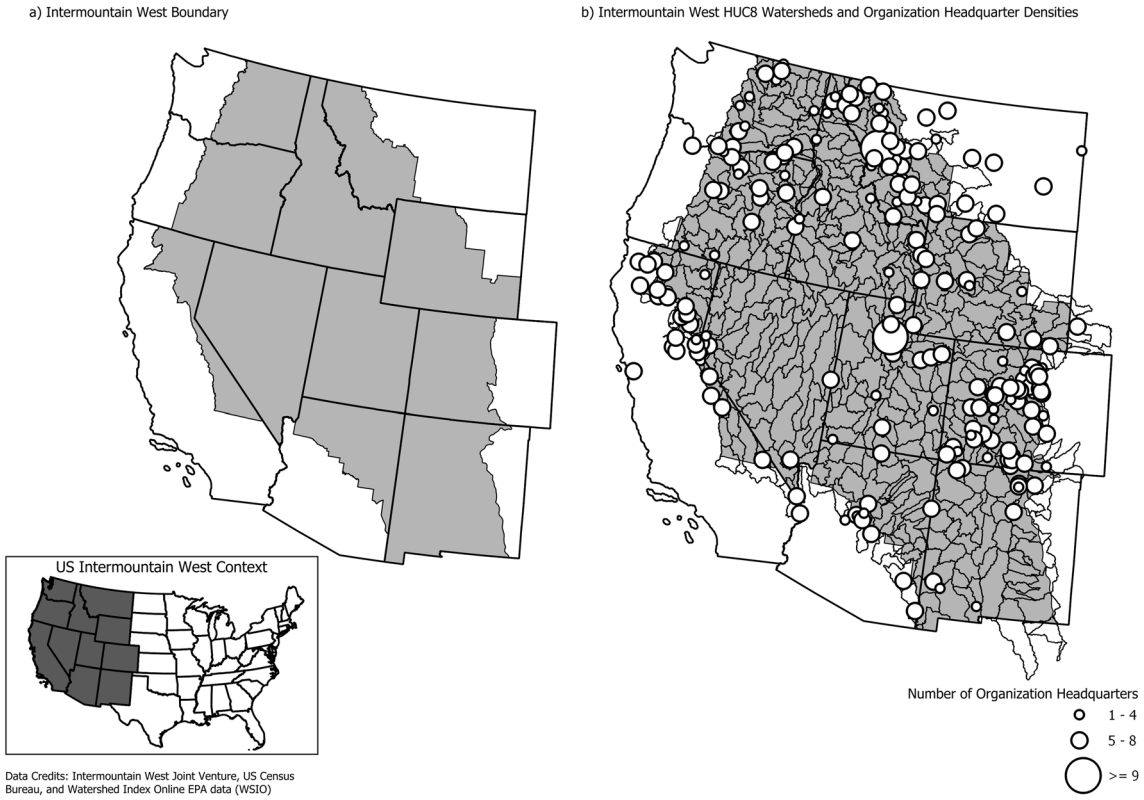

Fig. 1 **a** Map shows the Intermountain west context as designated by the intermountain west joint venture. **b** Map shows the USGS designated HUC8 watersheds in the IMW as well as the density of organization headquarters

including the Rocky Mountains and the Great Basin, major cities including Albuquerque, Denver, Salt Lake City, Las Vegas, Boise, and Spokane.

2.2 Organizational identification and project participation

A total of 462 organizations with potential focus on rivers and watersheds were identified in the study area using a map tool from the River Network website (map is no longer available on the website). River Network aims to connect water-related entities in the U.S., specifically around water advocacy. In 2019, the River Network had an interactive map that we used to identify organizations in the Intermountain West along with their contact information. In addition to the organizations drawn from the River Network site, systematic Google searches as well as other organizations identified in project interviews added to our list of regional organizations. Internet information on these organizations was used to map their headquarters (see Fig. 1b).

We sought to interview as many of these organizations as possible and contact information was obtained from organizational websites. Out of 434 organizational contact attempts, we were able to interview representatives from 237 organizations between 2020 and 2022, yielding a participation rate of 55%. Organizations in the region that were not contacted were either unknown to us, no longer active, had no available contact information, or were identified too late in the project for an interview. Some organizations were interviewed more than once as staff turned over or as our interview protocol evolved. Table 1 highlights organization participation rates by state.

2.3 Interview and data collection and analysis procedures

The data collection phase of this project occurred between 2020 and late 2022. Interviews were conducted by six team members who were all trained on interview methods and the project objectives, with 85% of the interviews conducted by two team members, one of whom is the second author. Organizational representatives, typically directors or communication staff, were contacted via email or phone with a description of the project and a request for an interview. For willing participants, interviews were conducted by phone or Zoom. Interviews followed a structured protocol, with occasional probing for further exploration of specific topics guided by the interviewer. As the project was carried out

Table 1 Number of interviewed organizations and participation rates by State

State	Number of organizations identified	Number of organizations contacted	Number of interviewed organizations	Participation rate (Interviewed/Contacted) (%)
Arizona	18	18 (100%)	15	83
California	39	23 (59%)	13	57
Colorado	114	109 (96%)	59	54
Idaho	33	26 (79%)	17	65
Montana	88	69 (78%)	42	61
New Mexico	29	28 (97%)	22	79
Nevada	12	11 (92%)	8	73
Oregon	38	31 (82%)	17	55
Utah	35	33 (94%)	15	45
Washington	33	31 (94%)	21	68
Wyoming	23	22 (96%)	8	36
Total	462	434 (94%)	237	55

Table 2 Interview questions

Focus area	Interview questions and notes
Organizational characteristics and location	Would you say that the majority of your organization's work is focused on rivers and watersheds? [If not] What else do you work on?
	What specific rivers or watersheds does your organization focus on? [Where possible, a map of watersheds was used over Zoom to clearly identify relevant watersheds.]
	Is your organization a 501(c)(3)?
	How long has your organization been in existence?
Organizational mission and goals	Please tell me about your organization's overall mission and vision
	What are some of your organization's current goals and objectives?
Knowledge	We're interested in the type of information and knowledge your organization works with. Would you say you work mostly with scientific, professional, or local knowledge or some combination? [When asked for clarification] Scientific: Technical information and knowledge of science experts. Professional: Knowledge of people whose work experience is in your area. Local: Knowledge based on the experience and observations of people in your area
	What do these different knowledge types look like for your organization?
Organizational successes and obstacles	Would you say that your organization has been successful or made progress in fulfilling your objectives?
	Could you provide some examples of how your organization has been successful or experienced good progress in fulfilling objectives?
	What factors have helped drive that success or progress?
	Are there any obstacles or barriers to success that the organization faces?
Resilience	Thinking overall and over time, would you say that your organization has played a role in the resilience of riverine landscapes from a social or ecological point of view?
Recommendations	If you had a chance to make a recommendation or two for another river or watershed organization just getting started, what would you say?
Other organizations	Are there other groups in your area that you see as river or watershed related organizations that we should make sure are on our list?
Any additional information	Is there anything else I haven't asked about that you think is important for us to know about your organization?

over three years, we added research questions at a couple of points and thus, new or altered interview questions. The most recent and most inclusive set of interview questions can be found in Table 2. For the most part, unless specified below, all core questions for this analysis were asked in all interviews. Organizational websites were consulted to supplement information such as mission focus areas and watershed location. Introductory interview questions assessed

general organizational characteristics and the watershed location of organizational focus. A map of HUC8 watersheds or sub-basins was used to pinpoint the locations in which organizations work. Additional questions inquired about the organization's mission and goals, the types of information of knowledge they draw upon, and what factors enable their success or progress and which factors present obstacles or barriers to success. A subset of 110 interviews conducted in the last year of data collection asked if, over time, the organization has played a role in the resilience of riverine landscapes from a social or ecological point of view, and if they had a recommendation or two to offer to another river or watershed organization just getting started. Organizations were also asked if there were other organizations that should be reached out to for the research as a form of snowball sampling.

Interviews were recorded with the permission of all participants and subsequently transcribed using Otter.ai software with follow-up editing by project staff. Interview transcripts were coded using Atlas.ti software, primarily using the interview structure as a coding framework to highlight organizational characteristics and key words and phrases for answers to the various questions. Codes were created collaboratively by team members and used to track emergent themes within the focus areas, guided by interview questions. These emergent themes or codes were then tallied quantitatively by summary area. Deeper, thematic analysis was conducted to understand additional dominant themes and to highlight illustrative quotes. This further analysis was supported by Atlas.ti's ability to find all answers to particular interview questions which aligned with our research questions, but the broader interpretation was subsequently done collaboratively by both authors.

All organizations were asked to stipulate the degree to which they were willing to allow their interview transcript or information to be shared in a public data repository, and all sharable data are available on the HydroShare repository. Organizations that we were not able to contact or that did not respond to requests have a simple disclaimer document in HydroShare noting that we could not reach the organization to determine identification decision, and thus, no organizational information is shared publicly. In this paper, we identify only the representatives and organizations that indicated willingness for that information to be shared publicly.

3 Results

The vast majority of organizations we interviewed were non-profit entities. Their origin stories varied widely, with some emerging out of state encouragement of watershed partnerships, particularly in Oregon and Colorado, and others from grass-roots efforts launched by individuals and groups, or out of partnerships forming in the space between multiple local and regional interests related to water, rivers, and watersheds and other unique circumstances. The findings below come from a synthetic analysis of all interviews, and it should be acknowledged that there is considerable heterogeneity in the size and structure of the interviewed organizations.

3.1 Watershed coverage by organizations

Interview participants were asked to identify which HUC8 subbasin watersheds they focus their efforts using an interactive map feature used via Zoom. Additionally, websites were used to further identify locations when interviews did not include such precision or when organizations were not interviewed. Figure 2a shows the coverage of those watersheds explicitly or specifically mentioned in interviews or on websites as being the focus of organizational efforts. Some organizations provided more general descriptions of their work areas which created some ambiguity in terms of coverage. Figure 2b shows that nearly all of the region's HUC8 watersheds are covered by organizational efforts of those interviewed when all generalized locational descriptions are included. Higher densities of organizational activity can be seen in Western Montana, The Upper Snake River region, the Verde River region in Arizona, and the state of Colorado.

3.2 Multidimensionality in mission focus areas and scope

River and watershed organizations focus on a diverse array of mission areas. Figure 3 shows a quantification of the number of times organizations mentioned a mission focus area falling into various summary categories. River and watershed organizations are working on a wide array of issues and goals. The most dominant focus area, emerging from 132 organizational interviews, was general river, stream, or watershed protection and conservation. Other mission focus areas that related predominantly to the more ecological or physical aspects of rivers and watersheds included invasive and native species, biodiversity and habitat (90), stream and riverbank restoration (64), water quality (49), water quantity, flows, and water conservation (26), data collection, monitoring and modeling (21), climate change and drought (9), and wildfire (2). Mission focus areas relating to more societal aspects of rivers and watersheds, or resource and land use, included land or landowners and agriculture (56), community dimensions (43), recreation (29), legacy and future generations (16), river management plans (15), irrigation management (8), mining (8), dams (7), and Indigenous or Tribal connections (5).

Organizations varied in both the spatial and temporal scales of their efforts as shown in Fig. 4a, b. Based on the

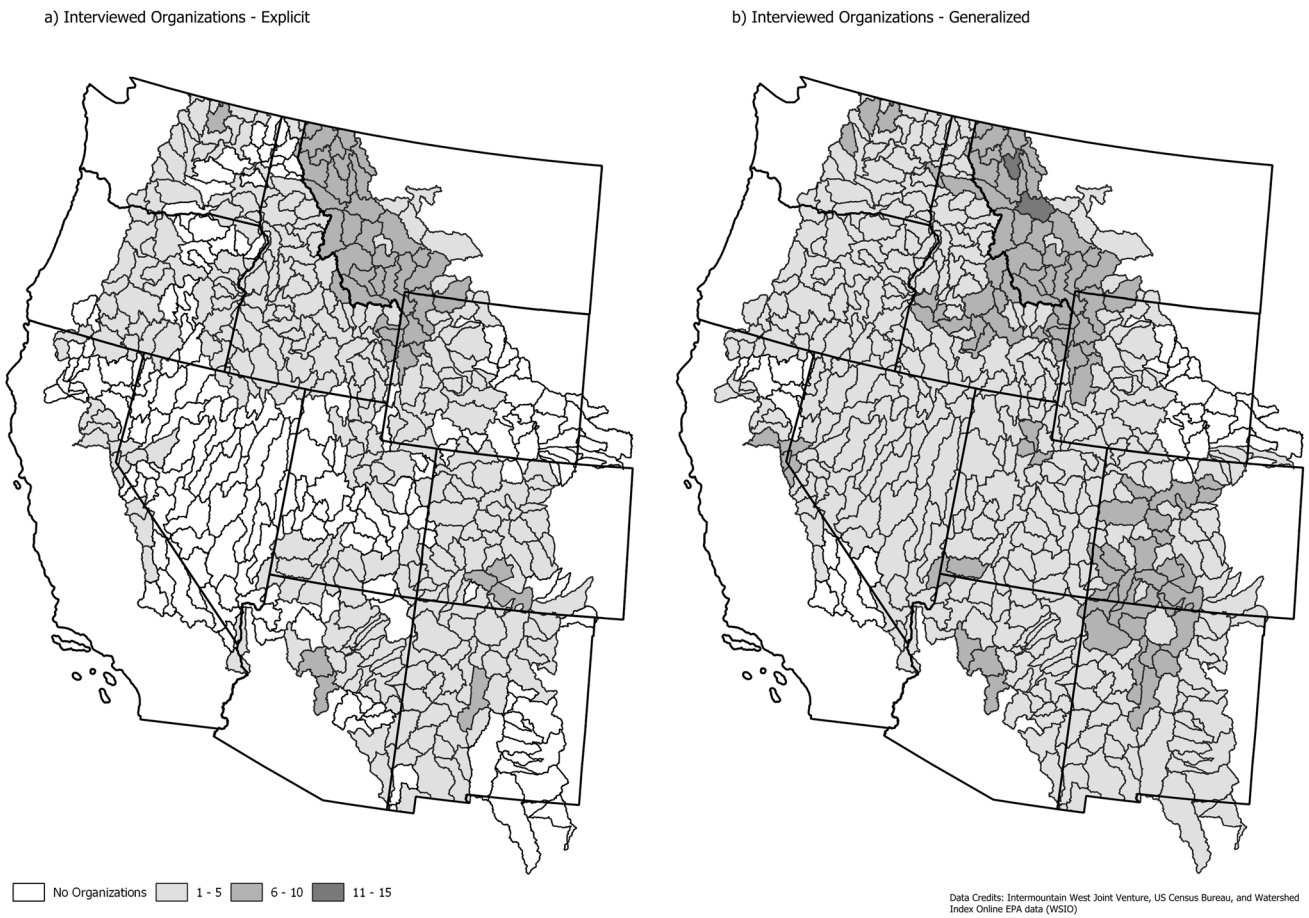

Fig. 2 Maps showing the different ways to show organization density in HUC8 watersheds. **a** Locational coverage based on explicit mention in interviews. **b** Locational coverage based on more generalized information from interviews

locational information provided, organizations were coded for the scale of their work from local or river reach to large regions of the Western U.S. The majority of organizations work at the watershed or multi-watershed (also referred to as river basin) scale, but there were organizations with finer or broader scale focus. Temporally, there was also variation in how long organizations have been in operation. The data shown in Fig. 4b are based on time since organizational establishment and show that 112 of the interviewed organizations have been in existence for more than 25 years followed by 96 in existence for 11–25 years. These data show that river and watershed organizations have longstanding perspectives within the region.

3.3 River and watershed organizations are knowledge integrators

Organizations were asked to describe if they drew upon scientific, professional, and local knowledge, or a combination. The vast majority of organizations were described as integrating all three knowledge types (see Fig. 5). Organizational representatives rarely mentioned relying on just one knowledge type. This quote from a Washington River Organization that did not choose to be identified highlights the collective value of different sources of knowledge:

> It's definitely a combination. Essentially, I'm our scientist on board and so we use science a lot to inform our decisions and we need the local residents and their knowledge and experience to sort of support us. And then also we're working a lot with professionals who are advising us and giving us policy ideas as well as working with professionals that oppose us as well. I think it's really important that the community supports you, and you listen to their local knowledge, we have a lot of tribes locally for example that give us a lot of support information, but you also need scientific. I

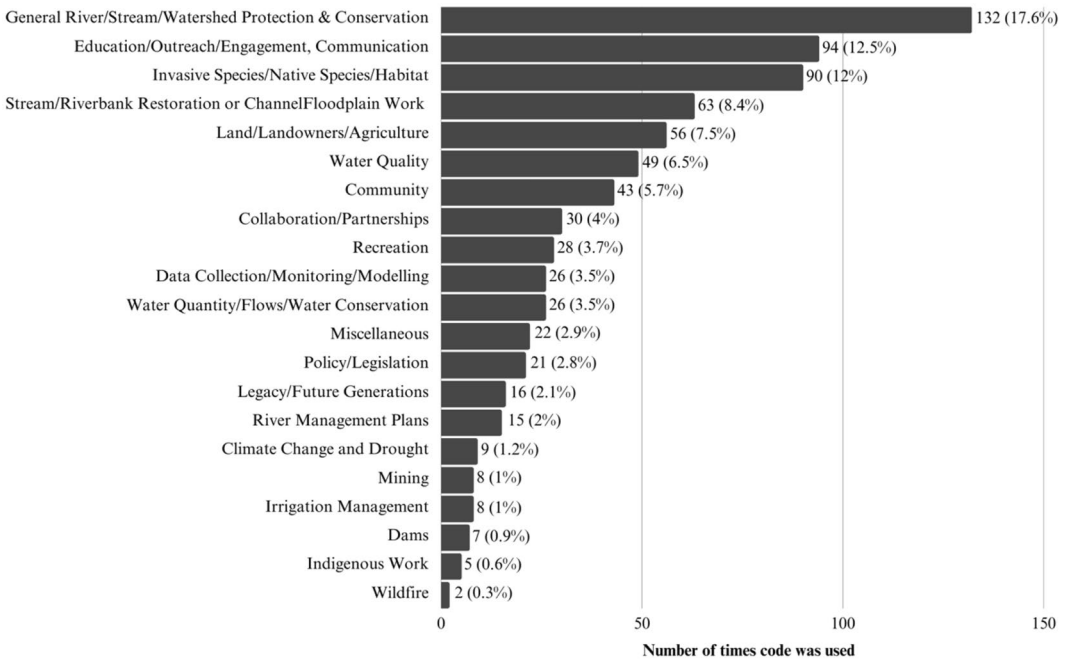

Fig. 3 Distribution of organizations across mission area categories

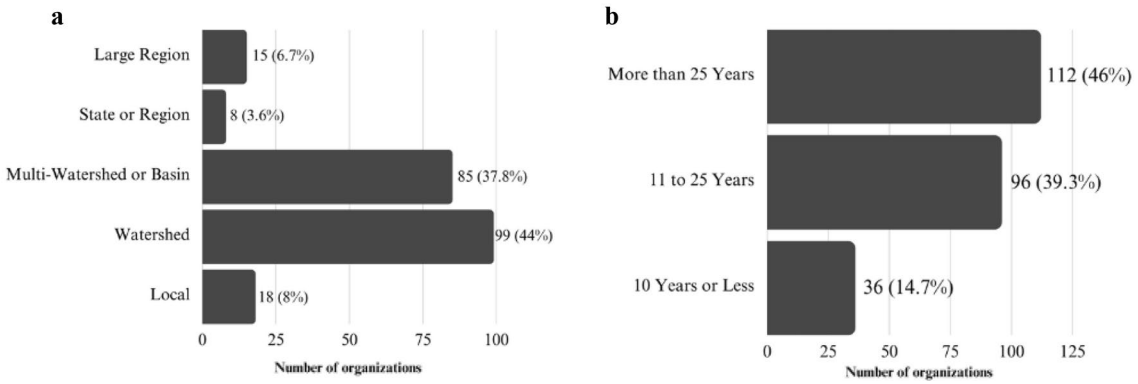

Fig. 4 Geographic (**a**) and Temporal (**b**) scales of river and watershed organizations

don't think one ever comes without the other in a well-rounded organization.[2]

Jake Kurzweil from the Mountain Studies Institute in Colorado mentioned Indigenous knowledge as particularly valuable as well as the other three types of knowledge. In hindsight, Indigenous knowledge should have been an additional knowledge type included in our interviews.

One of our big projects right now is called the Mancos Resiliency Project. And it's basically looking at the Mancos watershed as a whole and it has been impacted by drought. And what type of low impact management strategies can we do to basically make the watershed more resilient to climate change. And this covers private landowners, Mesa Verde National Park, and Ute Mountain Ute Reservation. So, we work with private landowners, scientists, government agencies, and tribal people, all on just one specific project. Another example would be most of my work is related to mining hydrology. So, San Juan's have somewhere around 16,000, abandoned mines, and they've got some pretty serious legacy mine issues. And in Silverton proper, we actually have an EPA Superfund site. So, we work directly with the EPA.

[2] We have removed "filler words", repeated words, and pauses from all quotations to enhance brevity.

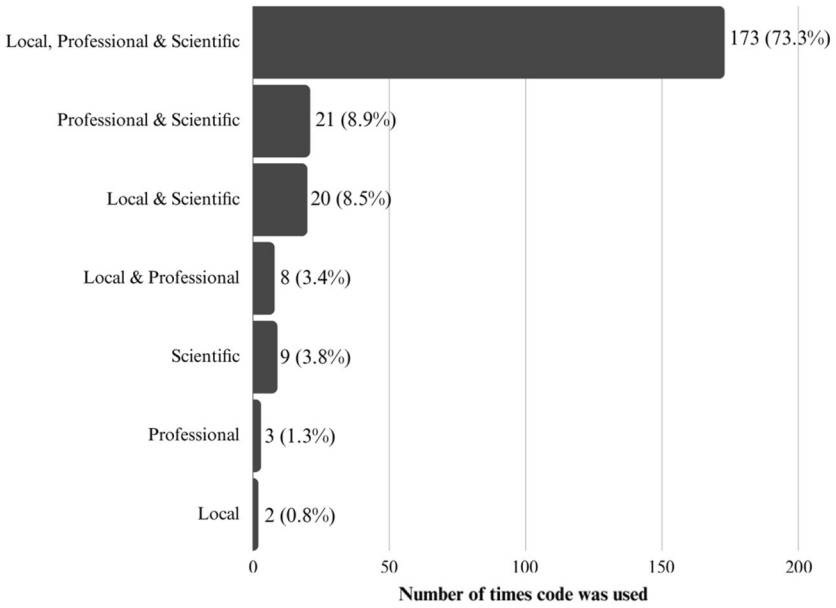

Fig. 5 Knowledge types mentioned as used by organizations

> They contract us to do monitoring and analysis as well as the United States Geological Survey. So, within those institutions we're relying on, I guess you would call professional information. But also, when you work with the GS, the Geological Survey, those are all PhDs. And so, we're talking to each other from that academic perspective, really hard-core science driven. So, we kind of span at all, and we really take local knowledge incredibly seriously, especially as it pertains to Indigenous knowledge, 'cause they have so much understanding that we just don't. And they've lived on this landscape for multiple generations and, I just moved here, so I don't have anything compared to them.

The interviews shed light on who or what brings the different knowledges into the organizational efforts. Scientific knowledge often included those who help with modeling, analyzing, and verifying data, experts with technological and scientific background or degrees, those who conduct ecological surveys, monitoring, and mapping, and various consultants who help with technical aspects such as hydrology, infrastructure, or water quality. Professional knowledge comes from state and federal agencies, attorneys, contractors and consultants, other organizations, local guides, and those who provide advice and help with organizational management. Local knowledge included residents and those providing community perspectives, experience and observations, volunteers and board members, landowners and agricultural producers, and tribal perspectives. It was also mentioned that local knowledge includes stories and local myths and legends as a source of information about rivers and watersheds.

3.4 Factors enabling or constraining success

Organizations were asked to describe their current goals and objectives. As a follow-up, organizations were asked to describe if they have been successful in those goals or making progress and what factors enabled the success they saw. Organizations were also asked what factors constrain the work they do. In analysis, responses were grouped into categories as shown in Fig. 6. The top factor category by far for enabling success was collaborations, partnerships, and relationships mentioned by interviewees from 127 organizations. As highlighted by Flint et al. (2023), human-river relationships led by organizations seem to rely heavily upon human–human relationships. Other factors enabling the success of organization's work were being engaged in the community and having a good board, organizational members, and volunteers. Organizational traits, staff abilities, capacities, and being able to retain them, as well as funding were also mentioned relatively frequently.

The overwhelmingly top factor in terms of obstacles or barriers to organizational success or progress was funding which was mentioned by 115 organizational representatives (see Fig. 7). Other top factors mentioned as limiting factors were people within the organization and the physical environment which included things like drought, floods, and climate. Government and bureaucracy, time, capacity and scale of organizational efforts, and contention with other water users were also quite frequently mentioned.

3.5 Contributions to resilience

In 110 more recent interviews, organization representatives were asked if they felt that the organization has

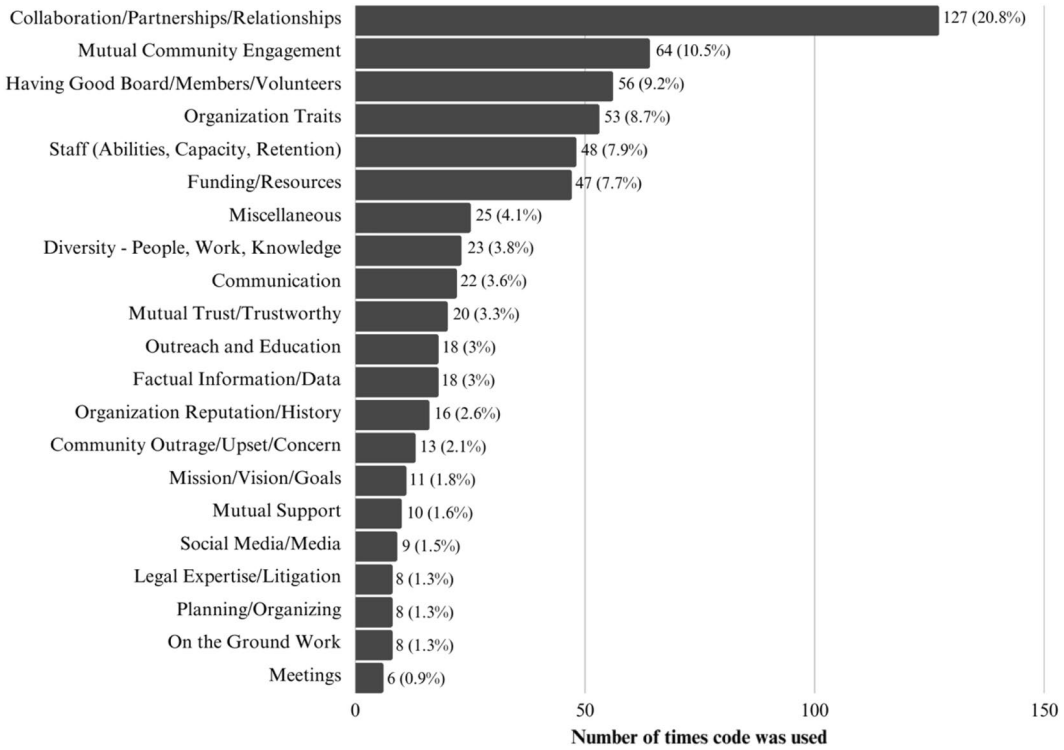

Fig. 6 Factors contributing to organizational success or progress

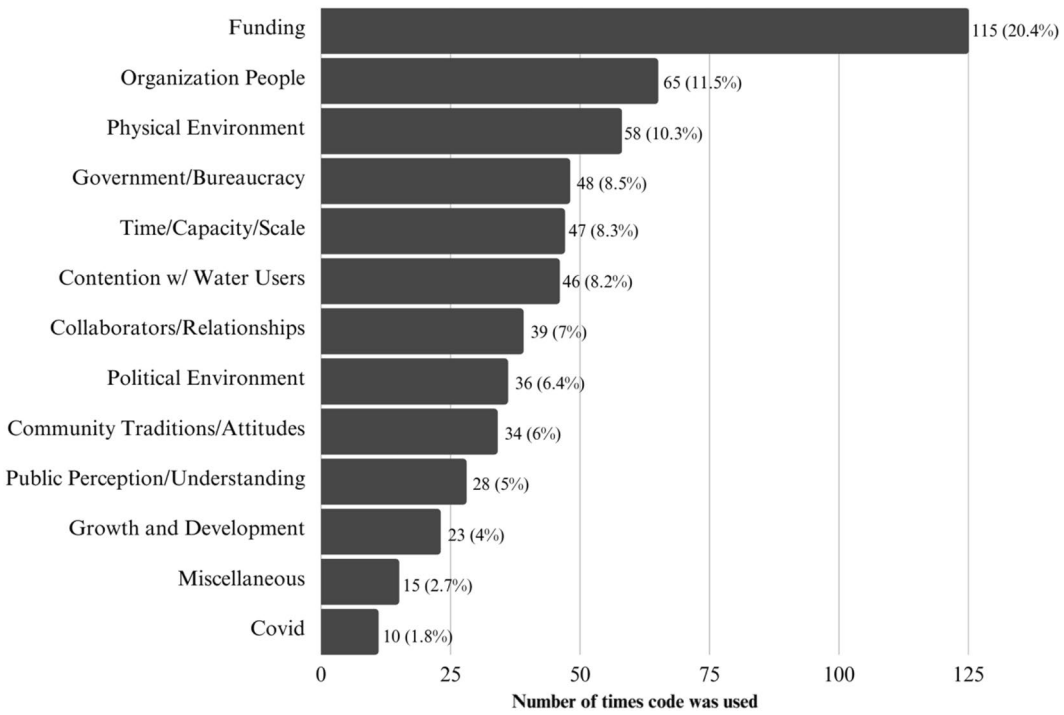

Fig. 7 Factors mentioned as obstacles to organizational success or progress

played a role in the resilience of the river/watershed system and they worked in from a social or ecological perspective. Answers ranged from ecological resilience, social resilience, a combination of the two, and some organizations either could not quite describe the role they have played or that they have had less of an impact than they would like. There were countless examples in the interviews of the contributions toward resilience made by river and water organizations. A few illustrations of how organizations have influenced river and watershed resilience from both social and ecological perspectives are shown in the quotes below.

A Colorado organization that did not choose to be identified focuses on resilience explicitly, saying:

> The vision is [to] have a resilient and adaptive [redacted] watershed … that provides ecosystem services, maintains ecological integrity, and sustains community values in the face of environmental change, supported by a diverse and active collaborative group. And so, it's acknowledging, its goal is around resilience, adaptive capacity to these systems, both social and ecological systems, and acknowledging the integral role for collaboration in the process.

When asked if they had played a role in the resilience of the landscape, this same interviewee said:

> Yes, we have. Quantifying that can always be a little bit challenging, but we've developed a monitoring program. We've supported kind of rapid monitoring that following mechanical disturbance that seemed too high. We're providing structure for resilience to be better quantified. So the respect for stakeholder engagement to better influence how management happens, to support and enhance resilience, and add individual stakeholder interests.

Doug Von Gausig from the Verde River Institute in Arizona highlighted the resilience connections between social and ecological dimensions of the river:

> Our goal is to connect the welfare of the Verde River to the welfare of the people that live in the watershed. We work a lot to improve both the water quality and the recreational opportunities that the Verde River provides. The big idea there is to kind of to connect the economy of the local, rural Arizona to the health of the river knowing that if people's economy is better because there's a river, they'll do what they need to do to conserve it.

Rob Van Kirk from the Henry's Fork Foundation in Idaho described their efforts to improve irrigation and precision water management which in turn affected the social resilience of the region:

> We have quantifiable evidence that our organization and our programs have made a big difference in water management. And so, that immediately relates to socio-economic factors here. I mean, agriculture is the most important industry here, obviously. And so, being successful at water conservation and precision water management helps ensure the viability of agriculture.

Kara Maplethorpe from the Centennial Valley Association in Montana described their efforts in the interface between water and ranching livelihoods:

> Our weeds program is helping maintain water quality [and] forage for wildlife and cattle. So that's huge. Our water and drought awareness program is providing information in a very condensed version. So, we do water reports. And so, all the information that people may be interested in is in one simple report. So, they don't have to like run around all over and try and find it. I think that's having a really positive impact on if people want to rotate their cattle, they're making different decisions about where they're running animals based on if there's any water. And then the range rider program is definitely helping with resilience, the rural economy, and just helping spread awareness also in increasing safety about grizzly bears because people don't realize they live in the sagebrush. They don't really live in the forest. And so, I think it's been very successful at advancing different ecological or social kind of advances in the community, and people really enjoy it.

3.6 Recommendations for new organizations

The same 110 organizations that were asked about resilience were also asked what recommendations they would give to another organization that was getting started. Many answers were given to encourage success, but nearly all focused on social aspects of an organization like collaboration and working with the community (see Fig. 8). Finding a niche to not duplicate other efforts, understanding communities and stakeholders, and generally building relationships were also commonly mentioned. Some organizational representatives mentioned its important to "get ready to fight" while other mentioned the importance of being neutral in politics. Different strategies were encouraged by longstanding organizations. The quotes below are some examples of common themes mentioned in the interviews.

Maya MacHamer from the Boulder Watershed Collective in Colorado mentioned the importance of working on organizational structure:

> Oh, I would tell them as boring as it is, to really focus on the organizational structure of their organi-

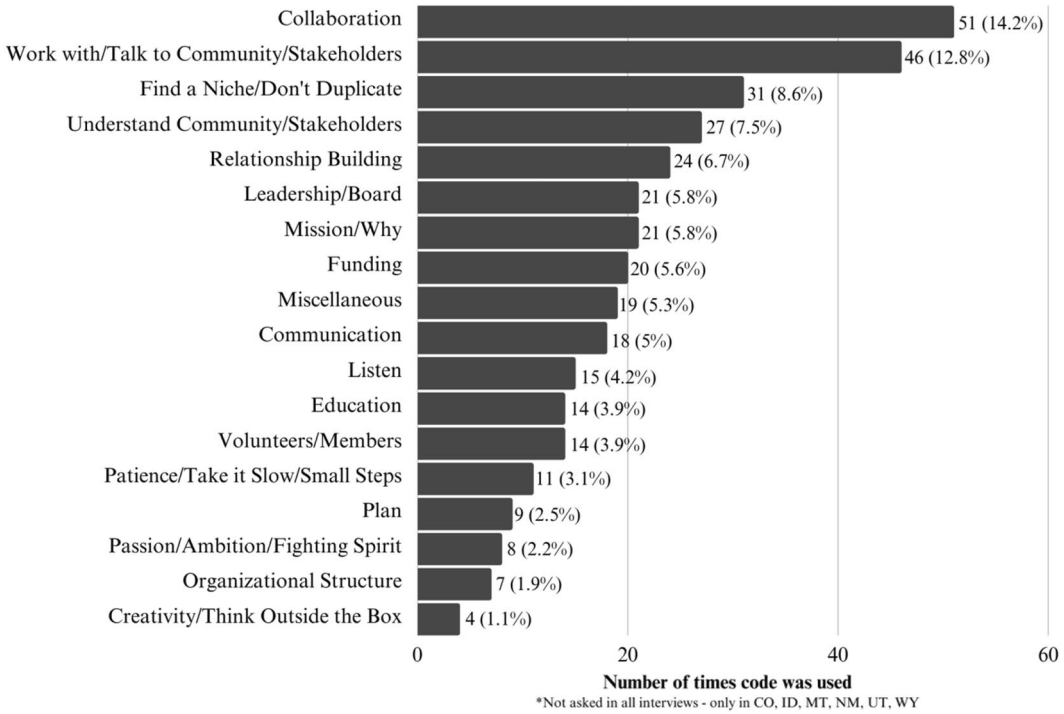

Fig. 8 Categories related to recommendations for other new organizations

zation. Like, just get it all out of the way, and get good policies and procedures, and understand the organizational structure, and make sure you have good financial systems in place, and just really focus on that stuff in the beginning.

On the importance of collaboration, especially to find overlap with other organizations, Sandi Good from Peaks to People Water Fund in Colorado said:

> Yeah, that's a tough one. But I mean, definitely, you know, collaboration is everything. At any stage of the game, it's critical, but especially when you're just getting started. There are, in any given community, a number of different organizations that are all trying to get their message out there and promote their mission and their purpose. But like when you, when you get out there and really start meeting them, and shaking their hands and find out what they're all about, you'll see that there is a lot of overlap, a lot of common things that you could probably collaborate on together and be more impactful than trying to do it in your bubbles. So, I guess, avoid that parallel play. Let's all try to play together in that sandbox. Because, at the end of the day, we're really all trying to do a lot of the same stuff, which is like, improve forest health and protect wildlife habitat and water supplies and in our communities and our livelihood, we're really all going after the same end goal. So I guess, that that would be the biggest thing is do that.

Karen Knudsen from the Clark Fork Coalition in Montana had multiple recommendations for new organizations including to be bold as well as to remember to work with communities:

> Always be bold. Go for the big vision.
> Probably, another recommendation, which took hard lessons for me, is that you've got to work with rural communities, you can't just steamroll them. And any of the work that we do, it has to work for them. So, you got to be bold, and you also have to go for the win-win. You know, a mindset of abundance, just assume that you can get a win-win. It's not a zero sum game.

On the importance of being neutral in politics to help achieve the organization's work, Tanya Ishikawa from Uncompahgre Watershed Partnership in Colorado said:

> One more thing that might be beneficial, I just thought of was, for our group in particular, we've stayed away from direct advocacy for wider issues. Like some groups, and especially the ones with the capacity that are huge. Love to get involved with advocating on political issues or development issues, but we've stayed away from that, because we really want to focus on water quality, and those on the ground things that

> we can accomplish scientifically. And so in order for us to really attract all stakeholders, including miners and ranchers, and people who aren't necessarily water conservationists, we stay—not completely neutral, I mean, each one of us has our own viewpoints—but the organization itself doesn't spend our time or money, getting bogged down by those by fighting for, for certain positions. That could be helpful.

And finally, emphasizing the importance of building relationships and to remember the time they might take in building them, Daniel Bertram from the Upper Salmon Basin Watershed Program in Idaho said:

> Probably work slowly. Build the relationships and build the trust over time. Often things don't end up the way they currently are overnight. And a lot of people expect them to be changed and fixed overnight. And I think that's definitely the wrong approach. Because you have to have that trust in the relationships.

4 Discussion

As highlighted in the findings presented above from the interviews conducted in recent years, river and watershed organizations are important social-ecological actors. They embody and illustrate the core principles of social ecology (Stokols et al. 2013) and the tenants of relationality (Lejano 2018; Kan and Lejano 2023). The diverse array of mission focus areas across general categories from conservation and protection of rivers and watersheds to working with land and landowners, water quality, education, recreation, and policy and advocacy show the multidimensionality of these organizations—supporting the first core principle of social ecology. The finding that the average number of mission focus areas was three, based on our coarse categorization suggests that these organizations are multitasking, even with their often-limited resources and capacities.

The multiple spatial scales at which they work, from small river reaches to large river basins, and their longevity spanning multiple decades, shows that they provide keen understanding of rivers and watersheds at multiple levels of analysis—supporting the second core principle of social ecology. This longevity counters some of the skepticism found in the late twentieth century literature on watershed initiatives (Kenney 1997). The keen insights offered by organizational representatives suggests there are not only material advancements led by their efforts, but they also contribute to the intersubjective values and less tangible dimensions of human-river and human–human relationships (Flint et al. 2023, p. 8 of 11). As Kan and Lejano (2023, p. 6) suggest, "Building strong functioning ties with all members of a community, and building mutual processes of collaborative support through them," is essential for institutional excellence. The substantial heterogeneity in the organizational structures, focus areas, and goals matches early observations of watershed-based efforts (Griffin 1999; Kenney 1997).

This project's findings on knowledge overwhelmingly show that river and watershed organizations draw upon and weave together diverse knowledges in their work, illustrating the third principle of social ecology. The shared social learning that comes from interactions and collaborations and integrating input from those with diverse knowledge background is critically important for watershed and social-ecological system resilience (Adger et al. 2021, p. 3 of 13; Biggs et al. 2012, p. 14–15 of 30; Baird et al. 2016, p. 1217; Cosens 2013, p. 3 of 10). This kind of collective learning is not automatic, particularly when there are longstanding power dynamics and tensions, and river and watershed organizations are key catalysts for building the interactional capacity to bring people together to find common ground (Flint et al. 2024).

The fourth core principle of social ecology relates to the complex systems of influence that shape outcomes through dynamic relationships. Representatives interviewed in this project described ways in which their organizations influenced social and ecological resilience in their watersheds and often described complex interactions. The factors found to influence organizational success and top recommendations for new organizations focused on collaboration, partnerships and building relationships and working with communities and stakeholders. In addition, interview participants also discussed the importance of having good board members, volunteers, and staff. The quotes shared about the importance of relationships show how primary they are in this arena. In short, as someone from a Washington watershed organization said, "Managing water is all about managing people." The ability of these organizations to navigate conflict and to find collaborative spaces among diverse perspectives suggests that early criticism and concern about the exclusiveness of consensus processes (Kenney 1997) was not supported by experience over time.

Despite the significant accomplishments and efforts led by river and watershed organizations, there are considerable obstacles. Funding and capacity were often mentioned as barriers to continuing to provide the leadership and actions to protect, restore, and elevate rivers and watersheds in their areas of focus. There are important opportunities for governmental policies and large non-governmental initiatives to reduce these obstacles and enhance the efforts of these organizations who provide "boots on the ground" expertise and local to regional leadership on the critical issues relating to rivers and watersheds. Furthermore, they are important catalysts for bringing together diverse stakeholders and often have put in decades of time and energy building the necessary relationships to overcome intransigent conflicts and to

pool together the resources and initiative to institute critical change and to mitigate risks facing rivers and watersheds. Finally, they play key roles in building awareness of watershed issues, functions, and services by educating local publics and the next generation of key stakeholders and leaders in water management.

5 Conclusion

Resilience in social-ecological systems depends on adaptive management and social learning (Olsson et al. 2004, p. 2 of 26). The information provided here on the intentions, actions, and perspectives of river and watershed organizations in the Intermountain West of the U.S., provides compelling evidence that these organizations play key roles in working toward the resilience of the region's waters, watersheds, and communities, in elevating the role of learning through collaboration and relationships, and in highlighting and navigating the complex human dimensions of rivers (Dunham et al. 2018). It is also said that resilience at time requires transformation and that building capacities for equitable and sustainable changes in social-ecological systems (Reyers et al. 2018, p. 275–277). Olsson et al. (2004) describe the first phase of social-ecological transformation as "preparing the system for change," including "building ecological knowledge, developing social networks; and providing vision and goals in a comprehensive framework" (2004, p. 18 of 26). Given their abilities to work across multidimensional spaces and timeframes, integrate diverse knowledges, and harness factors to influence successes and progress, river and watershed organizations are positioned as important actors in laying foundations for transformational processes. Entities focused on singular knowledge domains and purposes such as scientific or governmental endeavors would do well to learn from the experiences and wisdom of those working at the local and regional scale on watershed issues and concerns. Reyers et al. (2018, p. 277) clearly articulate the context for resilient transformations:

> (T)ransformations to sustainability in the Anthropocene will involve cross-scale dynamics as well as actors operating across those. Transforming across multiple scales will inevitably involve highly diverse perspectives about transformation and the need for confronting and making transparent the politics, power, contestation, and conflicts.

One of the lessons we can learn from the longstanding experience of river and watershed organizations in the U.S. Intermountain West is that interpersonal and cross-interest interactions and relationships are essential to navigating complexity and conflict in social-ecological systems. While certainly not the only key actors in the region working toward river and watershed resilience, the organizations herein are well-situated. Westley et al. (2011, p. 768) highlight the key role played by local and regional innovators in identifying and navigating transformation pathways in sustainable and equitable ways. It behooves us to elevate practitioners from river and watershed organizations, wherever in the world, they focus their efforts, as innovators and guides in the pursuit of social-ecological resilience.

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Declarations

Conflict of interest Courtney Flint is an editorial board member of Socio-Ecological Practice Research. She was not involved in the review or handling of the manuscript, and on behalf of all authors, has no other competing interests to disclose.

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