Review Article

Diversity, Equity, Inclusion, and Justice in Water Dialogues: A Review and Conceptualization

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Abstract: In the United States, the lack of diversity, equity, inclusion, and justice (DEIJ) in water governance and management has been identified as a serious problem that affects the validity of decisions. Because water governance and management institutions, processes, and practices at all scales involve dialogue, it is important to understand DEIJ in water dialogues. This paper reports on the results of a systematic literature survey that was undertaken to guide efforts by The University of Arizona Water Resources Research Center to improve diversity and inclusion in its engagement practices and outreach strategies. Three questions are explored: 1) How is DEIJ defined, conceptualized, and measured in water dialogues?, 2) How does a lack of DEIJ in water dialogues affect water-related outcomes and actors?, and 3) What are the approaches that can be used to increase DEIJ in water dialogues, especially with respect to underrepresented groups? The review synthesizes definitions of DEIJ and examines theories and methods from the literatures on discourse, diversity, social learning, and environmental justice. The lens of dialogue focused these disparate literatures on how people with diverse voices can be engaged and enabled to effectively participate in water dialogues. Despite the paucity of DEIJ literature relating to water resources in general, and to water dialogues more specifically, the review identified characteristics of DEIJ, factors that contribute to DEIJ issues, general lessons, and pathways that apply to increasing DEIJ in water dialogue participation. Further, this paper articulates a conceptual framework for understanding and addressing DEIJ failures in water dialogues. A concept of "just water dialogues" emerged that integrates insights from the literature reviewed with notions of environmental justice to help with identifying and resolving "water dialogue justice" (i.e., DEIJ failures). Review results suggest that DEIJ in water resources dialogues depends on the distribution of knowledge resources, and on broader issues that include cultural, political, and other often ignored contextual factors. Importantly, addressing DEIJ problems through the creation and maintenance of just water dialogues requires tackling power imbalances, enhancing individual and organizational capacity, and building bridges through effective engagement of diverse voices, especially those of underrepresented groups. Strategies that have demonstrated effectiveness in other contexts are highlighted, and future research needed to improve practices to enhance DEIJ in water dialogues is outlined.

Keywords: *water dialogues, discourse, diversity, equity, inclusion, environmental justice, engagement, water dialogue justice*

Effective governance and management are important for the long-term sustainability of water resources. Water resources governance is defined as the framework of water use laws, regulations, and customs, as well as the processes of engaging the public sector, the private sector, and civil society. It can include coordinating actions and decision-making between and among various jurisdictional levels and actors. On the other hand, water resources management consists of the actions to implement laws, policies, and regulations (Megdal et al. 2015; Petersen-Perlman et al. 2018).

Across the globe, one problem faced by the water sector is the lack of diversity, equity, inclusion, and justice (DEIJ) in water governance

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Research Implications

- The literature survey supports the conclusion that this is the first paper that focuses on DEIJ in water dialogues.

- Examination of DEIJ in the context of water dialogues illustrates how inequities stem from unequal distribution of access to, benefits of, and protection from the harms associated with knowledge produced and transferred in water dialogues; exclusion from or inadequate participation in dialogue decision-making; and a failure to recognize the cultural identity and unique knowledge of underrepresented groups.

- Concepts from the literatures of discourse, diversity, social learning, and environmental justice provide a foundation for understanding the factors that influence equity in water dialogues.

- Just Water Dialogues, the conceptual framework that emerged from this review, applies a pluralistic approach and posits that failures along five interrelated dimensions of water dialogues can converge to undermine DEIJ, thereby affecting individuals, groups, and organizations engaged in, or potentially benefiting from, these dialogues.

- Findings from this study and recommendations for addressing DEIJ failures through effective engagement practice can be directly applied by individuals, groups, communities, and organizations engaged in water dialogues.

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and management (World Bank 2019). Four characteristics of water provide insight into why DEIJ matters in water governance and management. These characteristics are: 1) water is essential for all life, 2) water goods and services provide multiple benefits to human well-being, 3) distribution of water resources is temporally and spatially uneven, and 4) power asymmetries affecting water governance result from this uneven resource distribution (Neal et al. 2014). These water attributes have resulted in the identification of various water governance and management issues that can emerge when DEIJ factors are considered or overlooked. If DEIJ is valued by society, then it is essential to pursue it in all aspects of water governance and management.

In the United States (U.S.), the lack of DEIJ in water governance and management has been identified as a serious problem that affects the validity of decisions (Wutich et al. 2013). Diversity in the water resources field remains low, despite recent efforts to attract new talent and expand dialogues. While population demographics in the U.S. have been trending toward greater diversity, these trends are not reflected in most water institutions, decision-making processes, or dialogues. Older males dominate water occupations more than in the general workforce. The median age of U.S. workers was 42 years in 2018, while the median age for water treatment operators was 46 years. In the same year, only 15% of water-related jobs were held by women, compared to an average of 47% of women in the national workforce (Kane and Tomer 2018). Additionally, women have lower recruitment rates in water occupations, have shorter average work tenure, and exit at higher rates than men (World Bank 2019). Racial minorities make up a lower share of the water sector workforce than the national labor force. Together, African American and Asian workers comprised 11.5% of water jobs compared to 18% of the national workforce (Kane and Tomer 2018). Similar patterns are seen within professional water associations and water education (King et al. 2018; Karsten 2019; Ali et al. 2021).

Although there is a growing consensus that the lack of diversity in geosciences presents an inequity requiring action (King et al. 2018), decades of research, policies, and projects have shown that diversifying water resource disciplines remains a challenge (Layne 2004; Neal et al. 2014; Zwarteveen and Boelens 2014; Kane and Tomer 2018; Hegde 2020). Previous DEIJ research has focused mainly on disparities in water resources access, impact of water hazards, and workforce composition (VanDerslice 2011; Balazs and Ray 2014; Liang 2016; Schaider et al. 2019; Statman-Weil et al. 2020). However, review of the literature

did not yield any studies that examined DEIJ in relation to the dialogues associated with water resources, its governance, or its management, despite the significant role of water dialogues. Because water resources governance, institutions, processes, and practices at all scales involve dialogue, it is important to understand and explicitly account for DEIJ in water dialogues.

There are several barriers to increasing diversity and inclusion, but there are many benefits to overcoming them. In water resources, change has been slow (Hegde 2020) given that challenges may arise from feedback loops between low group diversity and exclusivity. When recruiting new members, groups exhibit a bias toward the familiar, which works against diversity (Razack et al. 2015). If a group's turnover rate is low, increasing diversity can take a long time, even in the absence of any bias (O'Brien et al. 2015). The relatively high percentages of males to females in water occupations persist (Kane and Tomer 2018; Hegde 2020), despite well-established evidence that gender diversity in the workplace can lead to positive outcomes (Hernandez et al. 2017). This is especially so where these outcomes are dependent on a variety of ideas and perspectives, such as information processing in teams (Chambers et al. 2017). Women have different types of knowledge, perceptions, experiences, and perspectives to apply to analyzing problems and tailoring solutions that may enrich water governance and management (World Bank 2019). This suggests there are benefits to increasing diversity and inclusion to enhance governance decision-making and outcomes.

Population growth and redistribution pressures, such as an aging workforce and increasing percentages of non-white demographic groups, are reshaping resource governance institutions in the U.S. These pressures, along with new technologies and methodologies, are driving changes; organizations are becoming more customer-focused (World Bank 2019). Considerations of DEIJ are important in times of change, especially when proposed changes to resource allocations, institutional rules, or physical systems will have societal impacts (Neal et al. 2014; Erkmen et al. 2021). As water governance personnel respond to pressures for change at all spatial scales, they will need to devise strategies, adaptations, and actions to address the varied requirements of an increasingly diverse population. So, understanding issues of DEIJ in the water sector takes on greater urgency.

Dialogues are present in institutions and processes including resource allocation; supply and infrastructure management; knowledge production and sharing; and individual, group, and organizational capacity development (King et al. 2018; Mercer-Mapstone et al. 2019; Erkmen et al. 2021; Lutz-Ley et al. 2021). The creation of inclusive dialogues within water organizations helps them embrace and effectively manage change, including changes prompted by diversifying participation (Razack et al. 2015; Day and Beard 2019). Creating and sustaining inclusive dialogues require an understanding of the differences among stakeholders, the system experiencing change, surrounding communities, and the organization's capacity to act. Dialogues also require an understanding of the interactions within specific contexts among different participants; their personal and organizational attributes, characteristics, and values; and how these attributes may hinder or support effective diversity actions.

There is no commonly accepted concept of what is meant by DEIJ in the literature. Inconsistent definition of key terms such as equity have emerged in policy documents, resulting in varying findings relating to DEIJ practices and initiatives (Tamtik and Guenter 2019). Many disciplines have unclear contextual variables and theoretical foundations in approaches to DEIJ. The water resources field is no exception. Even with the increasing prominence of discourse using political, technical, or economic rhetoric in relation to DEIJ, definition remains imprecise in the water resources governance literature. Research is needed to conceptualize DEIJ in water dialogues, develop methodologies to explore its properties, and devise theoretical approaches to explain its effects and impacts in and on organizations. Such actions can improve understanding, prediction, and management of DEIJ within dialogues in organizations or professional groups.

This paper draws from a broad DEIJ and social science literature to propose a conceptual

foundation for understanding DEIJ in water resources dialogues. The paper provides a review of the literature applicable to defining and characterizing DEIJ and identifying best practices to address DEIJ issues in water resources, with the specific aim of diversifying water dialogues. Three questions are addressed: 1) How is DEIJ defined, conceptualized, and measured in water dialogues?, 2) How does a lack of DEIJ in water dialogues affect water-related outcomes and actors?, and 3) What approaches can be used to increase DEIJ in water dialogues, especially with respect to underrepresented groups? Theories and conclusions from social science research, particularly from the fields of discourse, diversity, social learning, and environmental justice (EJ), were analyzed and synthesized to articulate a conceptual framework for understanding and addressing DEIJ issues in water dialogues. The proposed conceptual framework integrates the analytical results and indicates pathways toward expanding DEIJ in dialogues relating to water governance and management.

Methods

Study Design

We performed a systematic review of literature relating to water resources, dialogues, and DEIJ. Figure 1 shows a flow chart of the study design. The varied nature of DEIJ in water resources necessitated an approach that considered the perspectives of multiple disciplines, theories, and information sources or types. Because most of the research reported in the literature is qualitative, the study's narrative synthesis is qualitative.

Search Strategy

Figure 2 shows the search strategy and data analysis methods applied in review and synthesis of the literature. Systematic searches were conducted of peer-reviewed publications in the Scopus and Google Scholar databases. Search terms relating to definitions, theories, characteristics, measurement, and engagement strategies within three categories, dialogues, water resources, and DEIJ, were incorporated into the search queries. The searches returned 263 papers and 84 were
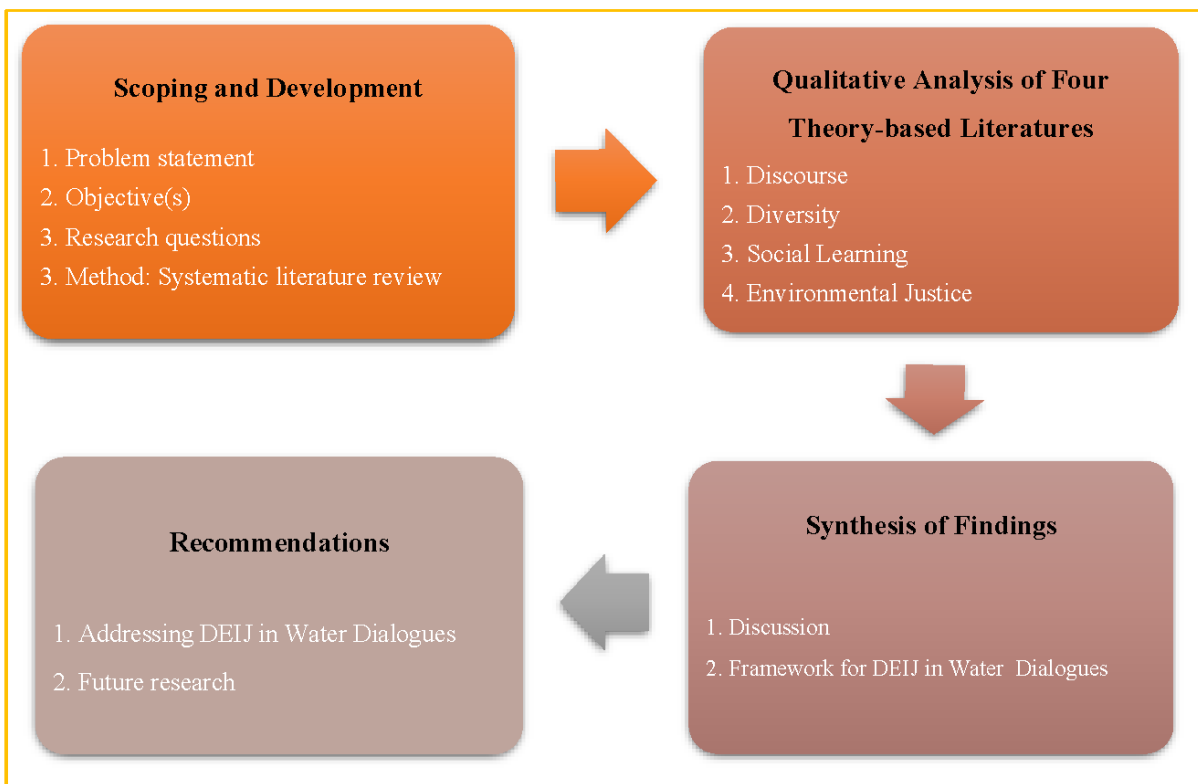

Figure 1. Flow chart of study methods and outputs.

selected for in-depth review based on defined exclusion criteria. An additional 23 citations from selected papers were pursued and reviewed. Additionally, grey literature, including reports and documents from conferences, workshops, and institutional websites, was scanned to identify current definitions, strategies, and practices that may not be captured in the published literature.

The study described herein employs an approach defined as theoretical pluralism: drawing upon multiple theoretical lenses to inform practice (Midgley 2011). The bulk of the studies identified for review came from four literatures: discourse, diversity, social learning, and EJ. Theoretical pluralism employs a systemic approach that requires examination of what each contributing
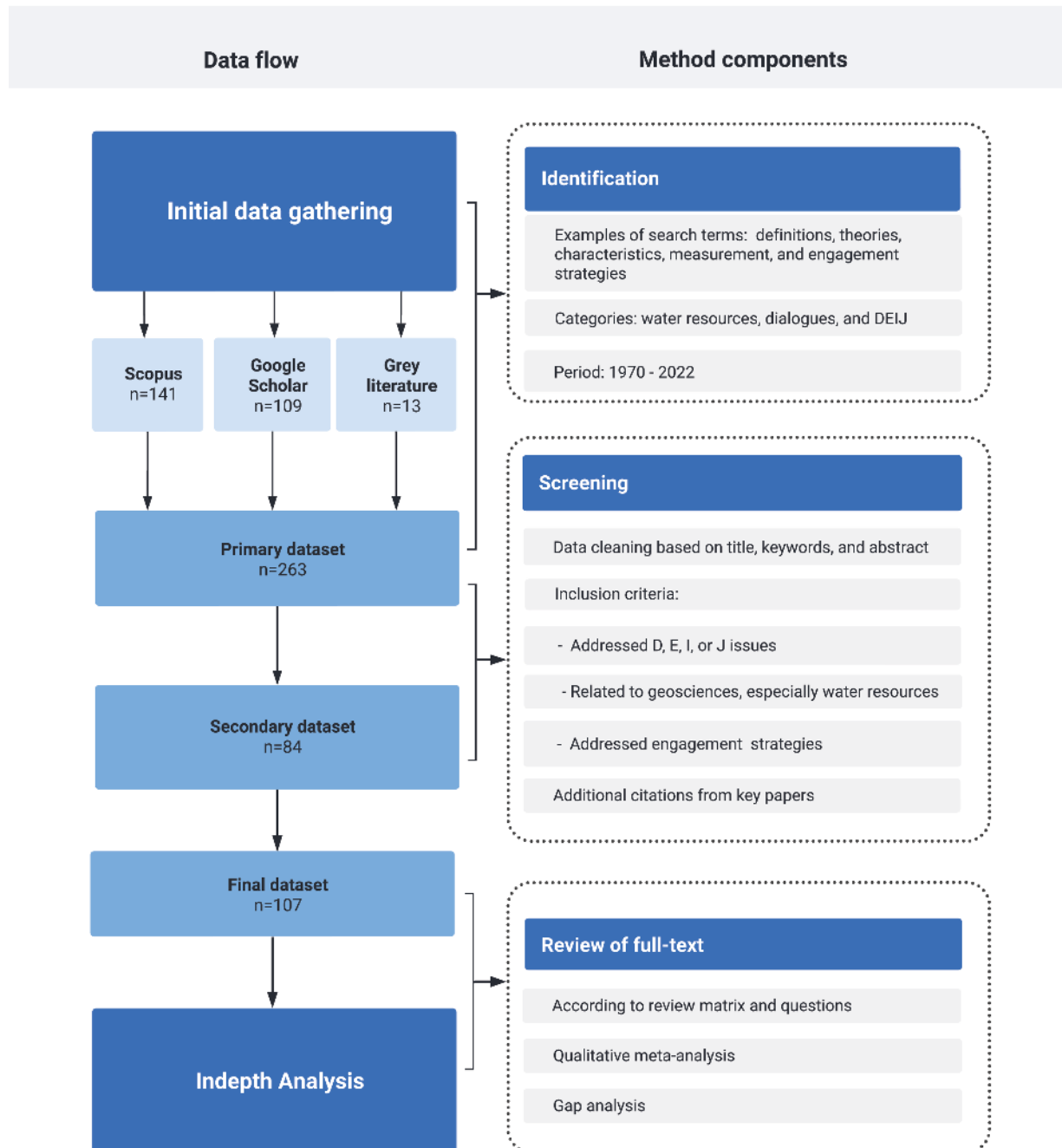

Figure 2. Data search and synthesis strategies.

perspective provides, how to decide among them, and how to reconcile conflicting perspectives into a coherent conceptual framework. This paper draws on predominant notions of dialogue to ground a single conceptual framework suggested by the literature of the four theoretical study areas listed above.

Definitions

Dialogue

Dialogue is a concept that has been characterized in many ways. It is the process of communicating, the forum of communication, and the output of a particular communication process. A dialogue can be open-ended learning, or a strategic undertaking aimed at achieving desired outcomes. It can be unstructured or designed with purpose and structure (Westoby and Dowling 2013; Mercer-Mapstone et al. 2017). Unlike ordinary discourse, dialogue is built on shared respect and the validity of all perspectives.

As the literature shows, dialogues are multi-dimensional spaces in which the characteristics of participants and their context interact. Bohm (1996) refers to "collective participation" to name an open-ended dialogue that convenes with no agenda, direction, topic, or theme, and that promotes fluid conversation while attempting to suspend personal opinions, beliefs, impulses, and judgments. Such dialogues focus on allowing all interests to voice concerns and individuals gain insight that is not achieved independent of the dialogue (Welp et al. 2006). The views of individual citizens are presented and defended, but participants do not negotiate positions, try to gain consensus, or win (Bohm 2004). On the other hand, Mercer-Mapstone et al. (2017) referred to dialogues in which a specific outcome is targeted, and dialogue processes are structured and consciously used to communicate and connect with the discourse of a certain field, discipline, agenda, or scenario. Water dialogues are structured communicative processes linking selected societal actors who are relevant for developing water governance and management, and professional and individual capacities. Relevant actors possess specialized knowledge, disparate life experiences, and insights that can vary from records on historical

water allocation and management expertise. Typical settings for water dialogues include meetings, conferences, workshops, universities, and professional associations.

Diversity and Inclusion

Diversity refers to any dimension of differentiation and reflects unique experiences within social, historical, political, and other contextual settings (Roberson 2019). Diversity considers differences between individuals on any attribute that may lead to the perception that another person is different from self (Williams and O'Reilly 1998). In academic and organizational practice, the study of diversity is heavily dominated by a limited set of dimensions: age, race, color, ethnicity, gender, tenure, and functional background. However, in principle, diversity entails an almost limitless number of attributes, which may include nationality, religion, training or education, and skill set, as well as political opinions, general attitudes, and values.

Diversity attributes can be placed into three categories. Some attributes are categorized as demographic diversity (e.g., age, ethnicity, gender, religion, sexual orientation, nationality, and family structure), based on the assumption that shared characteristics may have similar effects on individual group members. Similarly, functional diversity refers to a group of attributes based on job-related requirements (e.g., educational background and veteran status). Some attributes are categorized based on deep level diversity, which relates to psychological variables (e.g., personality, attitudes, and values) that are not easily discernible (Van Knippenberg and Van Ginkel 2010). Additionally, the concept of diversity incorporates differences stemming from where people have lived, their thoughts, and life experiences.

Inclusion extends diversity a step further to incorporate a call to action. The concept of inclusion refers to the extent to which individuals feel valued for their unique attributes and have a sense of belonging as an important member of the group (Brimhall and Saastamoinen 2020). Inclusiveness means recognizing individual talents and encouraging the full participation and contribution of each person in both formal and informal group activities. As illustrated in Table 1,

diversity and inclusion ask different questions and focus on different issues than efforts concerned with equity and justice (Stewart 2017). While an inclusive group is necessarily diverse, a diverse group is not always inclusive.

Equity, Justice, and Environmental Justice

Legal constructions of justice assert a uniform, formal framework for processes and outcomes based on the equality of all individuals before the law. In practice, however, frameworks that assert equality frequently ignore existing social differences, hierarchies, and implicit definitions of equality based on the characteristics, norms, standards, and interests of powerful groups (Boelens 2009). In contrast, equity indicates the consistent, systematic, fair, just, and impartial treatment of all persons, including those who belong to underserved communities that have been denied such treatment (US OPM 2021). Equity is defined by location, time, and group-based concepts of fairness. The ways society is ordered

Table 1. Comparison of Diversity, Equity, Inclusion, and Justice. Based on text from Stewart (2017), pg. 4, with quoted questions, copyright 2017 Inside Higher Ed.

Component	Focus	Types of Questions Asked	Measure of Success
Diversity	Valuing differences and increasing the numbers of underrepresented group members or perspectives.	1. "Who is in the room?" 2. "How many more of an underrepresented group do we have this year than last?"	▪ Representation from minoritized groups. ▪ Increases in numbers of minorities in group, forum, and institution. ▪ Incremental growth rates.
Equity	Reduction in harm via providing equal access based on need.	1. "Who is trying to get into the room but can't?" 2. "Whose presence in the room is under constant threat of erasure?" 3. "What conditions have we created that maintain certain groups as the perpetual majority here?"	▪ Increases in support for people's effective participation as reported by those who have been disadvantaged and targeted for inclusion. ▪ Types and degree of support provided relative to needs of minorities in the group.
Inclusion	Having a diverse candidate pool by fostering a sense of belonging, respect, and support.	1. "Has everyone's ideas been heard?" 2. "Is this environment safe for everyone to feel like they belong?"	▪ Records of balanced participation from all group members. ▪ Sources of all ideas considered show balanced impacts. ▪ Recognition for initiatives and credits for having a diverse candidate/membership pool.
Justice	Ensuring fair treatment, equitable access, effective practices, and accountability.	1. "Whose ideas won't be taken as seriously because they aren't in the majority?" 2. "Whose safety is being sacrificed and minimized to allow others to be comfortable maintaining dehumanizing views?"	▪ Getting rid of practices and policies that have disparate impacts on dominant versus underrepresented groups. ▪ Underrepresented group members' perception of fairness in participation.

are rooted in these specific contexts, which affect the distribution of resources, property, wealth, and authority (Zwarteveen 2006). This definition of equity, emphasizing its historical and place-based specificity, sets up tensions between different concepts of fairness. For instance, in educational science classes, efforts are growing to enhance representativeness to better reflect societal diversity (Layne 2004; Smith et al. 2009; Carr et al. 2015; Helitzer et al. 2016; Hoffman and Mitchell 2016; Irby-Butler 2017; West et al. 2018; Clark 2019; Tiwari et al. 2019). However, there is an inherent tension between these calls for representativeness in science classes and competitive student selection processes based on academic achievement. Political pushback from within academic excellence discourses has consistently prevailed over calls for greater demographic representativeness. Nonetheless, regardless of internal inconsistencies, examination of both formal justice founded on the principles of equality and socially perceived justice based on concepts of equity are necessary to gain a full understanding of EJ and justice in water matters (Boelens 2009).

Environmental justice is concerned less with equality and more with equity. It provides a lens through which equity and justice issues relating to water resources can be understood. The United States Environmental Protection Agency (US EPA 2020) defines EJ as the "fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies." Likewise, Brulle and Pellow (2006) define EJ as "the principle that all people and communities are entitled to equal protection of environmental and public health laws and regulations." These definitions specify that there should be unbiased representation of all groups, classes, and races that may be impacted by specific risks (Nelson and Grubesic 2018).

Stakeholder Engagement

Stakeholder engagement is a method for involving in the deliberation process those who affect and are affected by a plan, policy, law, or other decision. Dialogue is a form of stakeholder engagement. The literature identifies four distinct stages of engagement: 1) problem framing and stakeholder identification, 2) dialogue forum preparation, 3) dialogue facilitation, and 4) participant capacity development (Day and Beard 2019). Addressing complex water problems that demand ongoing, inclusive, and adaptive problem-solving requires participation from multiple stakeholders, often with conflicting visions, and heightens the need for integrative and effective DEIJ engagement strategies. Engagement strategy is defined as the actions adopted to achieve the basic long-term goals and objectives of an entity and the allocation of resources necessary for conducting these actions (Guillaume et al. 2017). The strategies employed often determine the impact or outcome of engagement efforts.

Sustained multi-stakeholder dialogues can promote just outcomes from adaptive resource governance (Zwarteveen and Boelens 2014; Lutz-Ley et al. 2021). The roles of stakeholders in water dialogues vary as the purposes of specific dialogues change. Participants may limit their contributions to witnessing the governance process and commenting on policy outcomes, or they may have significant involvement in the generation of new solutions, knowledge, and meaning. The process provides the various stakeholders involved with an opportunity to examine assumptions, revise perspectives, and learn as individuals and as groups. Within dialogues, debate and other interactions may build consensus on empirical and value disputes, or at least identify areas of prevailing disagreement (Welp et al. 2006). This provides opportunities to adapt water governance and management toward just outcomes.

Theoretical Frames

Multiple theories inform understanding of DEIJ in Dialogues. The literature of four established theoretical study areas relevant to DEIJ were reviewed for explanations of what happens in dialogues. Figure 3 shows these four theoretical study areas: discourse, diversity, social learning, and EJ. These are discussed in this section in relation to water dialogues and provide insight on how DEIJ may affect water-related outcomes and actors.
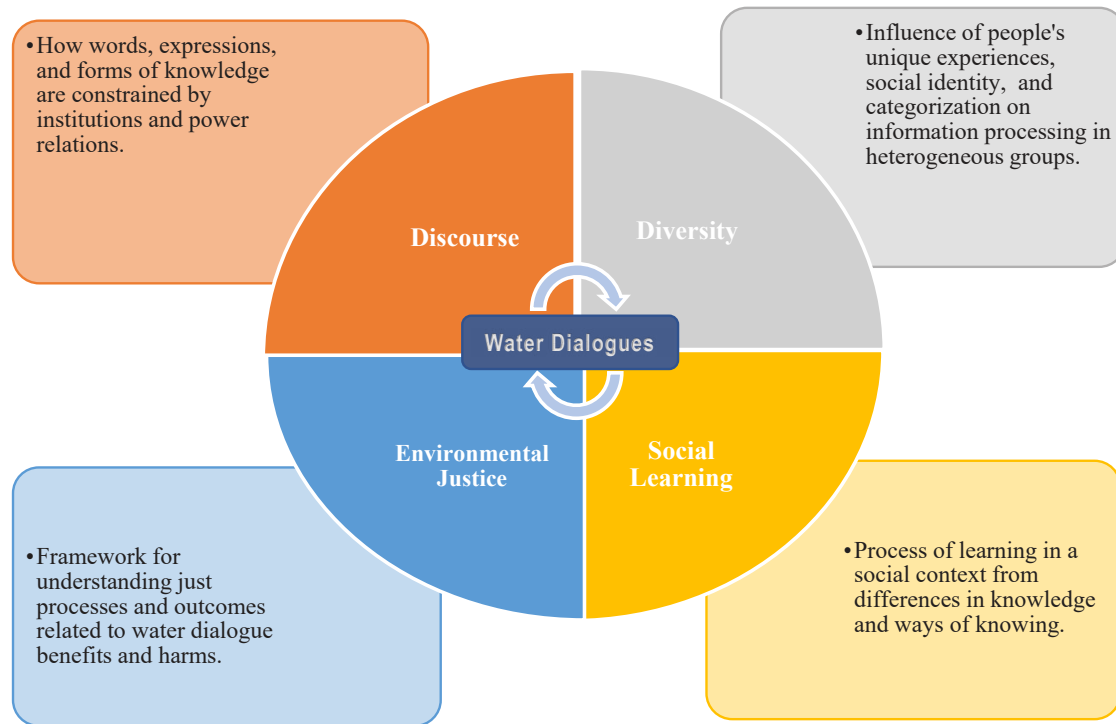
Figure 3. The four theoretical study areas contributing to a conceptual framework of DEIJ in water dialogues.

Discourse

Dialogues are the primary form of discourse. A discourse consists of statements, including those relating to truth, reality, morality, and behavior, which regulate how to talk about an issue. Within a discourse, it is difficult to think or act outside the boundaries imposed by these statements (Foucault 1975). This is because discursive practices are characterized by "delimitation of a field of objects, the definition of a legitimate perspective for the agent of knowledge, and the fixing of norms for the elaboration of concepts and theories" (Foucault 1977). Therefore, dialogues are theoretically grounded in the idea that discourse regulates social practices and the organization of social institutions (Razack et al. 2015).

Any institutional practice or technique in and through which social production of meaning takes place may be considered part of the discourse (Macdonell 1986). Meaning is expressed not only in speech and writing, but also in the consequence, order, and interchange of related verbal and non-verbal signs. Meaning is "embodied in technical processes, in institutions, in patterns for general behavior, in forms for transmission and diffusion

and in pedagogical forms" (Foucault 1971; 1977). Discourse analysis requires examination of the forces that shape thinking and understanding at the individual, organizational, and other scalar levels. Key issues in discourse analysis are accounting for the positions from which people speak, and the institutions that store and distribute the views that are expressed (Foucault 1977). Macdowell (1986) illustrates how statements made, and the meanings of words used, depend on characteristics of the speaker and the context in which the statements are made (e.g., different social classes may use and interpret the same words differently).

Discourses reinforce power relations, which tend to advance certain interests and groups over others (Macdonell 1986). Power relations are created and maintained by influencing definitions of acceptable ways of believing, thinking, and acting, or delineations of social boundaries that define the voices and interests that are considered in any given context (Razack et al. 2015). Statements of "truth" can serve to generate practices or processes that organize, classify, and divide individuals. Such political positioning creates an obstacle to effective dialogue and positive change (Eden

2011), especially when norms and rules serve to rationalize and depoliticize dialogues. One popular strategy used to depoliticize water problems is to place contentious questions outside of the domain of public debate; for example, by defining a question as being uniquely scientific. However, showing deference to science by defining questions only in scientific terms may reproduce historical patterns of exclusion and undermine the purposes of the dialogue.

Diversity

Researchers have utilized various theoretical perspectives to understand diversity and its effects on organizations and actors. The study of diversity's influence on varied processes and outcomes has primarily been conducted within business organizations and has produced unique insights into people's professional diversity-related experiences (Kane and Tomer 2018; World Bank 2019). There has been a significant evolution in the understanding of the meaning, operation, and effects of diversity in organizations.

Scholarship on diversity has been historically grounded in social psychological theories of intergroup relations. Such theories articulate the formation and functionality of social stereotypes wherein differences are viewed as social distinctions that impede intergroup relations. Some researchers cite two main differences underlying diversity: differences in readily detectable attributes such as sex, age, and ethnicity (social category diversity); and differences in less visible underlying attributes that are more job-related, such as functional and educational background (informational/ functional diversity) (Van Knippenberg et al. 2004). Regardless of categorical labels, diversity research and practice have focused on the impact of diversity on group process, performance, and diversity management. Two theoretical perspectives have dominated diversity research: the social categorization perspective and the informational resources perspective (Williams and O'Reilly 1998; Van Knippenberg and Van Ginkel 2010).

Three theories that frame the social categorization perspective studies include social identity theory, self-categorization theory, and similarity-attraction paradigm. Social identity theory proposes that people's definitions of self are shaped by their group memberships, so they are motivated to enhance their self-concept by seeking a positively valued distinctiveness from those groups (Tajfel 1978). Self-categorization theory posits that people tend to categorize themselves and others based on the social environments in which they are located. As social categories become salient, people tend to view themselves more as representatives of social categories than as unique individuals. Such differentiation manifests as biases favoring members of ingroups over those they view as belonging to other social categories (Hogg and Turner 1987; Hogg and Terry 2000). The similarity-attraction paradigm (Byrne 1971) expands theories of social identity or categorization. It hypothesizes that people are attracted to those they perceive as similar and are inclined to seek interactions with similar persons. This is based on salient factors such as demographic characteristics and expressions of (or assumptions about) values and attitudes. In self-defined meritocracies, privileged individuals seeking admission can use explicit strategies to "fit in" and demonstrate their recognition of established power dynamics (Razack et al. 2015) - a strategy not available to most individuals from disadvantaged groups. Similarity-attraction is likely to produce distinctions between in-groups and out-groups and shapes social interactions between groups (Roberson 2019).

Within the informational resource perspective on diversity, the value-in-diversity hypothesis (Cox and Stacy 1991) points to evidence that categorical dissimilarity creates variances in skills, knowledge, and experiences in groups. It assumes that heterogeneous groups have access to larger and more varied informational resources and therefore are more likely to generate better quality solutions to problems. Empirical research provides evidence of this performance advantage (Cox and Stacy 1991; Roberson 2019).

Some scholars have tried to integrate and reconcile theories of the influences of social identity and categorization with those of information processing in heterogeneous groups. In particular, the categorization-elaboration model (Van Knippenberg et al. 2004) posits that intergroup biases emanating from social categorization

processes may interrupt information exchange crucial to realizing the value in diversity. Guillaume et al. (2017) identify various contingency factors that determine the degree to which diversity leads to positive or negative outcomes. Facilitation may be needed to prevent intergroup biases from blocking the performative benefits of diversity and to foster the exchange of knowledge and perspectives derived from diversity. Individual and group information processing, information expansion, and the exchange and integration of knowledge-based resources within the group may also require facilitation (Roberson 2019).

Social Learning

Social learning, as the process and outcome of working together on a shared problem or question, bears directly on water dialogues. In dialogues, social learning provides a mechanism to connect diverse ways of knowing, producing, and sharing knowledge (Owen et al. 2019). Social learning theory suggests that differences drive learning in social contexts. Social learning theory emphasizes processes of observing, modeling, and emulating the behaviors, attitudes, and emotional reactions of others. Both environmental and cognitive factors interact to influence human learning and behavior (Balazs and Ray 2014). New knowledge emerges from working together in the social learning context and interactions change the understanding and beliefs of participants relative to the problem (Faysse et al. 2014; Akpo et al. 2015). The value of social learning as a process for fostering dialogue and as a product of dialogue has been demonstrated in the literature. Learning occurs when dialogues incorporate multiple viewpoints and create space for individual and organizational transformation (Owen et al. 2019).

Dialogue, as a group communication and interaction process, plays a key role in social learning. Welp et al. (2006) described three primary outcomes of water dialogues: production of new knowledge, increased odds of this knowledge being used in governance and decision-making, and improved capacity to develop and utilize water knowledge. The specific knowledge held by different actors can vary from scientific or technical expertise, through management or administrative experience, to the observations of community members and citizens. In contrast to discourse, social learning dialogues accept different kinds of knowledge on an equal footing. Meaning flows freely between participants, and individuals gain insight that is not achieved independent of the dialogue (Bohm 2004). Scientists need access to the knowledge of stakeholders to better understand, represent, and analyze water problems, define models, and identify solutions (Welp et al. 2006). As a social learning process, water dialogues help to build an expert belief system through communication and interaction with stakeholders that provides a more realistic and complete picture of water issues.

Environmental Justice

As described above, multiple notions of what constitutes justice exist simultaneously in EJ. Contributions have come from various disciplines; each adds valuable insight by applying different perspectives and approaches to EJ research (Nelson and Grubesic 2018). EJ theories have expanded significantly in several ways since their inception in the 1970s. Early EJ theories focused primarily on distributive equity; profoundly uneven social and geographical access to environmental amenities and exposure to environmental harms were viewed as demonstrating injustice (Wutich et al. 2013). Initial discussions and actions focused on prevention or mitigation of pollution and the allocation of pollution impacts and costs. Later, EJ examined demands for a focus on environmental outcomes (Zeitoun et al. 2014) and restorative actions based on historical responsibility. The per capita equity theories of Jamieson (2001) and Singer (2004) applied existing notions of distributive justice to the climate debate, while Caney (2006) took a rights-based approach to climate justice. In addition, the scope of EJ discourse and research has expanded to include a broader range of topics, geographic areas, new methods (such as spatial analysis) (Sze and London 2008), and demographic categories (e.g., ethnic groups, women, and youth), rather than only place-specific communities/individuals. The use of the term has diffused vertically to issues such as food security or Indigenous rights, and horizontally to alternative ideas, meanings, and framings from outside the U.S. (Walker 2009a; 2009b).

Recently the EJ discourse has moved toward a framework wherein both the natural and non-human environment interact to create the conditions for justice (Schlosberg 2013). Early notions of environment as wilderness were combined with a broad recognition of environment as including places where humans live, work, and play (Novotny 2000; Agyeman 2005), thus acknowledging the value of natural systems to both human and non-human well-being. EJ moved beyond description and documentation of inequity to the cultural and institutional structures that contribute to it. Nelson and Grubesic (2018) showed that EJ research came to focus on the distribution of environmental amenities. This conceptual shift considers that a working environment is required for justice and involves creating material flows and human practices that do not weaken environmental processes and systems. Drawing from EJ work that examines the reallocation of incomes, resources, and power because of changes to the environment, Schlosberg (2004) conceptualized EJ as a trivalent construct that includes dimensions of resource distribution, cultural recognition, and participation in decision-making. In this construct, justice requires not only an appreciation of unjust distribution of environmental benefits or harm and lack of recognition of the cultural identities of marginalized groups by dominant institutions, but also the interaction between the two in political and social processes and decisions that affect their environment (Zwarteveen and Boelens 2014). Schlosberg (2007) expanded the trivalent construct to include a capabilities dimension, which entails the rights of individuals to the things that allow or assist us to translate basic goods and services into conditions necessary to live a good life. In this case, capabilities move beyond only being concerned with the amount of goods an individual gets, to consider what those goods do for the individual's well-being.

Fricker (2007) contributed the concept of epistemic justice, which is people's right to be respected in their capacities and identities as knowers. This demands that the experiential and observational knowledge of local environmental conditions be given the same weight in decision-making as the knowledge of credentialed experts (Ottinger et al. 2017). Zwarteveen and Boelens (2014) articulated the concept of water justice by adding a socio-ecological integrity component that considers the relational coexistence of human and non-human ecologies as a matter of justice. Injustice issues may arise due to the interplay of power and politics with natural resources allocation and ways of thinking and talking about resources via complex, contested processes. The evolution of EJ conceptual models suggests the convergence of theoretical approaches on the value of DEIJ and, by extension, the importance of diversifying water dialogues. The paucity of studies applying EJ theories to water dialogues, however, leaves unillumined important factors, including how relevant information and knowledge is shared, who participates, and how dialogue processes may affect the creation and perpetuation of injustices in the water sector (Tamtik and Guenter 2019).

Discussion

Theoretical constructs contribute to a framework for understanding DEIJ in water resource dialogues. In some ways, the water discourse landscape may seem far removed from the urgency of local struggles over water access experienced by underserved people and communities. Some dialogues reveal issues of EJ due to low DEI that never generate disputes but manifest instead as silent hardships. Water dialogues frequently relate to active conflicts over whose interests will be prioritized in allocating and regulating water use. The initiation of dialogue on water reallocations or other forms of change, such as constructing dams that displace communities, can ignite conflict (Vos et al. 2006; Ahlers 2010; Zwarteveen and Boelens 2014). However, some actions trigger exclusion from access to and benefits of dialogue knowledge resources, especially when change advocates challenge the culture of existing dialogues and forms of knowledge. Although some of these situations attract significant attention, many involve subtle and extended struggles by underrepresented groups.

Insights from the four literatures reviewed herein (Figure 2) can inform understanding of DEIJ issues present in water dialogues. These four theoretic literatures contain several concepts that are important to identifying, understanding,

analyzing, and addressing the lack of DEI in water dialogues, which may lead to justice issues. The concepts open opportunities to deepen understanding of specific and interconnected political, socioeconomic, technical, biophysical, and cultural drivers that promote or inhibit DEIJ in water dialogues.

Just Water Dialogues: A Conceptual Framework of DEIJ in Water Dialogues

In this section, a conceptual framework is provided to show how the lack of, or low levels of, DEI in water dialogues can lead to injustices, especially for persons in underrepresented groups. We term these DEIJ failures in water dialogues as "water dialogue justice." Building on the exposition of the four components of justice by Schlosberg (2013), Zwarteveen and Boelens (2014), and others (i.e., distribution, recognition, capabilities, and participation), it is posited that the domain of DEIJ in water dialogues contains five interrelated

dimensions. These interrelated dimensions: 1) knowledge distribution, 2) participation, 3) social boundaries, 4) capabilities, and 5) scale and measurement, can converge to create instances of water dialogue justice and affect individuals, groups, organizations, and networks engaged in water dialogues. Figure 4 illustrates the proposed conceptual framework for just water dialogues and the interactions among and between the five dimensions.

Knowledge Distribution. The knowledge distributional dimension of water dialogues relates to questions of: Who has access to water dialogues?, How is information produced in these dialogues?, and How is access to information allocated? The ultimate distribution of benefits and harms depends on access to information. A lack of equitable access to information provided via dialogues can create injustices. Kibler et al. (2014) show how uneven access to hydrometeorological data and information in a river basin differentially affected the capacity
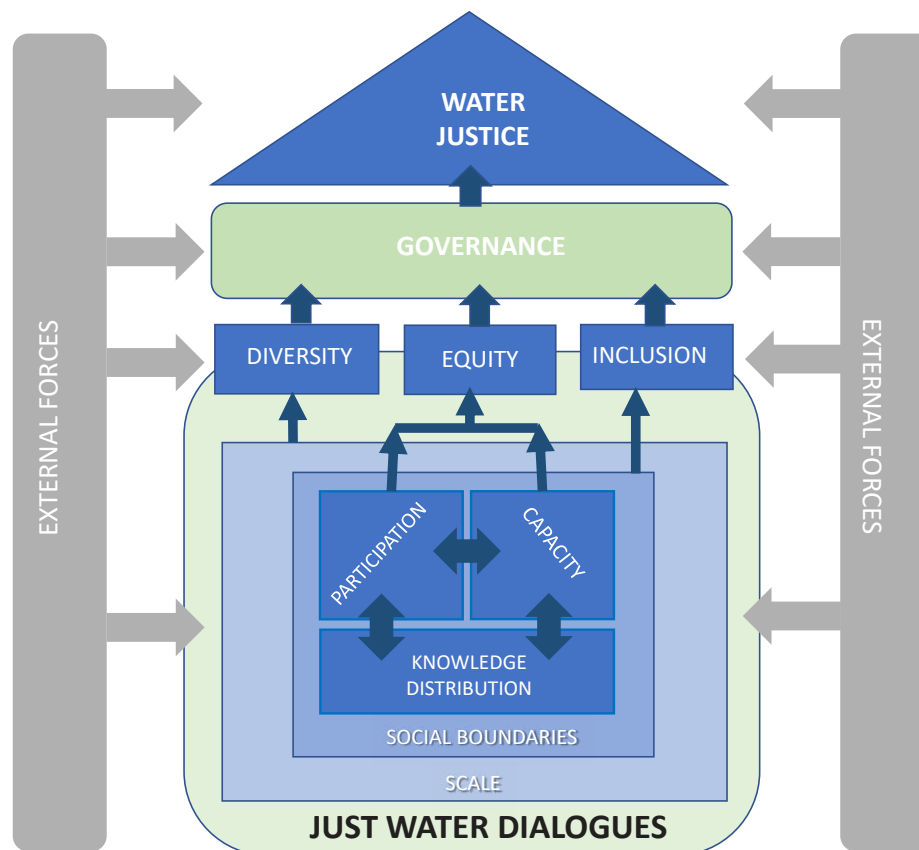

Figure 4. Conceptual framework of Just Water Dialogues.

of groups or individuals to increase their resilience to extreme hydrometeorological events. Despite codifying principles of equal access to data in formal agreements on basin-wide water allocation, at sub-basin levels, hydrometeorological data access principles were often ignored, and data were seldom shared across organizations operating in different sub-basin or geopolitical units. In the most downstream nation in the basin, precipitation and discharge stations fell significantly below minimum recommended densities, resulting in vastly ungauged areas and extremely limited data. The disparity in access to, and distribution of data and information impeded the application of basin-wide, data-driven, empirical models to forecast extreme events. Additionally, it may lead to injustice in terms of knowledge and capacity in some communities for increasing resilience to extreme events.

Science and technology can aid or inhibit knowledge production and distribution in ways that may lead to unjust outcomes. Two aspects of science and technology have important implications for knowledge-generating practices in water dialogues and decision-making. First, choice of technology can have unequal effects, benefiting some people to the exclusion of others (Ottinger et al. 2017). It can also advantage some values or knowledge systems. For example, dialogues that take place virtually, requiring broadband access, or at spatially concentrated, in-person meetings, have historically favored densely populated, urban communities over sparse, rural communities. Similarly, the use of scientific and technical language, and the communication method may affect participation by some underrepresented groups in the production and distribution of knowledge via water dialogues. Second, the professional practices, identities, and ethical codes of scientists can shape knowledge resource availability in marginalized communities (Ottinger et al. 2017). Despite the evident contribution of engineers toward DEIJ in industrial and development water projects, the enduring engineering culture that prioritizes technical over social aspects of solutions (Felt et al. 2016) tends to impede progress toward more equitable resource access outcomes and knowledge production. Some groups may deem other non-engineered solutions valuable. Therefore, such imbalance in access to

and coproduction of water knowledge may lead to suboptimal outcomes for underrepresented groups, especially when the knowledge is used in water governance and management.

Participation. The participation dimension concerns not only who participates, but also whose participation, priorities, and interests are privileged in water dialogues. In water resource professional dialogues, Shames and Wise (2017) found tensions relating to gender and methodology, wherein scientific methods are privileged. Research shows the dominance of specific methods and contribution types in the dialogue at geoscience conferences, along with considerable gender differences in the methods used, intellectual contributions made, and practical justifications articulated by presenters (King et al. 2018). Often, such dominance discourages the participation of women and racial minorities in many governance public processes and dialogues. The result is that the voices of disadvantaged groups may be subordinated by more privileged participants due to contextual and procedural factors. These factors include the fact that men have historically dominated water resources and other geoscience fields, and continue to dominate subfields of certain methods; that men disproportionately enter and remain in certain subfields and the larger water workforce; and that men are more likely to enter graduate programs with more mathematical and science training. Also, women may seek female mentors (Kane and Tomer 2018; King et al. 2018), but with fewer female mentors available, women are less likely to advance to leadership. It is important to also recognize that when access costs are high, economic hardship makes equitable participation in water dialogues difficult for multiple reasons (Zwarteveen and Boelens 2014).

Scientific knowledge may be used to limit the ability of individuals and groups to participate effectively in the design of and discussion within water dialogue processes. Increasing DEIJ in water dialogues is hampered by the practice of seeking scientific solutions for contentious political questions, thus avoiding public debate. Evidence from the literature shows that even when the search for solutions remains in the public realm, expert knowledge is privileged over other ways of knowing in public processes and dialogues in water

governance and management. Public comments on issues are also routinely reinterpreted and reframed using scientific constructs (Mercer-Mapstone et al. 2019), which discourages participation by individuals with non-scientific knowledge.

Ottinger et al. (2017) explain that when not framed as expert knowledge, individual, group, or community input is marginalized, misunderstood, or overlooked. However, local and experiential knowledge often serve as the basis for community-initiated investigations of water pollution and key water resource solutions. These authors show that knowledge generated through local ways of knowing often has driven action to address water pollution hazards, like the contamination of drinking water supplies that occurred in Flint, Michigan in 2014. Community groups may use different standards of proof, ask different questions, seek ways to sustain resource access and values, and seek to address threats to the resource, rather than only assess regulatory compliance (Ottinger and Cohen 2011; Ottingeret al. 2017). Although there is merit in non-scientific, local knowledge and perspectives, they may be excluded from water dialogues.

Social Boundaries. Shared norms, practices, resources, tools, routines, language, interests, and histories create boundaries within and around each water dialogue. These boundaries are negotiable and may be fluid (Wenger 2010a; 2010b), but they determine whose norms or rules are accommodated or determine the distribution of and access to knowledge produced in the dialogue. Learning occurs through social interactions within and across these boundaries, such as when people are challenged to recognize new points of view, new approaches, and new problems (Owen et al. 2019). Organizations like The University of Arizona Water Resources Research Center can function as bridging organizations that reach across boundaries to communicate, convene, consult, collaborate, and build capacity through water dialogues (Mott Lacroix and Megdal 2016; Mott Lacroix et al. 2016; Owen et al. 2019).

Boundaries may be used to distinguish in-groups from others, sometimes based on class, ethnicity, gender, or age. The norms shared in bounded groups may become entrenched and serve to rationalize failures in DEIJ (Zwarteveen

and Boelens 2014). A boundary separates scientists and water resource professionals from other dialogue participants. Scientists and professionals integrate their cultural identities, interpretations, and experiences into their work, and these personal characteristics often shape dialogue norms and rules. The procedural and interpretive choices involved in research and related dialogues necessitate value judgments (Zwarteveen and Boelens 2014; Roberson 2019), such as which questions to study and methods to use. Scientists often make these judgments based on group norms without understanding how their values might differ from those of other groups or communities. People without scientific or professional credentials integrate their cultural identities, assessments of scientific claims, and local, vocational, and experiential knowledge into their understanding of water resources, and that may be quite different from that of scientists and professionals (Wynne 1996). The result of a deference to scientific or expert knowledge has been a longstanding marginalization of local knowledge and non-scientific 'ways of knowing' based on socially constructed boundaries.

The marginalization of local and non-scientific knowledge and underrepresented groups in water dialogues, due to socially constructed boundaries, is then justified. The low participation of racial minority group members is often deemed a lack of interest, or the natural result of few minority group members being in the field, rather than as a problem of social boundaries, power relations, or information distribution. Frequently, common information dissemination methods such as the internet, organizational websites, and email listservs, are used without examining the effect on participation DEIJ. Public dissemination channels are often used to distribute information to depoliticize participation (or lack of participation) in the dialogue, despite these channels being ineffective in reaching some marginalized groups (Zwarteveen and Boelens 2014). An example is that using only virtual distribution channels when isolated rural and/or poor communities have low internet connectivity limits their participation. Various theories suggest that any choice mediated by humans, influenced by their power relationships, and subjected to individual

or group membership biases and norms, can construct participation scarcity beyond natural occurrence (Hogg and Terry 2000; Roberson 2019), and may drive injustice. The assumptions made distract attention from the choices made by in-groups, based on membership biases and norms that act as selective barriers, and can explain low participation rates by some groups. Additionally, exclusion of underrepresented groups may occur because conveners of dialogues do not know how to effectively engage them and, at the same time, marginalized groups do not have information about the opportunities to participate.

Capabilities. Within theoretic literatures, knowledge is a contestable, contingent set of socially produced claims that are intertwined with relations of power rather than existing separately from the political sphere (Fricker 2007). Water dialogues, meanings, and the production of facts are intrinsic to inequitable water policies. Concepts of truth and meaning emerge through social processes in which agreement, persuasion, belief, culture, and viewpoint play a role (Zwarteveen and Boelens 2014). The capacities of individuals and organizations to influence water governance and management are enhanced via three primary benefits that result from interaction in water dialogues: new practice-based knowledge, increased odds that this knowledge will be used in decision-making, and enhanced capacity to develop and utilize practical water knowledge (Welp et al. 2006). Pierre Bourdieu's theory of capitals proposes the concept of capital as the resource from which capabilities are derived. Within water dialogues, several types of social, economic, cultural, and symbolic capital compete, interact, and mediate individual standing and opportunities to influence the process and outcomes (Razack et al. 2015). Individuals may occupy various positions of power depending on their specific capital endowments relative to others operating and competing within dialogue processes.

The relative power of individuals may determine "Whose truth prevails?" in dialogues. The knowledge that is formed through dialogues may reflect power relations in ways that are consequential for water dialogue DEIJ (Zwarteveen and Boelens 2014; Razack et al. 2015). People and organizations endowed with high economic and political capital hold advantaged positions in water dialogues. Money and status flow to actors, programs, and organizations exploring topics of concern to government and corporate interests at the expense of topics important to less powerful groups. Because resources that enable research and dialogue flow overwhelmingly to areas of interest of political and economic elites, underrepresented communities living with water hazards tend to face systematically incomplete or unrepresentative knowledge (Hess 2007; Frickel et al. 2010). Therefore, dialogues dominated by elites have the potential to aggravate DEIJ failures in water resources, especially when people rely on these dialogues to gain knowledge and develop skills to effectively participate in decision-making (Ottinger et al. 2017). This often translates to a capability effect for individuals and groups who have limited access to knowledge transferred through dialogues that is diverted to others with less need.

Advantaged institutions, organizations, and individuals also frequently control problem framing. Water resource problems tend to be complex and subject to both factual uncertainty and conflicts over values. They are difficult to frame in ways that produce consensus on acceptable solutions. Empirical research indicates that how an issue is framed strongly influences the answers people give to related questions (Wynne 2005). Dialogues can be framed using specific discursive strategies to legitimize organizational perspectives. Strategically framed corporate communication has been used to gain prominence and public support in a social media context. Providing evidence-based facts and external experts as reliable and neutral sources and echoing words and actions of supporters are strategies used for advancing the organization's perspective. Also, when challenged, organizations manage dialogue by delegitimizing arguments that run counter to their view (Ravazzani and Maier 2017).

Framing is central to water dialogues because it can enhance or depress DEIJ. In water dialogues, framing shapes meaning by stipulating what is included, excluded, emphasized, and contextualized (Ravazzani and Maier 2017). Thus, framing has real consequences for water governance and management outcomes. For example, public misunderstanding, mistrust, or skepticism of the scientific discourse on risk, may relate to how risk

issues are defined and how the risk discourse is constructed (Welp et al. 2006). Political priorities and public behaviors at odds with natural resources and public health recommendations are the likely result.

Scale and Measurement. Measurement and the scale of measurement can serve to perpetuate DEIJ issues in organizations and dialogue programs. For instance, dominant water scarcity narratives start from the perceived imbalance between water supply and demand, which implies that solutions involve strategies to increase supplies or reduce demand. Scholars have criticized the narratives and frames of absolute water scarcity in policy debates for prioritizing quantitative metrics and ignoring issues of poverty, uneven water access and distribution, and the appropriation of water by powerful interests (Jairath 2010). If water scarcity is socially constructed, implicit in the question "is there sufficient water?" is the related question "sufficient for what, for whom, and where?" (Jaffee and Case 2018). In their study of conflict over groundwater extraction, Jaffee and Case (2018) showed how various actors deploy contextual ambiguities in water scarcity narratives or discourses to advance or defend their positions. The research illustrates the use of power relations, language, and framing to define water scarcity at convenient geographic and temporal scales, volumes, and economic impacts. They concluded that the issue of hydrologic scarcity masks deeper issues of economic and social justice at the heart of the water resources conflict. Therefore, measurement considerations are crucial to understanding water dialogue justice.

Water sector DEIJ issues are scale dependent. Assessment of fairness may change with the temporal and spatial units of analysis. Spatial and temporal scales used to evaluate DEIJ are contested social constructs that change with choice, definition, and decisions about scales (Zwarteveen and Boelens 2014). Evaluating the DEIJ of a water dialogue depends on how the boundaries of the system are defined. For instance, the diversity of participants in national professional associations may look entirely different from local counterparts. While membership and leadership in a national association may reflect low DEIJ, in any local association DEIJ may be high due to local factors. Equally, a local chapter may reflect low DEIJ relative to local population demographics. Shifting scales may be used as a strategy to change perceptions of inequity. DEIJ within an online seminar offered by a local entity may rise over time by expanding the area from which participants are recruited, but this expansion may be detrimental to local participants. Local participants may unfairly lose access to effective participation, leadership positions offered by the local association, and the knowledge transferred in the seminar. However, the seminar may be deemed inclusive because it includes participation from a larger and potentially more diverse national audience. Therefore, to address DEIJ deficits in water dialogues, explicit consideration needs to be given to understanding the contextual functioning of scale, including how it affects DEIJ measurement.

From Theory to Practice

The four groups of theories applied herein to conceptualize DEIJ issues in water dialogues come from a variety of sources, represent a range of fields, and reflect multiple aspects of water resource policy and practice. In combination, these theories point toward best practices for enhancing DEIJ outcomes in water dialogues.

Marginalized groups face unique challenges to engage in and benefit from dialogues. Dialogues that explicitly consider issues of DEIJ may be better positioned to reach these groups. Omitting consideration of DEIJ variables from evaluation of organization and program performances may limit the ability to serve marginalized communities, or even worse, may create new disparities (Ramos et al. 2021). Policies and initiatives to promote DEIJ can be undermined if the indicators used to define and measure DEIJ attainment reinforce existing disparities and hierarchies (Chambers et al. 2017). Karakhan et al. (2021) identify ten indicators that influence the achievement of DEIJ. The literature suggests that metrics and frameworks that perform exceptionally well are those that combined multiple standardized and validated measures with scales of measurement. However, while the literature provides various broad frameworks for assessing DEIJ, there are few studies that provide specifics on how to identify applicable indicators and determine their level of influence.

The just water dialogues framework can be deployed to evaluate DEIJ issues by illuminating the influences and interactions of access to knowledge, participation, social boundaries, capabilities, scale, and measurement. The framework anticipates methods for addressing DEIJ in water dialogues that differ and may conflict. Despite the interconnectedness of cultural, representational, distributional, and capabilities elements that leads to DEIJ failures in water dialogues, there is value in distinguishing them. For instance, in professional organization dialogues, recognition of racial minorities and women often means calling attention to people as members of a category and then affirming their value to organizations and dialogues. Alternatively, redistribution of access to leadership roles may require eliminating economic or political categorizations that underpin group norms. These solutions promote the right to equity as individuals instead of focusing on the right to be different as an identifiable group. Acknowledging such tension between satisfying individual or group claims is crucial to advancing DEIJ goals. Therefore, it is important to examine how bridges can be established across differences to address inequities in water dialogues, including through effective DEIJ engagement across contexts, locations, scales, and identities (Schlosberg 2004; Zwarteveen and Boelens 2014).

Research on admission to educational institutions indicates that policymakers addressing diversity and equity issues should explicitly recognize the power dynamics at play. This can enable greater inclusion by promoting multiple kinds of excellence, thereby challenging traditional notions of the meritocracy (Razack et al. 2015; King et al. 2018; Tamtik and Guenter 2019). It also helps to avoid unwanted exclusion based on one authoritative definition of excellence that consistently prevails over greater demographic representativeness. Recognizing inherent power relations also aids in identifying entrenched privilege in group selection processes that challenge the claims of meritocracy.

Methods proposed to improve participation of marginalized groups in water dialogues tend to apply "one size fits all" engagement systems. Two types of approaches are evident in the literature: broad engagement frameworks and general strategies (Akhmouch and Clavreul 2016).

General strategies identified in the literature to enhance engagement, recruitment, and retention from underrepresented groups include professional advocacy, mentorship, improving the participation environment, maintaining the flexibility of methods and modalities, and enhancing educational opportunities for new participants (Mallett et al. 2021). There is limited empirical evidence on application of these strategies and frameworks to guide practitioners seeking to improve engagement of diverse participants in water dialogues. The Center for Diversity and Global Initiatives reported several effective strategies for facilitating outreach and dialogues: case studies; simulation; coaching; role-modeling; and integrative dialogic practices that link various knowledge bases to intellectual, ethical, and technical decision-making (NLN 2017). The suitability and efficacy of each strategy may depend on the dialogue context, including the element of DEIJ characteristics and the targeted audience.

The current focus on engagement as a mechanism for addressing water dialogue justice is hampered by a lack of studies looking at the experiences of marginalized communities and the barriers that prevent their full participation in dialogues. Critically questioning established discourse norms, power relations, and contextual factors in water dialogues can result in recontextualizing and reorganizing the power relations in dialogues. It can also expose the specifics of place, time, and position of the knower(s) associated with dialogue outcomes (Zwarteveen and Boelens 2014). Making research useful in engagement practice requires sensitivity to the effects of certain discursive representations and frames on experiences, problems, and solutions and on knowledge generation and transfer in water dialogues. Deriving participant engagement best practices would involve visualizing power mechanisms operating within established discourse and illustrating how to address factors that can disguise distributional and representational issues.

A Convergence of Recommendations Suggests Effective Pathways to Increasing DEIJ in Water Dialogues

The literature described herein provides an initial set of parameters with which to identify and

address water dialogue justice via diverse, equitable, inclusive, and just engagement in water dialogues. The proposed five-dimensional framework of Just Water Dialogues links the literature to the water resources field and water dialogues specifically. The following recommendations are made to inform practices to enhance DEIJ in water dialogues.

- Knowledge production and distribution are key to enlarging engagement of diverse voices in water dialogues. Increasing DEIJ requires breaching of social boundaries that inhibit knowledge distribution. Sufficiently broad knowledge distribution will depend on insights into norms and rules that perpetuate exclusivity based on power relations, normative practices, and interactions with contextual factors and structures at various scales.

- There is a basic need for awareness and overt consideration of the ways discourse frames realities, problems, and solutions in knowledge generation and transfer, and how certain discursive representations and power relations affect individuals and groups.

- The water sector faces the challenge of developing processes for increasing DEIJ that account for the limits of scientific knowledge and the need to incorporate experiential knowledge into dialogue and decision-making. More work is needed to understand why science and expert knowledge are deemed authoritative in some cultural and socio-political contexts but not in others. This work should consider whether and how assertions or assumptions of scientists and other experts are at odds with community values and views.

- Because of the strong context dependence of water dialogues, standard, one-size-fits-all engagement methods proposed to improve the participation of underrepresented groups may be insufficient or may not lead to diversity improvement. Context-sensitive engagement design can improve DEIJ in water dialogues (Ottinger et al. 2017; Brimhall and Saastamoinen 2020).

- Promoting diversity and inclusion in organization mission, leadership, staff, outreach, dialogue programs, and processes is important. Emphasizing efforts to recruit, retain, and engage a diverse group of water dialogue participants is especially crucial, as is planning and executing an inclusive water dialogue program, and establishing partnerships that support increased diversity, equity, and inclusion.

- Several practices are recommended in relation to the four stages of engagement. First, early in the problem-framing and stakeholder identification and selection, water dialogue facilitators should engage varied marginalized communities and share control over framing the engagement program scope. Practitioners argue for more nuanced, emergent means for stakeholder identification to promote inclusivity, since existing 'top-down' frameworks for engagement have tended to exclude some stakeholders, particularly from minority groups (Mercer-Mapstone et al. 2019). Second, while preparing for dialogue forums, the facilitators should work closely with marginalized stakeholders to identify and address barriers that prevent their inclusion. Third, throughout dialogue facilitation, activities should be used that allow members of underrepresented groups to provide knowledge and input in ways that are most comfortable to them. Fourth, dialogue facilitators should work to enhance the capabilities and capacity of participants to understand information, communicate effectively, and deal with conflict (Day and Beard 2019).

- Dialogue facilitators should explicitly monitor DEIJ attainment using a combination of variables based on specific dialogue and DEIJ context. Reliance on standardized indicators to assess the distribution of water-related benefits/harms may produce or perpetuate inadequate responses to problems, missed opportunities for effective policies, and perceptions of inequitable management (Dawson et al. 2018). Defining and evaluating equity in the distribution of water-related benefits/harms implies engagement and involvement with those whose experiences and environments are the foci of dialogues.

Future Research

DEIJ research has moved away from simple, main effect approaches and toward examining

variables that influence the effects of diversity. While there is no shortage of primary studies linking diversity with positive or negative outcomes, it remains unclear which contingent factors make diversity work, including the factors that make demographic differences salient, produce or prevent intergroup bias, and enhance or weaken information elaboration (Guillaume et al. 2017). Research that gives greater clarity to the influence of context is essential to understanding where, when, and how diversity dynamics evolve in organizations (Joshi and Roh 2009; Roberson 2019). Enhancing the theoretical rigor and practical relevance of diversity research, therefore, requires considerations of structural, normative, and relational features of context. Essential research on elements of DEIJ and on how context affects perceptions of and reactions to it would benefit from studies that account for broad social and cultural influences (Roberson 2019). Diversity management practices can be examined in different settings, such as professional associations, universities, and utilities. As DEIJ performance indicators tend to be industry-specific, examining the diversity-performance relationship in non-business settings may provide new insights.

Conclusions

This paper draws from the broad DEIJ literature to propose a conceptual framework for understanding DEIJ in water dialogues and identifying best practices to create just water dialogues by addressing DEIJ failures. Theories from the literatures of discourse, diversity, social learning, and EJ provide the basis for understanding the factors that influence DEIJ outcomes in water dialogues. The just water dialogues framework applies a pluralistic approach to posit that five interrelated dimensions of DEIJ (i.e., knowledge distribution; participation; social boundaries; capabilities; and scale and measurement) can converge to create instances of DEIJ success or failures, affecting individuals, groups, organizations, and networks engaged in water dialogues. Water dialogue inequities stem from but are not limited to: distribution of access, benefits, and harms associated with knowledge produced and transferred in dialogues; participation in

dialogue decision-making; and recognition of the cultural identities and unique knowledge of underrepresented groups.

Discourse theory suggests that DEIJ in water dialogues starts with recognizing the limits on discourse, from monopolization of water knowledge to subtle normalization of dominant perspectives within a dialogue. Diversity theories focus on individual biases and the cultural contexts in which these biases are nurtured and propose pathways to DEIJ based on structural adjustments in organizations and engagement programs. Social learning theory provides an approach for designing and evaluating engagement strategies aimed at more diverse participation in water dialogues. In practice, social learning uses the co-creation of knowledge from reciprocal exchange among diverse stakeholders participating in water dialogues. EJ theories suggest that participation in dialogue design and management is required for just water dialogue outcomes. Within EJ theory, different ways of organizing around and discussing water, and of addressing recognition issues, will counteract socially or traditionally embedded rules and practices of water discourse that silence diverse voices (Zwarteveen 2010).

A focus on the context of water dialogues can contribute to understanding the deeper epistemic dimensions of DEIJ in these dialogues. This understanding will inform practices with potential to improve DEIJ in water dialogues, governance, and management. Solutions start with recognizing the many manifestations of injustice within water dialogues specifically, and water resources generally. Ultimately, change in water sector DEIJ will only occur with the meaningful and impactful involvement of previously unrepresented or underrepresented groups. Just water dialogues provide pathways for effective involvement of underrepresented groups. Design of engagement strategies should consider contextual factors and recognition of issues that discourage effective participation from underrepresented groups, and should actively involve these groups.

Acknowledgements

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