



# Evaluating Change in Representation and Coordination in Collaborative Governance Over Time: A Study of Environmental Justice Councils

Saba Siddiki<sup>1</sup> · Graham Ambrose<sup>1</sup>

Received: 12 January 2022 / Accepted: 8 July 2022 / Published online: 4 August 2022

© The Author(s), under exclusive licence to Springer Science+Business Media, LLC, part of Springer Nature 2022

## Abstract

Collaborative governance involves convening of government and non-government actors in policy formulation and implementation. Motivating collaborative governance is the expectation that engagement of diverse arrays of stakeholders in the public policy process allows policymakers and administrators to draw on the expertise, resources, and perspectives of these stakeholders to develop more contextually appropriate and effective policies. Since collaborative governance is fundamentally premised on the representation of diverse stakeholders in collaborative processes, assessing the extent to which representation is actualized is paramount. This paper adds to recent scholarship that examines representation dynamics in collaborative governance arrangements, focusing specifically on: (i) how diverse stakeholders included in collaborative governance arrangements are descriptively and substantively represented; (ii) how substantively represented stakeholders are coordinating on informational and relationship building activities; (iii) how representation and coordination dynamics change over time; and (iv) the extent to which representation and coordination dynamics are indicative of collaboration life cycle stage. Additionally, in responding to this latter aim, the paper presents a novel approach for measuring life cycle stages. The paper reports on a comparative case study of environmental justice councils, which are collaborative governance arrangements convened by states to assist in the design and implementation of policies aimed at reducing environmental harms within low income and minority populated communities.

**Keywords** Collaborative policymaking · Collaboration dynamics · Descriptive representation · Substantive representation · Environmental governance

## Introduction

Collaborative governance, defined here as the convening of government and non-government actors in policy formulation and policy implementation, is ubiquitous in scholarship and practice (Emerson and Nabatchi 2015; Bryson et al. 2006; Wondolleck and Yaffee 2000). Acknowledging its salience, numerous studies have been undertaken over the last several decades that seek to uncover prevailing forms of collaborative governance across and within specific domains, under what conditions collaborative governance arrangements emerge, the rules and processes by which they

are governed, and factors contributing to their effectiveness (Ansell and Gash 2008; Emerson and Nabatchi 2015; Newig et al. 2018; Biddle 2017; Siddiki et al. 2015; Biddle and Koontz 2014).

Furthermore, collaborative governance scholars have worked to understand the influence of diverse stakeholders on the policy process. Fundamentally, collaborative governance relies on the position that the engagement of a diversity of stakeholders in the public policy process leads to more contextually appropriate and effective public policies, insofar as it affords policymakers and administrators access to a wide array of experts, resources, and viewpoints (Emerson and Nabatchi 2015). Existing collaborative governance research that addresses issues of diversity and inclusion in collaborative processes seeks to better understand how diversity actually materializes in cases of collaboration, in terms of (1) which stakeholders are descriptively represented in collaboration through

---

✉ Saba Siddiki  
ssiddiki@syr.edu

<sup>1</sup> Syracuse University, 426 Eggers Hall, Syracuse, NY 13244, USA

governing documents, (2) the various ways that stakeholders are substantively represented through their actions, (3) how different kinds of stakeholders represented within collaboration coordinate, and (4) how various forms of representation link to collaboration outputs and outcomes (Koski et al. 2018; Calanni et al. 2015; Scott 2015).

This paper builds on the line of research focused on understanding issues of diversity, inclusion, and representation in collaborative governance arrangements by evaluating (i) how diverse stakeholders included in collaborative governance arrangements are descriptively and substantively represented; (ii) how substantively represented stakeholders are coordinating on informational and relationship building activities; (iii) how representation and coordination dynamics change over time; and (iv) the extent to which representation and coordination dynamics are indicative of collaboration life cycle stage. As part of the latter assessment, the paper identifies how representational and coordination dynamics map to different life cycle stages as defined by Imperial and colleagues (2016): activation, collectivity, institutionalization, and re-creation. Imperial's characterization of collaboration life cycles identifies characteristics of collaborative governance arrangements at different stages of development, demonstrating how key aspects of collaboration tend to change over time and thereby underscoring the importance of engaging in longitudinal assessments of collaboration. This paper contributes to research that uses this characterization of collaboration life cycles by engaging a bottom-up mapping of empirically observed case characteristics to life cycles and reorienting the measurement of life cycle transitions relating to these characteristics. In this way, the paper also lends insights on analytical approaches to support the study of collaborative governance.

The aforementioned research aims are pursued in the context of environmental justice councils. Environmental justice councils are diverse stakeholder groups created to help advise on the development and implementation of policies that promote environmental justice. As a movement, environmental justice is focused on protecting low-income communities and communities of color from disproportionately bearing environmental harms associated with economic development and other social activities. In the context of policy-making and administrative activity, environmental justice is defined by the United States Environmental Protection Agency (EPA) 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” (EPA 2021). Reflecting its growing significance in policy making and administrative affairs over the last two decades, environmental justice councils have been created across the country

to assist government officials in achieving environmental justice goals. Environmental justice councils are particularly appropriate venues in which to investigate representational and coordination dynamics inasmuch as this form of collaboration is specifically aimed at promoting inclusion of diverse stakeholders to support their meaningful engagement in the public policy process. Unfortunately, no formal assessments of these representational and coordination dynamics exist.

This paper contributes scientific and practical insights. Scientifically, it expands on existing conceptualizations and measurements of descriptive and substantive representation in the context of collaborative governance arrangements, while demonstrating the empirical value of measuring the change in representation over time. It also advances the collaboration life cycle conception proposed by Imperial and colleagues (2016) through a bottom-up mapping of case characteristics to life cycle stages that is rooted in an assessment of notable changes in activities signaling life cycle transitions. Practically, the paper offers guidance on the design of collaboratives in the increasingly important domain of environmental justice as well as more broadly.

This paper proceeds as follows. It begins by providing an overview of research germane to our study. The literature review is followed by an elaborated description of environmental justice councils, which offers additional detail about the councils as well as how they compare to other forms of collaborative governance. It then describes the methods used to study representation and coordination dynamics in environmental justice councils and results from the analysis engaged. The paper concludes with a discussion of research findings, contextualized in terms of their scientific and practical contributions. We observe through our analysis: a notable discrepancy between descriptive and substantive representation, relatively higher prevalence of two-way dialogue when councils are in activation and collectivity stages, and diversity in sectoral representation decreases in years preceding the recreation of councils and resurges during recreation, among other trends.

## Literature Review

Collaborative governance has garnered substantial interest among scholars of public affairs over the last several decades coinciding with its increasing prevalence in practice (Ansell and Gash 2008; Bingham 2011). Though the concept of collaborative governance is defined variably, its essential feature is the involvement of government (e.g., policymakers, administrators) and non-governmental actors (e.g., nonprofit groups, policy experts, members of the general public) in specific and sustained processes or fora focused on policy design and/or implementation (Emerson

and Nabatchi 2015; Bryson et al. 2006; Wondolleck and Yaffee 2000). These processes and fora provide opportunities for government and non-government actors to share resources and viewpoints, coordinate on problem-solving, and jointly develop and implement policy solutions, all of which are spurred by the stakeholders' vested interest in the policy problems and solutions (Beierle and Cayford 2002; Maggioni et al. 2012; Weible and Sabatier 2009; Wondolleck and Yaffee 2000). As well, collaborative processes and fora can foster opportunities for social learning among participants; for example, learning regarding the public problems motivating collaboration, policies or programs that governments are applying to address these problems, or even perspectives held by participants engaged in collaboration (Koontz; 2014; Siddiki and Goel 2017).

Recognizing the potential benefits stemming from opportunities and outcomes that collaborative governance can sponsor within different stages of the policymaking process, scholars have been particularly interested in ascertaining the structural, procedural, and other kinds of factors that contribute to their realization or attainment (Biddle and Koontz 2014). Within the context of these aims, in recent years, scholars have exhibited growing interest in evaluating diversity and inclusion with collaborative governance, and the extent to which these factors associate with collaboration outcomes. The attention to these factors acknowledges their salience within this form of governance more broadly, which is fundamentally grounded in principles of democracy and broad engagement of policy stakeholders, as well as their salience as critical intermediary factors that support the attainment of collaboration goals. Recent scholarship focused on diversity and inclusion in collaborative governance has sought to assess the latter empirically to evaluate, for example, how specific kinds of diversity (e.g., diversity in professional affiliations, diversity in beliefs) relates to technical and relational learning among collaborative group participants (Siddiki and Goel 2017), how diversity within collaborative policymaking groups relates to perceptions of procedural justice (Kim and Siddiki 2018), and what factors contribute to inclusion within collaborative processes (Ansell et al. 2020).

In the study of diversity and inclusion in collaborative governance, scholars regularly reference the concept of representation. Cast in relation to the concepts of diversity and inclusion, utilizing the concept of representation supports assessment of whose participation (diversity) is actually reflected in collaborative processes (inclusion). Studies of representation in collaborative governance particularly identify the extent to which publicly supported collaborative groups differ in levels of representation (Scott 2015), attributes of communities and governance settings that support the representation of disadvantaged communities within collaborative governance (Dobbin and Lubell 2021),

how collaborative governance arrangements differ in terms of descriptive and substantive representation and factors informing discrepancies among the two forms of representation (Koski et al. 2018), among other topics. As part of their investigation of the concept of representation, scholars of collaborative governance have sought to clarify what representation actually means within this domain. Leach (2006, 101) describes a representative collaborative process as one that “ensures that the interests of all affected individuals are effectively advocated, either in person or through proxies.” Embedded within Leach's definition is reference to active, versus passive, representation; where the former signals expression of interests of those engaged in processes, whereas the latter simply captures the presence of interests (Wilkins and Keiser 2006). Drawing out distinctions in forms of representation within collaborative governance arrangements further, Koski and colleagues (2018, 359) distinguish between descriptive and substantive representation. They define and measure descriptive representation in terms of stakeholder composition of the membership, and substantive representation in terms of (i) attendance in a collaborative process; (ii) participation in a collaborative process; and (iii) agenda issue presence, or the extent to which the issues that are important to participants of a collaborative process are reflected in its formal agenda. In doing so, they offer conceptual and operational clarity on the measurement of representation. However, as their study of a single case of collaboration is the only one in which this conceptualization and measurement of representation is used, further empirical validation of the utility of their approach is needed.

Complementary to the specific study of diversity, inclusion, and representation as described above, scholars of collaborative governance have additionally sought to examine coordination patterns among different types of stakeholders represented in collaborative processes, assessing with whom stakeholders coordinate (Calanni et al. 2015), as well as factors associated with the formation of ties among different stakeholders, including perceptions of trustworthiness (Cook et al. 2007), resource dependence (Pfeffer and Salancik 2003), and belief homophily (Weible and Sabatier 2005). Less insight has been offered on the nature of coordination occurring among different types of actors, which itself has been linked to inclusion in collaboration. For example, Ansell and colleagues (2020) associate coordination in informational work (e.g., information and knowledge exchange, co-production in knowledge and perspectives) and relationship-building activities (e.g., constructive dialogue, value alignment, joint problem-solving) with inclusive collaborative governance arrangements. They embed these associations within a model of collaborative inclusion that draws on existing collaborative governance scholarship. Their model would be bolstered

with additional empirical measurement and testing of concepts as well as relationships among coordination activity and different measures of diversity, equity, and inclusion posited therein. As explained in more detail in what follows, this research draws on different measures of model concepts toward further assessment of their salience in studies of representation in collaborative governance.

Yet another facet of diversity, inclusion, and representation that scholars have investigated, with growing interest in the last several years, in particular, is their temporal dynamics; that is, how and in what ways they vary over time. Efforts to characterize these dynamics are part of a broader effort to capture the life cycle stages of collaborative governance arrangements (Imperial et al. 2016; Ulibarri et al. 2020). According to Imperial and colleagues (2016), collaborative governance (or what they refer to as networked governance) arrangements transition between different life cycle stages throughout the duration of their existence as indicated by their purpose, emphasis, membership and social system, commitment among members, level of resistance to change among members, and leadership characteristics.

The life cycle stages identified by Imperial et al. include: (i) activation; (ii) collectivity; (iii) institutionalization; and (iv) stability, decline, re-orientation, and re-creation. The *activation* stage of the collaboration life cycle is defined primarily by: (1) establishing the orientation of the collaboration; (2) identification of legitimate stakeholders relevant to the collaboration's domain; and (3) the organic development of the collaborative's culture. (Imperial et al. 2016; Imperial 2022). The *collectivity* stage of the collaboration life cycle focuses on: (1) identifying and attracting new resources; (2) stabilizing network structure by emphasizing social norm, rule, and procedure; and (3) facilitating the movement from individuals acting together to 'working as a whole' as ideas and credit is shared amongst members. The *institutionalization* stage focuses on: (1) shifting from internal relationship building to external relationship building as the collaboration finds its institutional 'niche'; (2) specializing and differentiating in functions to improve decision making efficiency; and (3) the collaboration's 'proofs-of-concept' outputs initiated in the collectivity stage solidifying into institutionalized outputs of the collaboration. Finally, the *re-creation* stage is dominated by sporadic changes in priorities driving a recycling of the life cycle process.

Scholars have attempted to operationalize Imperial et al.'s life cycle stages framework by examining the specific ways that the aforementioned stage-wise characteristics manifest in collaboration cases, and to what extent they actually map to the four life cycle stages (Ulibarri et al. 2020). Both the original framework, and applications thereof, reference particular qualities of membership

composition and participation that signal a collaborative arrangement's belonging in one life cycle stage or another. However, research to date has not specifically examined how different forms of representation change over the life course of collaborative arrangements. Further, limited guidance is offered in existing research regarding the derived measurement of life cycle transitions based on collaboration characteristics.

This paper intersects scholarship on representation, coordination, and collaboration life cycles (i) offering further empirical validation of the utility of assessing descriptive and substantive representation within collaborative governance arrangements; (ii) linking the study of substantive representation with coordination activity; and (iii) furthering measurement of collaboration life cycle stages using representation and coordination indicators.

The following section provides an elaborated discussion of the study case—environmental justice councils.

### Case Study: Environmental Justice Councils

In support of environmental justice, governments at all levels in the United States have convened diverse stakeholder groups, referred to generally here as environmental justice councils (hereafter EJ councils), to advise on social, scientific, policy, and other issues related to environmental justice. Among the kinds of issues relating to these topics that councils address are: climate change planning, disaster management, reduction of pollution in overburdened communities, equitable conservation and public lands use, clean energy transitions, sustainable infrastructure, and civil rights. In relation to all these issues, key foci are ascertaining whether vulnerable and minority populations within communities face a disproportionate share of burdens relating to environmental activities and identifying frameworks or strategies for preventing or rectifying instances of such. Procedurally, EJ councils are intended to support information sharing, collective decision-making, and joint problem solving relevant to issues they are charged with addressing.

EJ councils are formally created through policies, such as executive orders, legislation, or regulation. These policies identify key aspects of the councils, such as their composition, function, expected activities and outputs, and requirements for a minimum number of meetings in a year. The policies that establish councils are thus useful references for understanding what councils are supposed to look like and do. This makes EJ councils unique compared to other forms of EJ collaboration such as citizen climate juries (Ross et al. 2021) and community-based collectives (Petersen et al. 2006). As compared to citizen juries, EJ councils sustain engagement over multiple and consistent meetings. As compared to community-based collectives, EJ

councils have formal and consistent positions identifying which stakeholders *should* be engaged.

Despite general commonalities in composition, function, and design of EJ councils, however, councils differ owing to the variable levels of government at which they are adopted (i.e., local, state, national) as well as differing administrative, political, social, and geographic contexts.

EJ councils are appropriate cases in which to evaluate our research questions for several reasons. First, they are ideal settings in which to investigate our core concepts of interest—representation and coordination. While such concepts are important in any case of collaborative governance, given that this form of governance is principally concerned with assessing engagement of diverse arrays of stakeholders, they are particularly salient in the EJ case. EJ is fundamentally oriented at ensuring the engagement of marginalized community stakeholders who may be bearing the brunt of environmental harms. Thus, assessing representation and engagement through different kinds of coordination speaks directly to the core objectives of collaborative governance generally, but it is particularly critical to environmental justice councils specifically. Second, EJ councils are an appropriate case in which to explore our research questions given the permissions, constraints, and required frequency of meetings identified in their governing documents. This makes EJ councils unique compared to other forms of EJ collaboration such as citizen climate juries and community-based collectives, as the assessment of representation and coordination patterns can be observed across relatively consistent meeting frequency and policy goals over time. Third, from a research design perspective, the ability to assess our questions across a set of cases that are generally comparable, but specifically varying along our focal conceptual dimensions allows us to gain a broader understanding of temporal dynamics of collaboration within the EJ domain. In the following section, we offer additional information regarding the methods we employ to study collaboration in EJ councils.

## Methods

### Study Sample and Conceptualization

Our study engages a within- and cross-case comparison of two state-level EJ councils that are legislatively mandated

(i.e., founded and structured through state legislation). Provided in Table 1 are general characteristics of the councils included in the study outlining: (1) the geographic region in which they are located, (2) the year the councils were established, (3) the number of legislatively mandated council participants, and (4) the minimum number of meetings required by mandate annually.

Table 2 lists additional characteristics of the councils relating to their mandated charge and organizational structure. The two councils exhibit similarity in each of the listed characteristics.

While the cases are similar across their mandated charge and organizational structure, the cases are evaluated to explore how variation in descriptive representation, substantive representation, coordination activities, and life cycle dynamics vary within and across them. These concepts and their operationalizations within the reported research are visualized in Fig. 1. Each council's mandate identifies its members, which is used to measure *descriptive representation* of the council. As a complement to understanding descriptive representation, which indicates who is supposed to participate in councils, *substantive representation* is assessed to ascertain who actually participates. Substantive representation is measured in two ways: (1) a stakeholder's *attendance* at the meeting and (2) a stakeholder's *active participation* in the meeting. As expressed in Fig. 1, we further bifurcate active participation acknowledging the difference between engaging in *one-way dialogue* (i.e., making a general *announcement* or presentation on a topic) and engaging in *two-way dialogue* (i.e., *discussing* a topic broadly, *asking* a question about a topic, or *answering* a proposed question).

Among those substantively represented in councils, we further seek to assess the types of coordination activities in which they engage. We particularly account for two coordination types drawing on Ansell and colleagues' (2020) characterization of each: (1) *joint informational activity* (i.e., knowledge sharing and joint fact-finding) and (2) *joint relationship building activity* (i.e., value alignment and joint problem solving) (Ansell et al. 2020; Buuren 2009). *Knowledge sharing* is defined as the sharing of knowledge among council members; whereas, *joint fact finding* is defined as the sharing of knowledge among council members and external participants who are non-members of the council. *Value alignment* is defined as coordination activity in which members define what they deem important or what

**Table 1** Descriptions of environmental justice councils

Council	Geographic Region	Year Establishing Mandate Passed	No. of Legislatively Mandated Participants	Mandated No. of Meetings per Year
Council 1	Midwest	2011	20/24	4
Council 2	Mid-Atlantic	2008	20	6



topics the council should address. *Joint problem solving* is defined as coordination activity in which members negotiate what actions the council should undertake.

These sub-characteristics of coordination are further expected to map into the *collaborative life cycle stages* observed in EJ councils over time. These activities inform, in part, four collaborative life cycle stages: (1) *activation*, (2) *collectivity*, (3) *institutionalization*, and (4) *re-creation*. Because councils are expected to be most influenced by those participants who attend meetings and, even more so, by participants who actively participate in meetings (Koski et al. 2018; Kingdon 1984), the direct connection between

representation, coordination, and collaborative life cycle stages is expected. Furthermore, we do not posit substantive representation leads to coordination activities and the collaborative life cycle stages, or vice versa, but, rather, representation, coordination, and collaborative life cycle stages are divergent characterizations of participant interactions directly associating with each other within the collaborative arrangement.

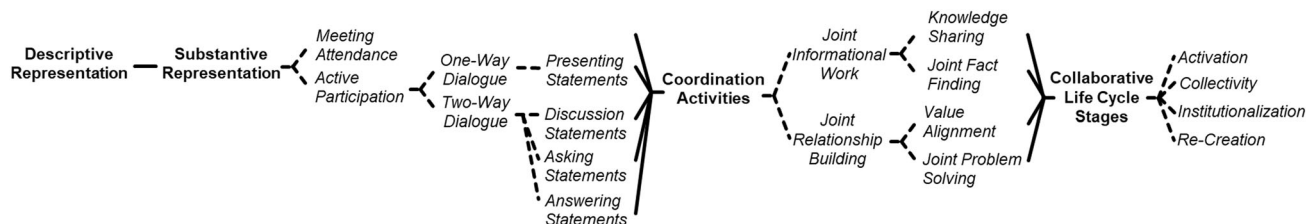
## Data Collection and Analysis

Data collection for the study of the two EJ councils first entailed collection of three types of publicly available council documents, each of which were retrieved from the councils' websites. First, the mandating documents of the councils were collected. These documents were used to establish the contextual characteristics identified in Tables 1 and 2 and descriptive representation of the EJ councils. Second, all available transcribed meeting minutes for each council were collected. The two EJ councils included in this study represent differing study periods (i.e., Midwest council: 2013–2018; Mid-Atlantic council: 2011–2021). The start date for each council is the year the councils were implemented. The differing end years of the study periods reflect availability of meeting minutes. While the Mid-Atlantic council maintained written meeting minutes until the time of data collection (September 2021), the Midwest council transitioned to audio recordings of meetings in 2018. Since this change in data format fundamentally changes the quality of information, the Midwest EJ council's study period ends in 2018. From the meeting minute transcripts, the discussions occurring in each of the council's meetings were captured. Finally, annual reports were collected to offer additional information regarding changes in participation from year to year.

Described next are the data collected from each type of council document. The mandating documents for each EJ council were first coded to establish the formally defined *descriptive representation* of the council. Stakeholders identified in the documents were further coded by sectoral affiliation (i.e., political organization/politician, public

**Table 2** Case characteristics

Variables	Cross-Case Comparison
Mandated Charge	
Advisory Body to Governor and State Agencies	Similar
Organizational Structure	
Externally Mandated	Similar
Mandated Frequency of Meetings	Similar
Size of Membership	Similar
Includes Public Interest members appointed by the Governor	Similar
Includes Ex officio Agency Heads or their delegates	Similar
Includes Appointed State Political Leaders	Similar
Single appointed chair leadership	Similar
Members are included in subcommittees	Similar
Descriptive Representation (i.e., Koski et al. 2018)	Similar
Substantive Representation (i.e., Koski et al. 2018)	Different
Coordination Activities (i.e., Ansell et al. 2020)	Different
Collaborative Life Cycle Stages (i.e., Imperial et al. 2016)	Different



**Fig. 1** Conceptual diagram of case characteristics and their interactions. **Bold text:** main variables observed in this study. **Italicized text:** sub-variables nested within the main variables observed in this study.

**Solid lines:** connections mapping main variables to each other. **Dashed lines:** connections between sub-variables and main variables

organizations/civil servant, private for-profit organization, private non-profit organization, citizens/informal citizen group, university/educational institution). After identifying stakeholders by affiliation, annual reports were used to identify specific individuals occupying mandated positions on the councils. Drawing on the mapping of specific individuals to mandated positions, substantive representation is linked to descriptive representation, as the actions taken by an individual are additionally linked to the position they hold. In addition, using meeting minutes and annual reports, individuals representing state agencies were identified. While multiple individual participants served as agency delegates across the study period, all these individuals were aggregated into a single actor for each agency. Finally, all remaining actors were identified as external actors.

To support the use of meeting minutes to measure substantive representation, the raw meeting minute data were converted into a tabular format establishing each statement in the meeting minutes as an individual data point. In this study, statements are defined as individual comments expressed by an individual captured in the meeting minutes. Statements were identified in two ways. First, a new statement was denoted by a new speaker in the minutes. Second, when a single participant represented a substantial section of the meeting minutes, a new statement was identified by the return of a new paragraph. As an example of the tabular formatting of statements, an excerpt from the Mid-Atlantic EJ council is included in Table 3.

Each statement was assigned to the participant who made the statement. When the speaker of the statement was not clear, this assignment was left blank. 98.8% of statements coded for the Midwest EJ council were assigned to a particular participant and 96.6% of statements coded for the Mid-Atlantic EJ council were coded to a particular participant. In addition to assigning statements to participants, each statement was coded to reflect whether it captures one-way dialogue (i.e., *announcement*) or two-way dialogue (i.e., *discussing*, *asking*, or *answering*).

The aforescribed method for collecting information from councils' meeting minutes supported measurement of *substantive representation* along the following operationalizations. First, roll information captured at the beginning of each meeting's minutes supported the assessment of which participants are attending council meetings. Second, assignment of statements to speakers supported identification of participants actively participating in meetings. This was operationalized in two ways: (1) in an absolute, binary representation (i.e., if the individual makes at least one in the meeting) and (2) a quantity count (i.e., how many times an individual makes a statement in the meeting). Additionally captured for statements coded in these binary and continuous (count) terms, is whether coded statements are of the following kinds: (i) a statement in which an *announcement* is being made; (ii) a statement reflecting *discussion* of particular topic; (iii) a statement in which the member to which it is assigned is *asking* a question; (iv) a statement in which the member to which it is assigned is *answering* another person. Since the unit of analysis of the coding is at the individual level, all measures can be represented at the individual level or aggregate to the sectoral level.

All statements were further coded for their association to coordination activities. To capture whether participants are coordinating through engagement in *joint informational activity*, we code the statements to identify instances of activities involving knowledge sharing or joint fact finding. To capture whether participants are coordinating through engagement in *joint relationship building activity*, we code the statements to identify instances of activities involving value alignment or joint problem-solving. These measures of joint informational and relationship building activities are drawn from the Collaborative Governance Case Database code form (Douglas et al. 2020) and are conceptually organized by Ansell and colleagues (2020).

Finally, all statements were coded given their association with collaborative life cycle activities. Each of the four life

**Table 3** Meeting minute excerpt from the Mid-Atlantic Council

Participant	Statement
Participant A	believes that this needs to be a priority for the group because without the business community, the Commission is just preaching to the choir.
Participant B	recommends having an offline call between meetings to get things rolling on this issue. Last summer the council had an outreach meeting with business that was very successful but because of the economic climate the commission has pulled back on this initiative.
Participant C	points out that the business community is not really engaged on these issues. Its feeling is that this Commission is only good when something bad is about to happen.
Participant A	recommends organizing a roundtable with some economic development leaders and the department of economic development to explain what EJ is and how it affects them.
Participant D	mentions that this effort could be tied to Governor's Office's Fast Track program in terms of permitting.

cycle stages (i.e., activation, collectivity, institutionalization, and re-creation) were operationalized across multiple activities as each collaborative life cycle stage is defined by many components (Imperial et al. 2016; Imperial 2022). The definition and operationalizations for each collaborative life cycle stage is defined in Table 4. To aid in continuity between definition and operationalization, the number associated with each life cycle subcomponent corresponds to the number in parentheses following each operationalization. Furthermore, the coordination activities outlined above are also assigned to collaborative life cycle stages. Therefore, to avoid endogenous comparisons between operationalizations, coordination activities will not be compared to collaborative life cycle stages in this analysis.

Summarizing the preceding discussion, Table 4 lists the variables which were coded for through the analysis of council documents, their conceptual definitions, and operationalizations in the context of the reported analysis.

Representation and coordination along the specific measures outlined above are captured for each set of meeting minutes for each council. Given that councils meet multiple times per year, our dataset allows us to ascertain (i) how representation and coordination change across the course of a year and (ii) across all years that a council is in existence. To map representation and coordination trends to collaboration life cycle stages, we rely on council-year values, which we calculate by summing meeting level representation and coordination values for a given council in a given year.

### Shannon H Measurement

We use Shannon–Weiner index (i.e., Shannon’s H) analysis to compare the change in the total number and the diversity of substantively represented participants within an EJ council over time, and between the EJ councils. Shannon’s H scores range from zero (i.e., no diversity) to the natural log of the number of individuals included in the calculation (i.e., the highest possible diversity given the group), and is calculated using the following formula:

$$H = - \sum_{i=1}^S p_i \cdot \ln(p_i)$$

Where  $i$  represents the total number of cases included in the calculation,  $p_i$  is the proportion of cases assigned to each category (e.g., sector or individuals). The proportion of cases is multiplied by the natural log of this proportion. Then all category calculations are summed. Furthermore, we calculate the Shannon’s H measure for both attendance and active participation for all meetings. We do this to better assess the substantive representation gap between

diversity in attendance and diversity in active participation in the meeting.

## Results

### Descriptive and Substantive Representation Over Time

Tables 5 and 6 depict descriptive and substantive representation over time for the Midwest EJ council and the Mid-Atlantic EJ council respectively. The first column from the left identifies descriptive representation of the councils as defined by each council’s mandating documents. The second column from the left identifies descriptive representation of the councils based on the sectoral classifications as proposed by Douglas and colleagues (2020). The Mid-Atlantic EJ council’s sector affiliation is coded based on the persons who fill the role. The mandate of the Mid-Atlantic EJ council broadly states what groups should be represented through seats reserved for the public interest members (e.g., business organizations, environmental organizations, health experts on environmental justice, and local government), but it does not establish specific seats to be filled by specific interests. However, while descriptive representation in the Mid-Atlantic EJ council is not formally established through its mandate, membership by stakeholder affiliation proves to be stable over the study period. In contrast, the mandate of the Midwest EJ council specifically establishes the minimum seats which must be filled by members representing sectors.

The remaining columns of Tables 5 and 6 depict substantive representation. The first column in each year identifies the percent of meetings that the individual member attended, whereas the second column identifies the percent of meetings in which the individual member actively participated (i.e., had at least one statement recorded in the meeting minutes). In both tables, the cells are shaded on a gradient from no substantive representation (i.e., white; 0%) to substantive representation at all meetings in a given year (i.e., dark gray; 100%).

Furthermore, the bolded vertical lines on the left boundary of cells denote a membership change in the stakeholder position in that year. The ‘V’ represents vacancies in the position in the respective year (e.g., the ‘Affected Communities 4’ position in the Midwest EJ Council is vacant in the year 2014). The ‘X’ represents positions that had not yet existed in the respective year (e.g., ‘Business Organization 2’, ‘Labor Organization 1 & 2’, and ‘General Public 2’ positions in the Midwest EJ Council were added as formal positions in 2017).

Across the two councils, three groups of stakeholders predominate in descriptive representation: (1) state-level



**Table 4** Variables, conceptual definitions, and operationalizations

Variables	Conceptual Definition	Operationalization
<b>Representation</b>		
Descriptive Representation	The formal representation of the various stakeholders who have a vested interest in the policy domain (Koski et al. 2018)	Representation of stakeholders as <u>formally defined by the mandating documents</u> of the collaboration.
Substantive Representation	A reflection of the domain's stakeholders in the process, goals, and outputs of the collaboration (Koski et al. 2018)	Representation of stakeholders through <u>attendance and active participation</u> (i.e., at least one recorded statement) as recorded in the respective meeting minutes.
<b>Coordination</b>		
Joint Informational Work	Mechanisms for facilitation stakeholder problem-solving (Ansell et al. 2020; Buuren 2009)	<u>Knowledge Sharing</u> : Statements where knowledge is shared from collaboration member to collaboration member <u>Joint Fact Finding</u> : Statements where knowledge is shared from external sources to the collaboration
Joint Relationship Building	General processes in collaborations that work to allow constructive dialogue, align stakeholder perspectives and interest, and facilitate joint problem solving (Ansell et al. 2020)	<u>Value Alignment</u> : Statements where members discuss what is important or what topics the collaboration should address <u>Joint Problem Solving</u> : Statements where members discuss what actions should be taken
<b>Collaborative Life Cycle Stages</b>		
Activation	A stage of collaboration activity which focuses on: (1) establishing the orientation of the collaboration, (2) identification of legitimate stakeholders relevant to the collaboration's domain, and (3) the organic development of the collaborative's culture. (Imperial et al. 2016; Imperial 2022)	<u>Rule Development (1)</u> : Statements denoting the development of rules internal to the collaboration <u>Collaboration's Orientation (1)</u> : Strategic Discussion regarding the Collaborations Orientation and what it should be doing <u>Addition of New Members (2)</u> : Statements introducing new members or discussing the addition of new members <u>Stakeholder Identification (2)</u> : Statements identifying specific groups the council should be engaging or who are affected by EI issues <u>Value Alignment (3)</u> : See Above
Collectivity	A stage of collaboration activity which focuses on: (1) identifying and attracting new resources, (2) stabilizing network structure by emphasizing social norm, rule and procedure creation, and (3) facilitating the movement from individuals acting together to 'working as a whole' as ideas and credit is shared amongst members (Imperial et al. 2016; Imperial 2022)	<u>Identification of Resources (1)</u> : Discussions identifying the availability of the following resources <u>1. Time/Staff support (1)</u> : Statements identifying the availability of personnel or staff to engage with tasks (e.g., agency staff, interns, etc.) <u>2. Technical (1)</u> : Statements identifying technical/ scientific resources (e.g., data, tools, research, etc.) <u>3. Financial (1)</u> : Statements identifying monetary resources (e.g., Items in the state budget, grants, etc.) <u>Plan Development (2)</u> : Statements discussing the development of plans to take action or reports to other entities <u>Knowledge Sharing (3)</u> : See Above
<b>Institutionalization</b>	A stage of collaboration activity which focuses on: (1) shifting from internal relationship building to external relationship building as the collaboration finds its institutional 'niche', (2) specializing and differentiating in functions to improve decision making efficiency, and (3) the collaboration's 'proofs-of-concept' outputs initiated in the collectivity stage solidify into institutionalized outputs of the collaboration. (Imperial et al. 2016; Imperial 2022)	<u>Establishing External Relationships (1)</u> : Statements identifying specific groups with whom the collaboration is or should be coordinating <u>Joint Fact Finding (1)</u> : See Above <u>Sub-Committee Development (2)</u> : Statements developing or from sub-committees or task Forces established by the council <u>Joint Problem Solving (3)</u> : See Above
<b>Re-Creation</b>	A stage of collaboration activity which results from sporadic changes in priorities (Imperial et al. 2016; Imperial 2022)	Statement referencing legislation or policy that significantly shift the process, aims, and/or values of the collaboration

**Table 5** Midwest EJ council descriptive and substantive representation over time

Descriptive Representation	Sector	2013		2014		2015		2016		2017		2018	
		Att	Part	Att	Part	Att	Part	Att	Part	Att	Part	Att	Part
Affected Comm.1	Non-profit	100%	100%	100%	75%	100%	67%	75%	75%	100%	86%	100%	100%
Affected Comm.2	Non-profit	100%	100%	50%	50%	100%	33%	25%	0%	57%	0%	0%	0%
Affected Comm.3	Non-profit	100%	100%	100%	100%	100%	100%	75%	75%	100%	100%	100%	100%
Affected Comm. 4	Non-profit	100%	100%	V	V	33%	33%	75%	75%	V	V	V	V
Business Org. 1	For-profit	100%	100%	75%	75%	33%	0%	75%	25%	86%	71%	100%	100%
Business Org. 2	For-profit	X	X	X	X	X	X	X	X	V	V	100%	0%
Environ. Org. 1	Non-profit	100%	100%	50%	50%	67%	67%	50%	25%	43%	43%	0%	0%
Environ. Org. 2	Non-profit	100%	100%	V	V	V	V	V	V	V	V	V	V
General Public 1	Citizens	100%	100%	50%	50%	67%	33%	75%	0%	71%	29%	0%	0%
General Public 2	Citizens	X	X	X	X	X	X	X	X	0%	0%	100%	0%
Health Rep.	Non-profit	50%	50%	50%	50%	33%	33%	0%	0%	V	V	V	V
Labor Org. 1	Non-profit	X	X	X	X	X	X	X	X	V	V	V	V
Labor Org. 2	Non-profit	X	X	X	X	X	X	X	X	V	V	V	V
Local Government	Politician	50%	50%	0%	0%	V	V	V	V	V	V	V	V
State House (Major.)	Politician	100%	50%	25%	0%	0%	0%	0%	0%	0%	0%	0%	0%
State House (Minor.)	Politician	50%	50%	0%	0%	0%	0%	0%	0%	0%	0%	V	V
State Senator (Major.)	Politician	50%	50%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
State Senator (Minor.)	Politician	0%	0%	0%	0%	0%	0%	0%	0%	V	V	V	V
Dept. of Health	Civil Serv.	50%	0%	100%	100%	67%	0%	75%	0%	43%	0%	100%	0%
Dept. of Enviro.	Civil Serv.	100%	50%	100%	75%	100%	67%	100%	50%	100%	100%	100%	100%
Dept. of Ec. Dev.	Civil Serv.	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Dept. Human Serv.	Civil Serv.	0%	0%	0%	0%	0%	0%	0%	0%	57%	29%	0%	0%
Dept of Trans.	Civil Serv.	100%	50%	50%	25%	0%	0%	0%	0%	0%	0%	0%	0%
Dept. Nat. Res.	Civil Serv.	100%	100%	75%	50%	0%	0%	0%	0%	0%	0%	0%	0%
External	External	100%	50%	100%	75%	100%	67%	100%	75%	86%	14%	100%	100%

**Att:** Percent of meetings attended in the given year; **Part:** Percent of meetings where they actively participated in the given year

**Shading:** shaded on a gradient representing the change from no substantive representation in the year (white, 0%) to representation at all meetings of the year (dark gray; 100%)

**V:** represents vacancies in the position in the respective year

**X:** represents years where the position did not exist via the mandating document (i.e., position was added in later legislation)

**Cells with bolded vertical left-hand borders:** years in which new members fill the position

politicians, (2) governor appointed public interests, and (3) ex officio state administration heads/delegates. Across both councils, state-level politicians have poor attendance and participation – state politicians are only substantively represented in the first year (i.e., 2013) in the Midwest EJ council. Table 5 shows the Midwest EJ council has strong initial participation across public interests and state agencies. Over time, attendance and participation across the Midwest EJ council's membership was reduced to a few public interest members and delegates from the Department

of Environment. The Department of Health continues to attend meetings but does not actively participate in the meetings. The starkest trend depicted in Table 5 is the growing number of vacant positions in the last two years of the study period. In 2018, the last year included in this study, eight of the 24 total positions and six of the 14 appointed positions in the Midwest EJ council were vacant. Table 6 shows the Mid-Atlantic EJ council has stronger attendance and participation by state agencies over time. Furthermore, the Mid-Atlantic EJ council does not have the

**Table 6** Mid-Atlantic EJ council descriptive and substantive representation over time

Descriptive Representation	Sector	2011		2012		2013		2014		2015		2016		2017		2018		2019		2020		2021	
		Att	Part	Att	Part	Att	Part	Att	Part	Att	Part	Att	Part	Att	Part	Att	Part	Att	Part	Att	Part	Att	Part
Affected Comm. 1	Citizens	67%	67%	50%	38%	70%	60%	56%	44%	57%	43%	40%	20%	50%	33%	83%	67%	50%	50%	V	V	V	V
Affected Comm. 2	Citizens	V	V	V	V	V	V	0%	44%	14%	0%	90%	50%	83%	50%	33%	33%	25%	25%	100%	67%	33%	33%
Public Interest 1	Non-profit	67%	67%	50%	50%	20%	10%	0%	0%	0%	0%	V	V	V	V	0%	0%	0%	0%	100%	0%	33%	33%
Public Interest 2	Non-profit	33%	33%	100%	88%	40%	0%	11%	33%	43%	0%	V	V	0%	0%	0%	0%	0%	0%	V	V	V	V
Public Interest 3	Non-profit	67%	67%	38%	38%	60%	60%	78%	67%	86%	86%	90%	90%	17%	17%	33%	0%	0%	0%	V	V	V	V
Public Interest 4	Local Politician	67%	67%	38%	38%	90%	90%	67%	44%	0%	0%	V	V	83%	83%	83%	83%	25%	25%	100%	100%	100%	100%
Public Interest 5	Local Politician	67%	33%	50%	38%	60%	60%	11%	67%	57%	57%	40%	30%	33%	0%	0%	0%	100%	100%	33%	0%	67%	0%
Public Interest 6	Citizens Group	67%	67%	38%	13%	70%	50%	11%	56%	29%	0%	20%	10%	17%	0%	83%	33%	25%	0%	V	V	V	V
Public Interest 7	For-profit	100%	67%	63%	38%	20%	0%	56%	44%	29%	29%	0%	0%	17%	0%	33%	33%	100%	50%	33%	33%	33%	0%
Public Interest 8	For-profit	67%	0%	38%	13%	60%	30%	78%	0%	0%	0%	V	V	V	V	V	V	V	V	V	V	V	V
Public Interest 9	Non-profit	33%	33%	25%	38%	0%	0%	11%	22%	100%	100%	100%	100%	100%	100%	0%	0%	75%	25%	100%	0%	67%	33%
Public Interest 10	Non-profit	67%	33%	25%	25%	10%	0%	22%	22%	14%	0%	0%	0%	0%	17%	0%	0%	0%	0%	0%	0%	0%	0%
State House	Politician	0%	0%	0%	0%	0%	0%	0%	0%	V	V	0%	0%	0%	0%	0%	0%	50%	50%	0%	0%	0%	0%
State Senate	Politician	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Dept. of Enviro.	Civil Serv.	100%	100%	100%	88%	100%	90%	100%	100%	100%	100%	90%	60%	100%	83%	67%	33%	25%	0%	100%	100%	100%	100%
Dept. of Health	Civil Serv.	67%	0%	75%	75%	70%	50%	56%	56%	57%	43%	70%	50%	67%	33%	100%	100%	75%	50%	67%	67%	100%	67%
Dept. of Housing	Civil Serv.	33%	0%	38%	38%	20%	10%	0%	0%	0%	0%	100%	80%	83%	83%	83%	67%	0%	0%	33%	33%	33%	0%
Dept. of Planning	Civil Serv.	0%	0%	88%	50%	30%	10%	67%	56%	71%	43%	30%	30%	33%	17%	100%	100%	100%	100%	67%	67%	33%	33%
Dept. of Ec. Dev.	Civil Serv.	67%	67%	75%	63%	40%	50%	22%	22%	0%	0%	90%	80%	67%	67%	17%	0%	75%	25%	33%	0%	33%	0%
Dept of Trans.	Civil Serv.	67%	33%	63%	63%	0%	0%	22%	78%	0%	0%	60%	20%	67%	0%	67%	17%	75%	0%	0%	0%	33%	0%
External	External	67%	67%	100%	63%	50%	30%	11%	44%	29%	14%	80%	80%	83%	83%	50%	50%	50%	100%	100%	100%	100%	100%

**Att:** Percent of meetings attended in the given year; **Part:** Percent of meetings where they actively participated in the given year

**Shading:** shaded on a gradient representing the change from no substantive representation in the year (white, 0%) to representation at all meetings of the year (dark gray; 100%)

**V:** represents vacancies in the position in the respective year

**Cells with bolded vertical left-hand borders:** years in which new members fill the position

same rapid reduction of attendance and participation by appointed public interests as seen in the Midwest EJ council. Similar to the Midwest EJ Council, the latter years of the study period of the Mid-Atlantic EJ council are defined by growing vacancies—in 2021, the last year included in this study, five of the 20 total positions and five of the 12 appointed positions are vacant. This shift to lower participation broadly begins in 2018 and continues through the end of the study period.

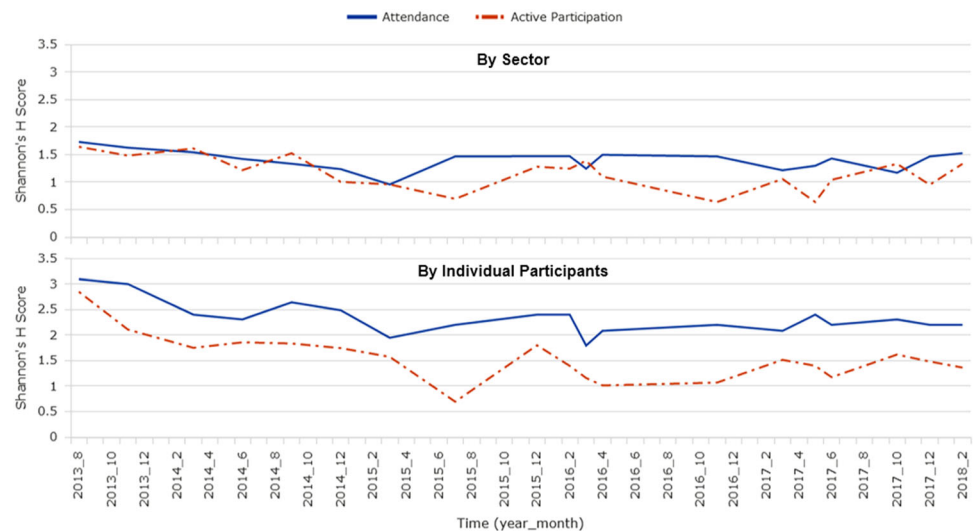
Figures 2 and 3 depict the change in substantive representation for each meeting over time as measured using the Shannon's H diversity index. In each panel of Figs. 2 and 3 the solid blue line represents the Shannon's H diversity index for member attendance, whereas the dashed, red line represents the Shannon's H diversity index for active participation of actors. Additionally, the figures have two panels: (a) the top panel represents the Shannon's H index of statements across sectors, and (b) the bottom panel represents the Shannon's H index of statements across individual participants.

Both panels in Fig. 2 show decreasing substantive representation in the Midwest EJ council until early 2015, after which representation stabilizes for the rest of the study period. In contrast, both panels in Fig. 3 represent relatively stable diversity in substantive representation for the Mid-

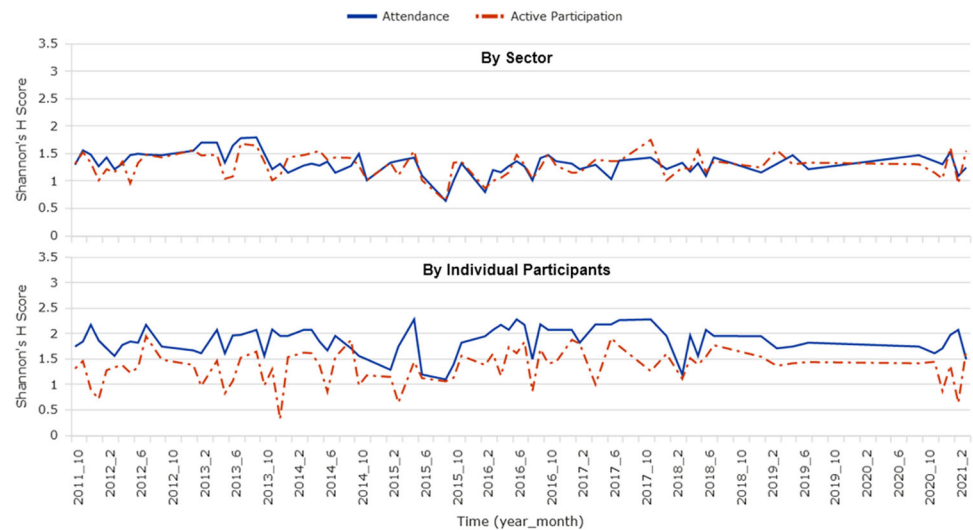
Atlantic EJ council across the full study period. Since high Shannon's H scores can result from both (1) a greater total number of sectors or individuals actively participating in a meeting and (2) a more equal distribution of these statements across sectors or individuals, the early reduction in participation by state agencies and political leaders in the Midwest EJ Council (reference Table 5) is likely responsible for the early decrease in Shannon's H.

Furthermore, since each panel depicts the Shannon's H diversity scores for attendance and active participation, comparisons can be made between the diversity in actors who are coming to the councils and those who are actively participating once they are there. When the dashed, red line (active participation) is below the solid, blue line (attendance), this gap represents the loss of diversity as participants are attending but not participating in the meeting. In the Midwest EJ council, a gap between active participation and attendance for sectoral diversity develops in 2015 (i.e., Fig. 2 top panel); whereas, this gap in diversity between active participation and attendance is present in the Individual Shannon's H score throughout the study period (i.e., Fig. 2 bottom panel). In contrast, the Mid-Atlantic EJ council's active participation and attendance trends are more closely bound when considering sector diversity in representation (i.e., Fig. 3 top panel).

**Fig. 2** Midwest EJ Council Substantive Representation over time



**Fig. 3** Mid-Atlantic EJ Council Substantive Representation over time



While diversity in active participation for individuals tends to be lower than the diversity in attendance (i.e., Fig. 3 bottom panel), the gap between these indices in the Mid-Atlantic EJ council is less consistent than the gap observed in the Midwest EJ council. For a representative comparison only, the Midwest EJ council's average difference in sectoral Shannon's H score between active participation and attendance averaged across all meeting is  $-0.206$  and in individual Shannon's H score is  $-0.887$ ; whereas, the Mid-Atlantic EJ council's average difference in sectoral Shannon's H score is  $-0.025$  and in individual Shannon's H score is  $-0.503$ .

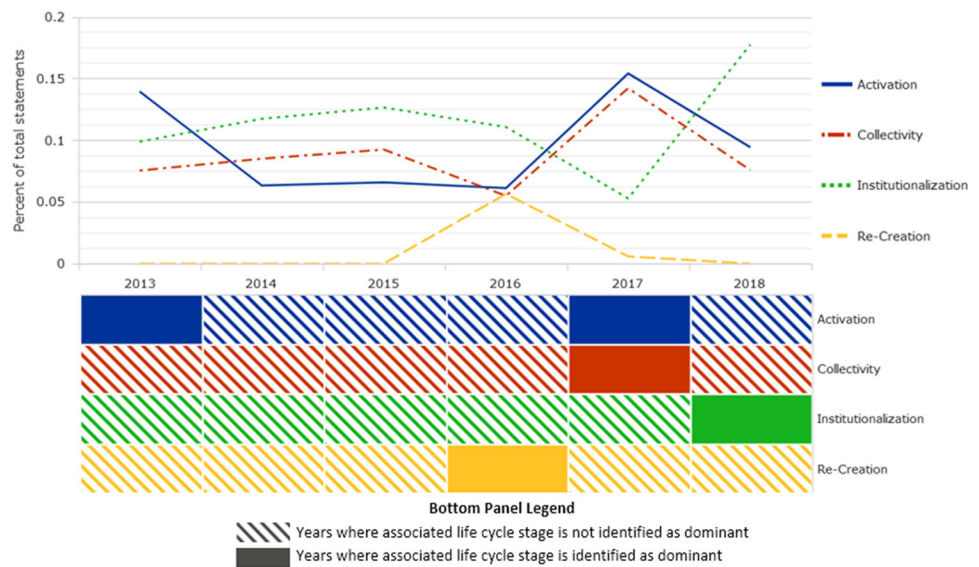
### Identifying Collaborative Life Cycle Stages

Both Figs. 4 and 5 are constructed to visualize the collaborative life cycle stages over the study period as operationalized in this study. The top panels show the frequency

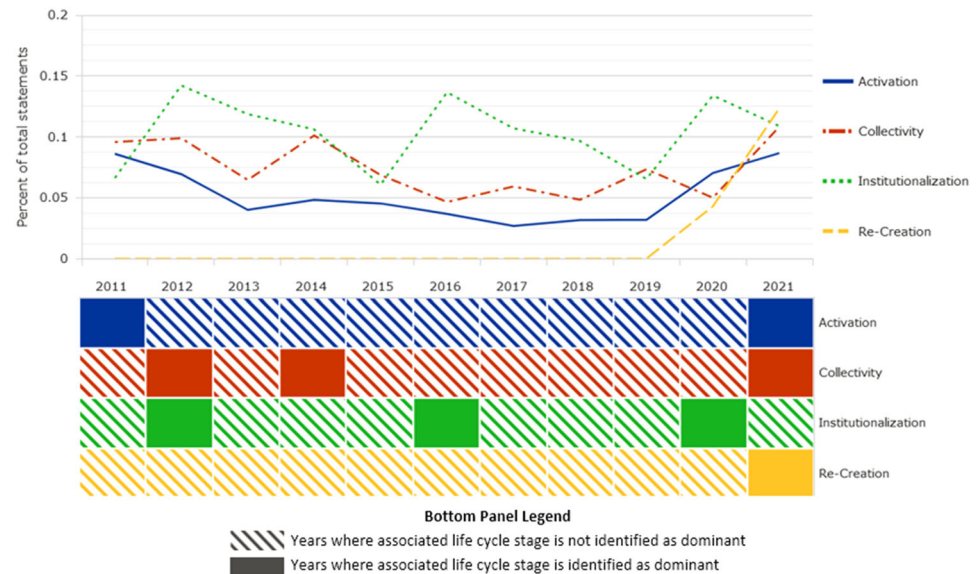
of statements coded to actions associated with each life cycle stage over each study year. The bottom panels depict the dominant stage for each year. The dominant stage is calculated by determining the mean and standard deviation of the statement frequency for each life cycle stage across all years. Given these calculations, years are coded to the life cycle stages when the statement frequency for that year is greater than one standard deviation above the mean of the sample. Stated a different way for the Mid-Atlantic EJ Council, the mean frequency of statements coded to 'activation' activities is 5.2% and the standard deviation is calculated to be 2.2%. The frequency of statements coded to activation activities is only greater than 7.4% twice – in 2011 (i.e., 8.6%) and 2021 (i.e., 8.7%). Therefore, 2011 and 2021 are considered years where activation is the dominant life cycle stage, and, thus, are represented by fully colored blocks in the bottom panel of Table 5 rather than a hashed box.



**Fig. 4** Midwest EJ Council Life Cycle stages over time. **Top panel:** expresses the percentage of statements coded to each life cycle stage in each year in the study sample. **Bottom panel:** cells are shaded darker in years where the year's percentage is greater than one standard deviation more than the mean percentage across all years for the given life cycle stage



**Fig. 5** Mid-Atlantic EJ Council Life Cycle stages over time. **Top panel:** expresses the percentage of statements coded to each life cycle stage in each year in the study sample. **Bottom panel:** cells are shaded darker in years where the year's percentage is greater than one standard deviation more than the mean percentage across all years for the given life cycle stage

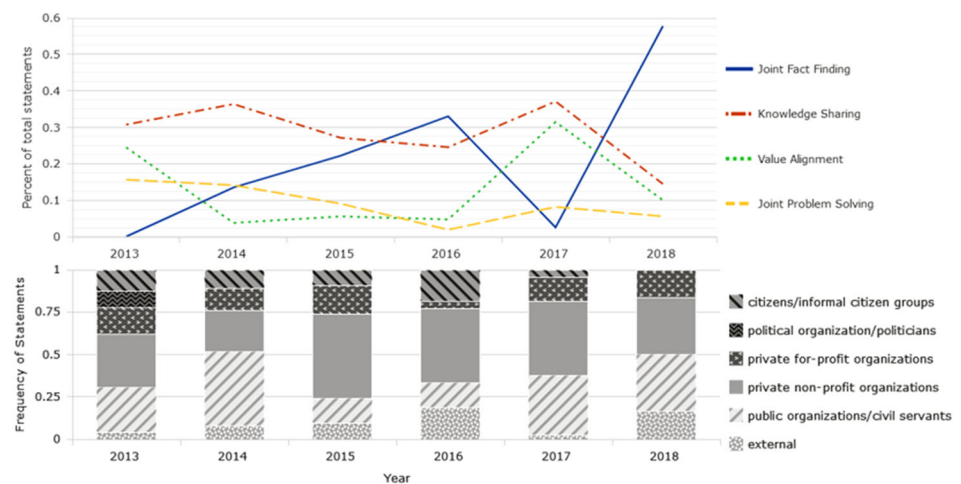


There are two important nuances to this operationalization of the life cycle stages. First, years being assigned as a dominant life cycle stage is independent of other stages. An example of this is the institutionalization stage in the Midwest EJ council. Despite having the greatest statement frequency between 2014 and 2016 compared to the other stages, these years are not identified as institutionalization dominant years as the frequency is lower than one standard deviation above the mean across all years in the sample period. Second, a year might be identified as dominant for multiple life cycle stages or no life cycle stages. Again, because assignment is independent across life cycle typologies, only a significant influx in activities specific to a life cycle stage is required to trigger the assignment as a dominant stage rather than a relative quantity to the other stages.

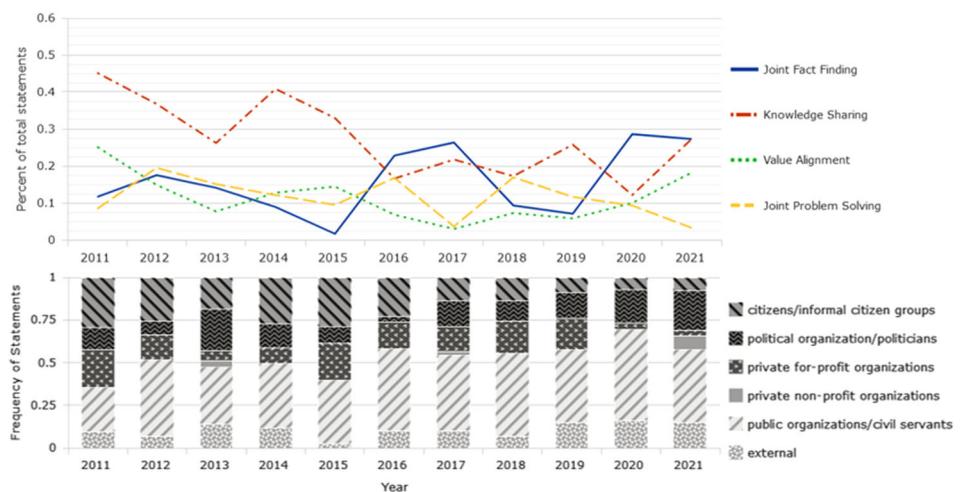
As shown in Figs. 4 and 5, statements are most frequently coded to institutionalization activities on average in both councils (Midwest mean: 11.4%; Mid-Atlantic mean: 10.4%), with re-creation activities occurring least frequently (Midwest mean: 1.0%; Mid-Atlantic mean: 1.5%), and statements coded to activation activities (Midwest mean: 9.6%; Mid-Atlantic mean: 5.2%) and collectivity activities (Midwest mean: 8.4%; Mid-Atlantic mean: 8.8%) fall in the middle. Despite these differences in average frequency, the operationalization of the life cycle stages maps closely with the logic outlined by Imperial et al. (2016). In both EJ councils, the first year's dominant life cycle stage is identified as the activation stage. Second, influxes in activation and collectivity activities are observed before or in years identified as



**Fig. 6** Midwest EJ Council frequency of coordination types compared to the frequency of statements per sector over time. **Top panel:** expresses the percentage of statements coded to each coordination activity in each year in the study sample. **Bottom panel:** each bar represents the frequency of statements, as a proportion of the total number of statements coded each year, associated with each sectoral classification



**Fig. 7** Mid-Atlantic EJ Council frequency of coordination types compared to the frequency of statements per sector over time. **Top panel:** expresses the percentage of statements coded to each coordination activity in each year in the study sample. **Bottom panel:** each bar represents the frequency of statements, as a proportion of the total number of statements coded each year, associated with each sectoral classification



institutionalization dominant years (Midwest: 2018; Mid-Atlantic: 2012, 2016, and 2020).

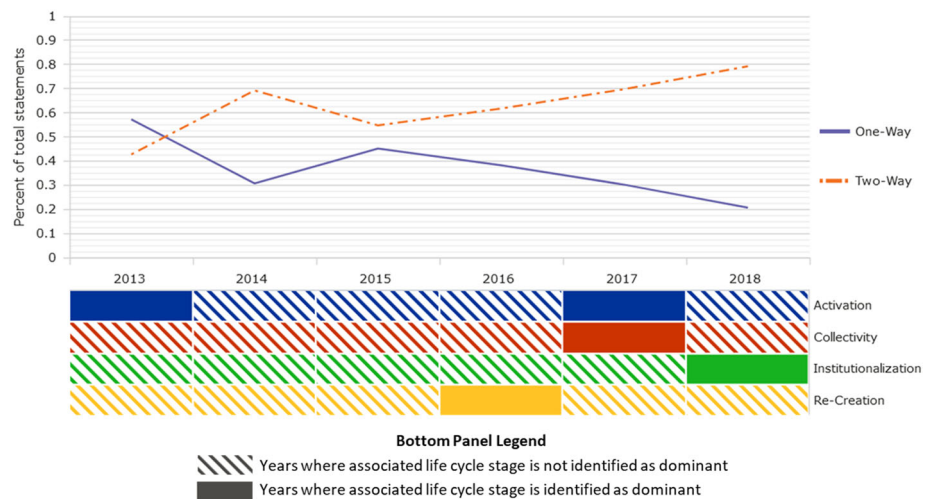
In the same way, the sequential results of activation, collectivity, and institutionalization dominant years follow the logic outlined by Imperial and colleagues (2016), the life cycle sequence leading into and out of re-creation dominant years also follows the logic theoretically proposed. For the Midwest EJ council (Fig. 4), the second two years (i.e., 2014 and 2015) are not assigned to any life cycle stages, which is followed by a re-creation year in 2016. In a similar way, we see this pattern in the Mid-Atlantic EJ council (Fig. 5)—there are multiple years unassigned to any life cycle stage (i.e., between 2017 and 2019) leading into a re-creation dominant year (i.e., 2021). After the re-creation dominant years, Figs. 4 and 5 show both councils return to activation dominant and collectivity dominant years. The Midwest EJ council returns to these stages in the year following the re-creation dominant year, and the Mid-Atlantic EJ council returns to these stages in the same year.

## Coordination Activities and Active Participation

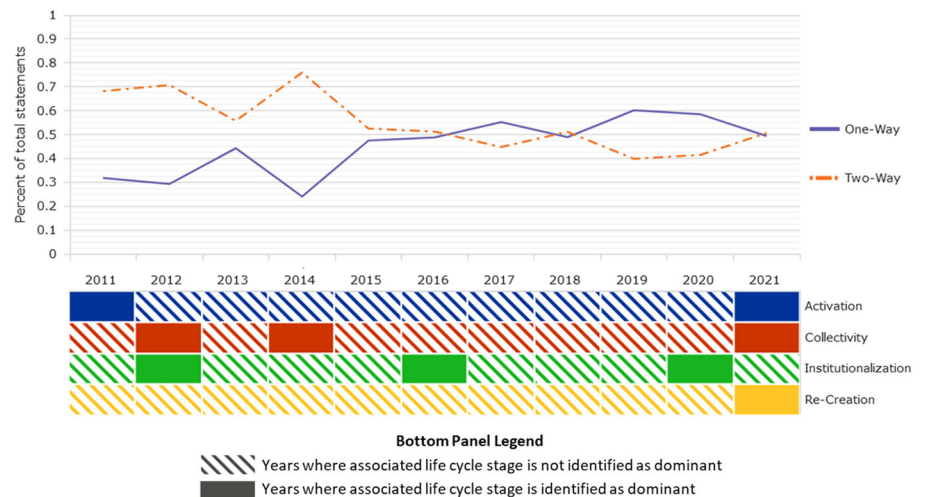
Figures 6 and 7 depict, in the top panel, the year-to-year trends across the percent of statements coded to each coordination type (i.e., joint fact finding, knowledge sharing, value alignment, and joint problem solving). In the bottom panels of Figs. 6 and 7, the frequency of active participation for each sector—across all statement types (i.e., presentation, discussion, ask, and answer)—are depicted proportionally to all statements coded in the EJ councils in a given year. In this way, the top panel in Figs. 6 and 7 broadly represents the orientation of coordination activities while the bottom panel outlines the active participation proportionally across sectors in a given year.

Despite the grouping of the four coded coordination activities into two categories of coordination – joint informational activities (i.e., joint fact-finding and knowledge sharing) and relationship-building activities (i.e., value alignment and joint problem solving)—the results in the top panels of Figs. 6 and 7 show these activities do not trend

**Fig. 8** Midwest EJ Council One-Way and Two-Way Dialogue compared to life cycle stages over time. **Top panel:** expresses the percentage of statements coded to one-way dialogue (i.e., announcement) and two-way dialogue (i.e., ask, answer, discussion) in each year of the study sample. **Bottom panel:** cells are shaded darker in years where the year's percentage is greater than one standard deviation more than the mean percentage across all years for the given life cycle stages



**Fig. 9** Mid-Atlantic EJ Council One-Way and Two-Way Dialogue compared to life cycle stages over time. **Top panel:** expresses the percentage of statements coded to one-way dialogue (i.e., announcement) and two-way dialogue (i.e., ask, answer, discussion) in each year of the study sample. **Bottom panel:** cells are shaded darker in years where the year's percentage is greater than one standard deviation more than the mean percentage across all years for the given life cycle stages



distinctly in cohesive groupings. Stated a different way, joint fact-finding and knowledge sharing do not have similar, relative trends over time despite both being identified as joint informational activities. Furthermore, while both councils start with high frequencies of statements coded to knowledge sharing and value alignment activities in the first year after establishment, the year-to-year ebbs and flows of activity frequency, at least between councils, does not seem to follow generalizable patterns.

The bottom panel of Figs. 6 and 7 show both councils have an increased number of sectors actively participating in council meetings for the Midwest council (i.e., six sectors) and the second most for the Mid-Atlantic council (i.e., five sectors) in their first year compared to other sampled years. Across these sectors we see the most equitable distribution in statement frequency in the first year of both councils. In both councils, a high frequency of knowledge-sharing activities and a relatively equitable distribution of active participation across a greater number of sectors are observed in the first year.

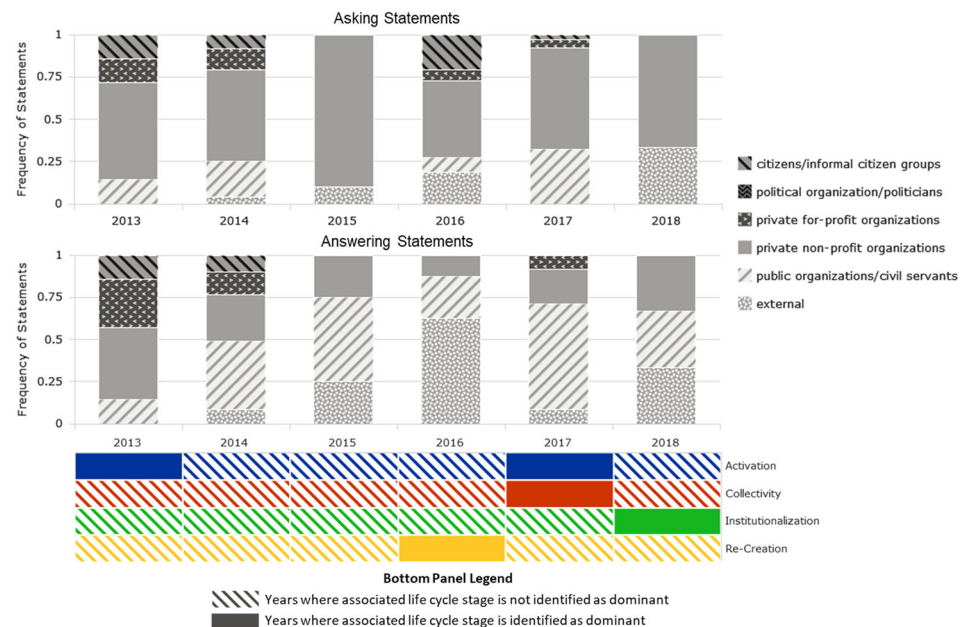
While this early trend is consistent across the two councils, there are few additional similarities between the council's trends in active participation. The bottom panel of Fig. 6 shows the Midwest EJ council has large fluctuations in the frequencies of active participation observed for each sector from year to year. For instance, public organizations/civil servants substantially dominate the proportion of statements coded in 2014 while private non-profit organizations represent a substantially smaller percentage of statements. In the following year, this outcome switches. In the Mid-Atlantic EJ council, Fig. 7, large fluctuations in public sector/civil servants' frequency of active participation are not observed from year to year.

### One-Way dialogue, Two-Way dialogue, and Collaborative Life Cycle Stages Over Time

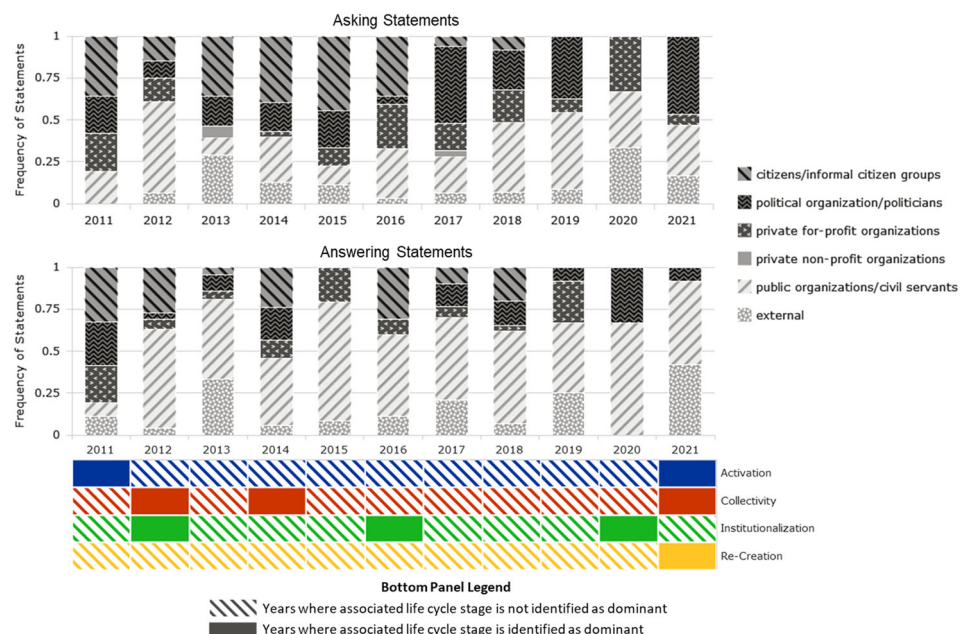
Figures 8 and 9 integrate the frequency of dialogue types (i.e., one-way dialogue and two-way dialogue) (i.e., top panel) with the dominant life cycle stages as identified in

Figs. 4 and 5 (i.e., bottom panel). In this way, Figs. 8 and 9 are designed to explore the co-occurrence between changes in the type of active participation and the dominant life cycle stage. In both the Midwest and Mid-Atlantic EJ councils, years that are unassigned to a dominant life cycle stage broadly co-occur with an increase in one-way dialogue and decreasing two-way dialogue. In addition, activation and collectivity dominant years co-occur with shifts towards two-way dialogue and away from one-way dialogue relative to the prior year.

**Fig. 10** Midwest EJ Council Ask and Answer Statements by sector compared to life cycle stages over time. **Top panel:** each bar represents the frequency of asking statements associated with each sectoral classification. **Middle panel:** each bar represents the frequency of answering statements associated with each sectoral classification. **Bottom panel:** cells are shaded darker in years where the year's percentage is greater than one standard deviation more than the mean percentage across all years for the given life cycle stages



**Fig. 11** Mid-Atlantic EJ Council Ask and Answer Statements by sector compared to life cycle stages over time. **Top panel:** each bar represents the frequency of asking statements associated with each sectoral classification. **Middle panel:** each bar represents the frequency of answering statements associated with each sectoral classification. **Bottom panel:** cells are shaded darker in years where the year's percentage is greater than one standard deviation more than the mean percentage across all years for the given life cycle stages



## Sectoral Representation in Asking and Answering Statements and the Association with Collaborative Life Cycle Stages Over Time

Figures 10 and 11 are designed to make two comparisons. The first comparison is between the top panel, which identifies the frequency of *ask statements* coded to a sector in a given year as a proportion of the total *ask statements* coded, and the middle panel, which identifies the frequency of *answer statements* coded to a sector in a given year as a



proportion of the total *answer statements* coded. In this way, trends between who is asking questions in the councils and who is answering them are outlined. Second, the bottom panel, which identifies the dominant life cycle stages in the given year, is added to compare year-to-year trends in ask and answer statements to life cycle stages.

In early years of both councils, the greatest number of sectors are represented in ask and answer statements and represents the most equitable distribution of frequency across the respective sectors. In years prior to re-creation dominant years, both councils have the lowest number of sectors represented in both ask and answer statements. It is also of note these pre-re-creation dominant years are also marked by a growth in public organizations/civil servants answering questions. Furthermore, in pre-re-creation dominant years, the Midwest EJ council has a large growth in the frequency of participants associated with private non-profit organizations asking questions, and the Mid-Atlantic EJ council has a growth in the frequency of participants associated with private for-profit organizations and external participants asking questions. Finally, in the re-creation year both councils have a regrowth in the total number of sectors represented in both ask and answer statements.

## Discussion

The study reported on this paper relies on coded meeting minute data from two similar EJ councils to evaluate representation, coordination activities, and collaborative life cycle stages over the study period. Drawing on these data, the analysis presented in this paper (i) assesses how diverse stakeholders included in collaborative governance arrangements are descriptively and substantively represented; (ii) how those substantively represented in the EJ councils are coordinating on informational and relationship-building activities; (iii) how representation and coordination dynamics change over time; and (iii) the extent to which representation and coordination dynamics are indicative of collaboration life cycle stage. The discussion presented in this section highlights key contributions stemming from the reported study.

### Operationalization of the collaborative life cycle stages as applied to each council

The reported study proposes and applies a novel operationalization of the collaborative life cycle stages initially proposed by Imperial and colleagues (2016), and, in doing so, supports the development of generalizable analytical approaches to support the study of collaborative governance dynamics. Rather than qualitatively assigning stages to time

periods in the collaboration's life span, the study relies on coded meeting minute data to evaluate the comparative frequency of activities associated with each life cycle stage. Beyond the advantages of having multiple operationalizations to evaluate a concept, there are significant theoretical and empirical implications for using this operationalization.

First, life cycle stages are defined by dynamic influxes in activities creating periods of dominant life cycle stages. This development has significant theoretical implications as: (1) it acknowledges other life cycle activities are still observed but to a lesser extent meaning life cycle activities are non-discreet and overlap; (2) the frequency of life cycle stages are evaluated in reference to the same life cycle activities in other years rather than to other life cycle activities in the same year; and (3) a period of time can be assigned to no life cycle stages, to one life cycle stages, or to multiple life cycle stages.

As the study results show, activation, collectivity, and institutionalization activities were observed in all years of both EJ councils despite very few years being assigned as years dominated by those life cycle stages. Even re-creation activities, which were coded the least frequently across all life cycle activities (re-creation statements coded as a percentage of all statements—Midwest: 0.66%; Mid-Atlantic: 0.67%), are observed in years outside of those assigned to re-creation (Midwest: 2016; Mid-Atlantic: 2021). While the health and success of a collaboration is defined by its maturation and life cycle stage (Imperial et al. 2016, Provan and Kenis, 2008), the activities required early on in collaborations are often required throughout a collaboration's life (Emerson and Nabatchi 2015; Thomson and Perry 2006). The operationalization engaged in this research thus offers a more realistic representation of collaboration activities and life cycle stages as collaborations are required to complete tasks, which are conceptually assigned to all stages, to maintain the functionality of the collaborative arrangement (Emerson and Nabatchi 2015; Parker et al. 2010). Life cycle stages are therefore conceptualized as a significant increase in these activities beyond the average 'maintenance' level observed in the collaboration.

Furthermore, life cycle stages should be evaluated based on an influx of activities associated with that life cycle stage compared to other years rather than comparing the frequency of activities across life cycle stages within a given year. An example of this can be seen in 2016 in the Midwest EJ council. Despite activities being assigned to the re-creation stage representing the lowest frequency of statements across all four life cycle stages (5.5% compared to 5.7% for collectivity, 6.1% for activation, and 11.1% for institutionalization), it is the only dominant stage assigned to that year given our operationalization. In other operationalizations of the collaborative life cycle stages

(Imperial et al. 2016; Ulibarri et al. 2020), 2016 would most likely not be defined as a re-creation year. Nonetheless, the evidence from this study supports our operationalization, as an influx in activation and collectivity activities are observed in the following year (i.e., 2017) representing a recycling of the collaborative life cycle. This recycling process is outlined by Imperial and colleagues (2016 and 2022) as a result of the re-creation stage.

To further illustrate this theoretical contribution, collaborative life cycle stages must be assigned based on a significant influx in activity compared to other years, as some activities are expected to be more salient than others in signaling dominant years. While re-creation activities in 2016 in the Midwest EJ council had the lowest frequency, a few salient actions were able to trigger rapid life cycle change in the following years. In contrast, some activities are expected to be less salient, as, given our operationalization, institutionalization is often not the dominant life stage despite representing the greatest frequency in a given year (e.g., Midwest: 2014–2016; Mid-Atlantic: 2013, 2014, 2017 and 2018). This further exemplifies a need to observe the difference between maintenance levels of an activity and influx levels. When maintenance levels are high, an individual action is less salient, meaning more individual actions are required to trigger a year to be dominated by that life cycle stage.

Finally, the operationalization of life cycle stages used in this research allows years to be assigned as dominant to no life cycle stages, to one life cycle stage, or to multiple life cycle stages. Due to this, the stagnation of the council as well as the rate at which a council is moving through stages can be evaluated. In our study, we see periods of times with no life cycle assignment (i.e., Midwest: 2014–2015; Mid-Atlantic: 2017–2019) representing a general decline in activity observed in years prior to re-creation dominant years. Imperial and colleagues (2022) posit this ‘free-riding’ in the council as a precursor to these periods of rapid change, whereas Ulibarri and colleagues (2020) observed a decline in measured activity across 21 collaborative governance arrangements before councils either die or went through re-creation stages. This rapid, post-re-creation change can also be observed in the influx of other activities associated with other life cycle stages. In the Midwest EJ council, the year following the re-creation dominant year (i.e., 2017) represents a significant influx in activation and collectivity activities. This influx in activation and collectivity activities occurs in the same year for the Mid-Atlantic council (i.e., 2021). Given our operationalization we are able to observe the rapid increase in activity broadly across activation and collectivity activities in response to re-creation dominant years, whereas, these influxes in activity across multiple stages might be obscured by other operationalizations.

By developing an operationalization that leverages quantifiable measures of life cycle stages, clearer empirical observations between changes in life cycle stages and other activities can be made. This research, thus, moves from the rich description of life cycle stages observed in other works (Imperial et al. 2016; Ulibarri et al. 2020) to an evaluative tool to assign years to dominate life cycle stages in order to further explore the nuance and patterns observed in the time period. In this way, this study not only explores in which life cycle stage each council is oriented and how these stages evolve over time, but also how these stages dynamically interact with other measured activities. Finally, we note the approach utilized herein can be readily applied to other cases of collaborative governance, insofar as the measurement of collaboration life cycle stages is tied to generalizable concepts and not domain-specific indicators.

### Differences in Descriptive and Substantive representation

In this study, significant differences between descriptive and substantive representation were observed. The descriptive representation of both councils was relatively stable, as only one change in descriptive representation was observed—in 2017 four positions were added to the Midwest EJ council. This stability is reflective of descriptive representation’s mandated nature, as scholars argue mandated rules are expected to remain in place or change slowly over time (Ostrom 2009; Imperial et al. 2016; Imperial 2022).

In contrast to the stability of the descriptive representation, substantive representation is expected to evolve and change more rapidly over time as individual stakeholders are added and leave the collaboration (Imperial et al. 2016; Bryson et al. 2006), the attention of the stakeholders shift to new focusing events (Imperial et al. 2016; Kingdon 1984), or individual stakeholders choose or are able to actively participate in the council (Leach 2006; Cobb et al. 1976). This study shows differences in substantive representation, both between cases and across years within the same case. While the Mid-Atlantic council maintains stable substantive representation, in both attendance and active participation, from public organizations/civil servants (Table 6), this sector is not substantively represented outside of the first two years of the Midwest EJ council’s (i.e., 2013 and 2014) (Table 5). In both EJ councils, later years of the study are defined by position vacancies and decreased substantive representation by appointed, public interest positions. These declines in substantive representation can be observed in the declining Shannon’s H scores for the Midwest EJ council over time (Fig. 2). While the Mid-Atlantic EJ council also has a reduction in substantive representation in the later years of the study, its Shannon’s H scores (Fig. 3), by both sector and individual, are likely stabilized by the consistent



substantive representation of the public organizations/civil servants. While both the Midwest EJ council and the Mid-Atlantic EJ council represent similar substantive representation trends for appointed, public interest positions and political leaders, the substantive representation of a single sector in the Mid-Atlantic EJ council helps maintain the diversity of attendance and active representation, as measured by Shannon's *H*, over the years included in this study.

Furthermore, the results of this research confirm our conceptual model (i.e., Fig. 1) and correspond to theoretical models of collaborative governance (Imperial et al. 2016; Ostrom 2009; Bryson et al. 2006) and policy process (Kingdon 1984). Observed are co-occurrences of rapid change in substantive representation, coordination activities, and collaborative life cycle stages despite observing little to no change in the mandates and descriptive representation of the councils. This emphasizes the importance of identifying the asymmetries between who is mandated to engage with collaborative arrangements (i.e., descriptive representation) and who is actually engaging in collaborative arrangements (i.e., substantive representations), as the latter is more clearly observed to co-occur with the actions and evolution of the council.

### Changes in Coordination Activities Relative to Substantive Representation

Despite both councils representing establishing years with high frequencies of coordination coded to knowledge sharing and a more diverse number and more equitable distribution of statement frequencies across sectors actively participating in the councils (Figs. 6 and 7), the Midwest EJ council and Mid-Atlantic EJ council have few additional similarities in coordination activities and substantive representation by sector over time. These differences in the evolution of active participation frequency by sector and the coordination activities over time begin to identify the differences that emerge between the two councils. The large fluctuations in sectoral-based, substantive representation observed in the Midwest council are reflective of the results initially outlined by Table 5. The lowest frequency for active participation years for public sector/civil servants in the Midwest councils (i.e., 2015 and 2016) (Fig. 6) corresponds with a decrease in absolute substantive representation (Table 5). These year-to-year fluctuations in substantive participation are not seen in the Mid-Atlantic EJ council mapping closely with the results outlined in Table 6. When taken with the absolute frequencies, the Mid-Atlantic council has relatively robust and stable active participation from public sector/civil servants when compared to other sectors and the Midwest EJ council.

Additionally, in the Midwest EJ Council there is a common trend between an increase in the frequency of

statements associated with external actors and the frequency of statements assigned to joint fact-finding. While this link is loosely associated in the Mid-Atlantic Council, it does not have the same co-occurrence seen in the Midwest council. This coincides with how the councils are oriented and how they are engaging with external stakeholders. Through the meeting minutes, the Midwest EJ council is observed to have a technocratic connection to external actors.

Knowledge experts—often federal US EPA representatives—are brought in to discuss specific policy domains or environmental issues. In this way, an increase in frequency of joint fact-finding activities, in Fig. 6, co-occurs with an increase in the frequency of active participation by external participants, as these meetings are focused on gathering technical information through long exchanges of dialogue between the council members and these technical-based, external participants. In contrast, a community-based connection to external actors is observed in the Mid-Atlantic EJ council focusing on understanding the local and regional contexts from across their state. While coordination activities of joint fact-finding were present in the Mid-Atlantic EJ council's dialogue between members and community-based, external participants, meetings were not dominated by these exchanges; thus, the co-occurrence of external participants and joint fact-finding are not as closely observed as in the Midwest EJ council (reference Figs. 10 and 11).

The inclusion of external participants, and more specifically what type of external participant, is posited to be important to the function of a collaboration through mechanisms informed by expert-based information and community information (Weible 2008). While the direct association cannot be made in this study, we observe lower levels of burnout (i.e., reductions in attendance and active participation) and a reduction in collaboration failure (i.e., a longer time between collaboration establishment and recreation dominant years) in the Mid-Atlantic EJ council, which focuses on including community information, compared to the Midwest EJ council. More work is needed to explore the interaction between substantive representation and coordination—more specifically looking at the types of information, expert-based or community, gained through joint fact-finding.

### Sectoral Substantive Representation and Collaborative Life Cycle Stages

After establishing the dominant life cycle across all years in the study leveraging our operationalization of Imperial and colleagues (2016) four collaborative life cycle stages, the study shifts to observe co-occurrences between life cycle stages, dialogue patterns, and sectoral engagement patterns. While each council represented its own year-to-year trends, two broad dialogue patterns were observed (Figs. 8, 9). In

stagnant years (i.e., years defined by a lack of assignment to any life cycle stage), the frequency of one-way dialogue generally increased when compared to the prior year. Additionally, dominant activation and collectivity years represented the largest growth in two-way dialogue.

Second, explored are co-occurrence of the frequency of asking and answering statements by sector and the life cycle stages of the councils (Figs. 10 and 11). While the frequencies of asking and answering statements by sector represent divergent trends between the two councils—largely informed by the substantive representation of each council (Tables 5, 6), again two patterns emerge. First, the most equal distribution in frequency of ask and answer statements are observed in the first years of each council. While this diversity in sectoral representation declines quickly in the Midwest EJ council, the Mid-Atlantic EJ council shows slower and a less regular decline in sectoral representation. Second, in the pre-re-creation dominant year, both councils are observed to have the lowest sectoral representation in their ask and answer statements. Furthermore, in their re-creation dominant year, an increase in sectoral representation is observed in their asking and answering statements.

## Conclusion

The research reported in this paper furthers a line of research aimed at better understanding representation within collaborative governance arrangements, while also offering guidance on measuring life cycle dynamics. Extending beyond the study of these two EJ councils, this research is useful for policymakers, administrators, and other conveners of collaborative fora confronted with devising strategies to support access, participation, and sustained engagement by different stakeholder groups in these fora. It elucidates indicators of representation that they can rely on to assess prevalence of representation as well as indicators of life cycle stages in which different representational patterns may emerge. Knowing when representation may tend to increase or decrease can help designers and facilitators of collaborative fora anticipate when engagement strategies may be needed or effective. Furthermore, it may also help them consider when more or less engagement is important given the nature of the activities that associate with different life cycle stages.

Going forward, this research can be extended in a variety of ways to further understand representational dynamics. Our future work aims to engage an assessment of a greater number of environmental justice cases to investigate collaboration contexts in more detail in an effort to understand factors contributing to descriptive representation. Another effort will be to examine council

processes in more detail through interviews to identify factors influencing substantive representation. Finally, a third effort will be dedicated to understanding how patterns in descriptive and substantive representation contribute to collaboration outputs, outcomes, and impacts (Siddiki and Goel 2017).

**Acknowledgements** This research is supported by NSF-USDA Innovations at the Nexus of Food, Energy, and Water Systems (INFEWS) [grant no. 2019-67019-30463].

**Author Contributions** SS: conceptualization, methodology, writing – original draft, and writing – review & editing. GA: conceptualization, data curation, formal analysis, methodology, visualization, writing – original draft, and writing – review & editing.

## Compliance with Ethical Standards

**Conflict of Interest** The authors declare no competing interests.

**Publisher's note** Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

Springer Nature or its licensor holds exclusive rights to this article under a publishing agreement with the author(s) or other rightsholder(s); author self-archiving of the accepted manuscript version of this article is solely governed by the terms of such publishing agreement and applicable law. Springer Nature or its licensor holds exclusive rights to this article under a publishing agreement with the author(s) or other rightsholder(s); author self-archiving of the accepted manuscript version of this article is solely governed by the terms of such publishing agreement and applicable law.

## References

- Ansell C, Gash A (2008) Collaborative governance in theory and practice. *J Public Adm Res Theory* 18(4):543–571
- Ansell C, Doberstein C, Henderson H, Siddiki S, Hart P (2020) Understanding inclusion in collaborative governance: a mixed methods approach. *Policy Soc* 39(4):570–591
- Beierle TC, Cayford J (2002) *Democracy in Practice: Public Participation in Environmental Decisions*. Resources for the Future, Washington, DC
- Biddle JC (2017) Improving the effectiveness of collaborative governance regimes: Lessons from watershed partnerships. *J Water Resour Plan Manag* 143(9):04017048
- Biddle JC, Koontz TM (2014) Goal specificity: A proxy measure for improvements in environmental outcomes in collaborative governance. *J Environ Manag* 145:268–276
- Bingham, L. B. (2011). *Collaborative governance*. The SAGE handbook of governance, 386–401
- Bryson JM, Crosby BC, Stone MM (2006) The design and implementation of Cross-Sector collaborations: Propositions from the literature. *Public Adm Rev* 66:44–55
- Buuren AV (2009) Knowledge for governance, governance of knowledge: Inclusive knowledge management in collaborative governance processes. *Int Public Manag J* 12(2):208–235
- Calanni JC, Siddiki SN, Weible CM, Leach WD (2015) Explaining coordination in collaborative partnerships and clarifying the scope of the belief homophily hypothesis. *J Public Adm Res Theory* 25(3):901–927

- Cobb R, Ross JK, Ross MH (1976) Agenda building as a comparative political process. *Am Political Sci Rev* 70(1):126–138
- Cook, K. S., Hardin, R., & Levi, M. (2007). Cooperation without Law or Trust [2005]. *Contemporary Sociological Theory*, 125
- Dobbin KB, Lubell M (2021) Collaborative governance and environmental justice: Disadvantaged community representation in California sustainable groundwater management. *Policy Stud J* 49(2):562–590
- Douglas S, Ansell C, Parker CF, Sørensen E, T Hart P, Torfing J (2020) Understanding collaboration: introducing the collaborative Governance Case Databank. *Policy Soc* 39(4):495–509
- Emerson, K., & Nabatchi, T. (2015). Collaborative governance regimes. Georgetown University Press
- Imperial MT, Johnston E, Pruett-Jones M, Leong K, Thomsen J (2016) Sustaining the useful life of network governance: life cycles and developmental challenges. *Front Ecol Environ* 14(3):135–144
- Imperial, M. (2022). Life cycle Dynamics and Developmental Processes in Collaborative Partnerships: Examples from four watersheds in the U.S. of this special issue
- Kim J, Siddiki S (2018) Linking diversity of collaborative policymaking venues with procedural justice perceptions: A study of US marine aquaculture partnerships. *Am Rev Public Adm* 48(2):159–174
- Kingdon JW (1984) Processes: Origins, rationality, incrementalism, and garbage cans. *Agendas, Alternatives, and Public Policies*. Longman, New York, NY, 75–94
- Koontz TM (2014) Social learning in collaborative watershed planning: the importance of process control and efficacy. *J Environ Plan Manag* 57(10):1572–1593
- Koski C, Siddiki S, Sadiq AA, Carboni J (2018) Representation in collaborative governance: A case study of a food policy council. *Am Rev Public Adm* 48(4):359–373
- Leach WD (2006) Collaborative public management and democracy: Evidence from western watershed partnerships. *Public Adm Rev* 66:100–110
- Maggioni E, Nelson H, Mazmanian DA (2012) Industry influence in stakeholder-driven state climate change planning efforts. *Policy Stud J* 40(2):234–255
- Newig J, Challies E, Jager NW, Kochskaemper E, Adzersen A (2018) The environmental performance of participatory and collaborative governance: a framework of causal mechanisms. *Policy Stud J* 46(2):269–297
- Ostrom E (2009) Understanding institutional diversity. Princeton University Press
- Parker KB, Margerum RD, Dedrick DC, Dedrick JP (2010) Sustaining watershed collaboratives: The issue of coordinator-board relationships. *Soc Nat Resour* 23:469–484
- Petersen D, Minkler M, Vásquez VB, Baden AC (2006) Community-based participatory research as a tool for policy change: A case study of the Southern California Environmental Justice Collaborative. *Review of Policy. Research* 23(2):339–354
- Pfeffer J, Salancik GR (2003) The external control of organizations: A resource dependence perspective. Stanford University Press
- Ross A, Van Alstine J, Cotton M, Middlemiss L (2021) Deliberative democracy and environmental justice: evaluating the role of citizens' juries in urban climate governance. *Local Environ* 26(12):1512–1531
- Scott T (2015) Does collaboration make any difference? Linking collaborative governance to environmental outcomes. *J Policy Anal Manag* 34(3):537–566
- Siddiki SN, Carboni JL, Koski C, Sadiq AA (2015) How policy rules shape the structure and performance of collaborative governance arrangements. *Public Adm Rev* 75(4):536–547
- Siddiki S, Goel S (2017) Assessing collaborative policymaking outcomes: an analysis of US Marine Aquaculture Partnerships. *Am Rev Public Adm* 47(2):253–271
- Thomson AM, Perry JL (2006) Collaboration processes: Inside the black box. *Public Adm Rev* 66:20–32
- Ulibarri N, Emerson K, Imperial MT, Jager NW, Newig J, Weber E (2020) How does collaborative governance evolve? Insights from a medium-n case comparison. *Policy Soc* 39(4):617–637
- United States Environmental Protection Agency. 2021. Environmental Justice. <https://www.epa.gov/environmentaljustice>. Accessed October 27, 2021
- Weible CM (2008) Expert-based information and policy subsystems: a review and synthesis. *Policy Stud J* 36(4):615–635
- Weible CM, Sabatier PA (2005) Comparing policy networks: Marine protected areas in California. *Policy Stud J* 33(2):181–201
- Weible CM, Sabatier PA (2009) Coalitions, science, and belief change: Comparing adversarial and collaborative policy subsystems. *Policy Stud J* 37(2):195–212
- Wilkins VM, Keiser LR (2006) Linking passive and active representation by gender: The case of child support agencies. *J Public Adm Res Theory* 16(1):87–102
- Wondollock, J. M., & Yaffee, S. L. (2000). Making collaboration work: Lessons from innovation in natural resource management. Island Press