Preliminary Discussion Draft

Civic Engagement and Environmental Stewardship in the MARB Area.

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1. Overview

This white paper pivots on the findings of our Year 1 report, "Using Social Indicators to Accelerate the Implementation of State-Level Nutrient Reduction Strategies," by focusing on compiling, assessing, and evaluating <u>civic engagement strategies and measures</u>. Our goal is to understand civic engagement efforts in the Mississippi-Atchafalaya River Basin (MARB) area and set the foundations for a community that will actively promote and foster civilian involvement and environmental stewardship. Our findings will have public policy and engagement implications beyond the MARB area.

Although we will employ the same procedures and methodologies as in Year 1, there are several fundamental differences. First, the study population is different. Whereas, social indicators assess current knowledge, beliefs and practices, predominately among agricultural stakeholders, the potential population for civic engagement is much broader. The scope of civic engagement measures broadens to encompass all potential stakeholders from all categories with interests ranging from recreation, aesthetics, and environmental advocacy to hunting/gathering, rent seeking and agricultural production.

A second important difference is the end purpose. Whereas social indicators measure changes in stakeholder knowledge, beliefs and behavior due to interventions, civic engagement relates to the capacity among the communities, stakeholders, and individuals to assume responsibility for stewardship of "their" watershed, river, lake, or local environment. This assessment of capacity can facilitate and encourage individuals, groups of citizens, and/or businesses to assume active ownership, management, and/or financial support of their natural resources. For the policy makers and regulatory agencies who must constantly reallocate scarce

resources, understanding the precursors and mechanics of civic engagement can be useful for determining where and how those scarce resources are used. Those communities with high rates of civic engagement can more easily transition from nutrient reduction best practices interventions to on-going stewardship as an agency's funding commitment is reduced and redeployed. While not every community will have the capacity to take on this responsibility, understanding civic engagement will provide policy makers with the tools to determine which communities are likely candidates for transition.

In the following pages we address these issues incrementally. First, we begin by discussing the origins of "civic engagement," its presence in the literature, and its theoretical orientation. We contend that the lack of conceptual clarity and interdisciplinary dialogue has hindered the development of a research program that focuses exclusively on a holistic understanding of civic engagement. Second, we offer our assessment of scholarly attempts to model civic engagement, particularly as it concerns grassroots environmental stewardship. Third, we discuss the major findings of recent empirical analyses. Next, we present an overview of our own research effort on the conditions that promote the emergence of civic engagement groups. Finally, we end by offering recommendations and suggestions for continuing the research on environmental civic engagement.

2. What is Civic Engagement?

The term "civic engagement" has been widely used to denote a multi-dimensional range of activities and participants without a clear scholarly consensus on its meaning, definition, and operationalization. Although it was first introduced by Putnam (1993) in his seminal work *Making Democracy Work*, over the past 25 years "civic engagement" has gained popularity among the public, media, scholars, and policymakers alike, despite its conceptually ambiguous and ontologically convoluted nature. During this period, the concept of civic engagement has evolved from its original minimalist definition of a politically engaged citizenry (Putnam 1993) to a buzzword used to describe "describe activities ranging from bowling in leagues to watching political tele- vision shows, writing checks to political advocacy groups, and participating in political rallies and marches" (Berger 2009: 335).

In our review of the civic engagement literature we identified several overlapping – and at times competing – theoretical perspectives. In political science, civic engagement captures social and political actions by individuals or groups towards the improvement of society (Berg 2013). Under this paradigm, civic engagement incorporates volunteerism and political involvement towards a fuzzy definition of "political change." In psychology it pertains to "individual and collective actions designed to identify and address issues of public concern […] such as working in a soup kitchen, serving on a neighborhood association, writing a letter to an elected official or voting" (APA 2018; also Battistoni 2002). Sociologists view civic engagement as a nexus of collective efforts to achieve a well-defined goal within a well-specified plane of interactions, in which the community, rather than the individual, is the theoretical focal point (Ehrenhalt 1996). Yet, certain political theorists contend that civic engagement is merely an

irrelevant symptom of an active citizenry and civilian involvement that should be receiving less

scholarly attention than civil society and social capital (Barber 2004; Cohen and Arato 1994;

Putnam 2000). It is important to note that outside the confines of social sciences there has

been sparse engagement with the phenomenon of civic engagement.

Competing conceptualizations aside, civic engagement seems to denote a

fundamentally reactionary process, by which agency appears following the presence of certain

conditions that are of particular importance to an individual. Given the idiosyncratic nature of

our decision-making calculi, civic engagement can take various forms and be associated with

multiple objectives. Depending on the expected utility of each set goal, it can be manifested as

a vector of both observable and unobservable actions, thus rendering its operationalization and

measuring extremely challenging. To add to the above, it appears that coalescing individual

calculi may lead to group formation, which by definition lowers the cost of civic engagement

but, at the same time, leads to a collective action problem.

In order to avoid conceptual stretching and confusion, for the purposes of this study we

have restricted our research to a particular aspect of civic engagement, namely environmental

civic engagement (ECE), which we define as *organized activities performed by individuals*

towards their perceived improvement of environmental conditions, particularly as it relates to

efforts directed towards addressing nutrient reduction, non-point source pollution, and hypoxia

in watersheds belonging in the wider Mississippi-Atchafalaya River Basin (MARB) area. An

important element embedded in our definition is that such activities should result in an

absolute net material cost to the individual(s) engaged, but an overall positive expected utility

as to rationally justify involvement. The decision to act is contingent on a pervasive perception

of a "problem" that is a direct component of the decision-making calculus of the individual(s) involved. Under these conditions we, therefore, capture both latent volunteerism and coordinated actions, while we comfortably exclude attempts that seek long-term engagement rents and tangible compensation.

3. Understanding Civic Engagement

A simple Google Scholar search of the term yielded upwards of 56,000 published works published just in the last decade. In our efforts to holistically understand civic engagement we have reviewed more than one hundred highly cited and relatively recent (i.e. post-2000) articles and books obtained by the Web of Science database. The vast majority of these publications focused on explaining very narrow expressions of civic engagement, such as political participation and youth development. A relatively small subset of these were concerned with the general causes or determinants of civic engagement, while an even smaller number of articles adopted empirical approaches to the study of the phenomenon. We determined the lack of comprehensive and cumulative research on civic engagement is the product of both its conceptual vagueness and the fragmented academic landscape that disincentivizes transdisciplinary discourse. In general, most of the works we reviewed were not comparable as they exhibited fundamental ontological, epistemological, and methodological differences.

That being said, we gained several important insights following our literature review that are useful in the context of the present study. To begin with, civic engagement seems to be predicated on the presence of an interacting set of exogenous and endogenous factors that are

highly contextual. The political structure, for instance, is considered an exogenous factor that deeply influences the manifestation of civic engagement as political participation and voting behavior. Similarly, in the specific case of ECE, one of the necessary – albeit not sufficient – exogenous conditions for the emergence of environmental stewardship is the observed degradation of water quality. Individuals deciding to take action in improving the water quality of a neighboring watershed presumably only respond to events that occurred outside and beyond their control. Other exogenous factors fall squarely within natural effects, such as climate patterns, morphological attributes, and geographical locations. Given the across-case variability of these exogenous factors, it is safe to assume that a ceteris paribus approach to explaining ECE is impossible unless we completely ignore such heterogeneity. In contrast, endogenous factors range from the socioeconomic background of involved individuals, to their demographic attributes, to their standing in local communities. Since these attributes are directly connected to the expression of civic engagement behaviors, most studies opt to focus on them exclusively.

Common ground amongst the reviewed works could also be found on the role and importance of civil society and social capital to the emergence of civic engagement behaviors. Simply put, civil society refers to communities of individuals with common interests, while social capital attempts to capture the communal bonds, identity bridges, and social connections that are commonly exhibited in "well-functioning" societies (for an exhaustive overview of these terms see Putnam 2000). According to several authors, both civil society and social capital are positively correlated with civic engagement. The more people trust and respect their societal counterparts, the more likely it is for coordinated civic engagement networks to

emerge and flourish. For that reason, civilian involvement, activism, and volunteerism are less likely to appear within societies that experience existential differences. The influence of civil society and social capital on the study of civic engagement is such that earlier works appear to routinely conflate all three concepts.

Most recently the civic engagement literature seems to be concerned with "community capacity" as a more appropriate approximation of the interaction between civil society and social capital. In the words of Chaskin (2001: 295), capacity is defined as "the interaction of human capital, organizational resources and social capital existing within a given community that can be leveraged to solve collective problems and improve or maintain the well-being of that community." In practical terms, community capacity refers to the ability of any given group of people to address and react to common threats, including – but not restricted to – economic and structural inequality, institutional repression etc. In these studies, the underlying assumption is that civic engagement occurs organically in communities possessing increased capacity for action. As such, observing and analyzing attributes associated with community capacity is preferable to examining specific instances of civic engagement.

Shifting our focus to ECE in specific, we noticed that relevant research has recently attracted greater scholarly attention. We reviewed 58 articles and reports that contemplate environmental stewardship. During our review we found that scholars are using multiple terms to analyze behaviors falling under the wider ECE conceptual umbrella. Indicatively, some of these constructs are "community-based natural resource management (CBNRM)," "collaborative natural resource (or watershed) management," "sustainability-centered environmental engagement," and "grassroots ecosystem management" to name just a few.

Although the terms may sound different, their analytical scope is largely similar as they all refer to collaborative behaviors that aim to improve environmental conditions.

A large part of this literature is concerned with developing models that explain "capacity," which is considered a necessary precursor – and at cases a robust predictor – to ECE. The common themes across these capacity building models are: a) individual characteristics (e.g. knowledge about issues, leadership traits, organizational skills); b) community characteristics (e.g. established networks, past collaborative experiences, issue-linkages); and c) the structure of opportunities (e.g. perceptive local governance, availability of resources, economic conditions). A particularly informative model of community capacity specifically addressing watershed management is offered by Davenport and Seekamp (2013: 1105; adapted by Foster-Fishman et al. 2001). This model (presented below) visualizes how member engagement, relational networks, organizational development, and programmatic coordination cumulatively interact to lead to sustainable ECE.
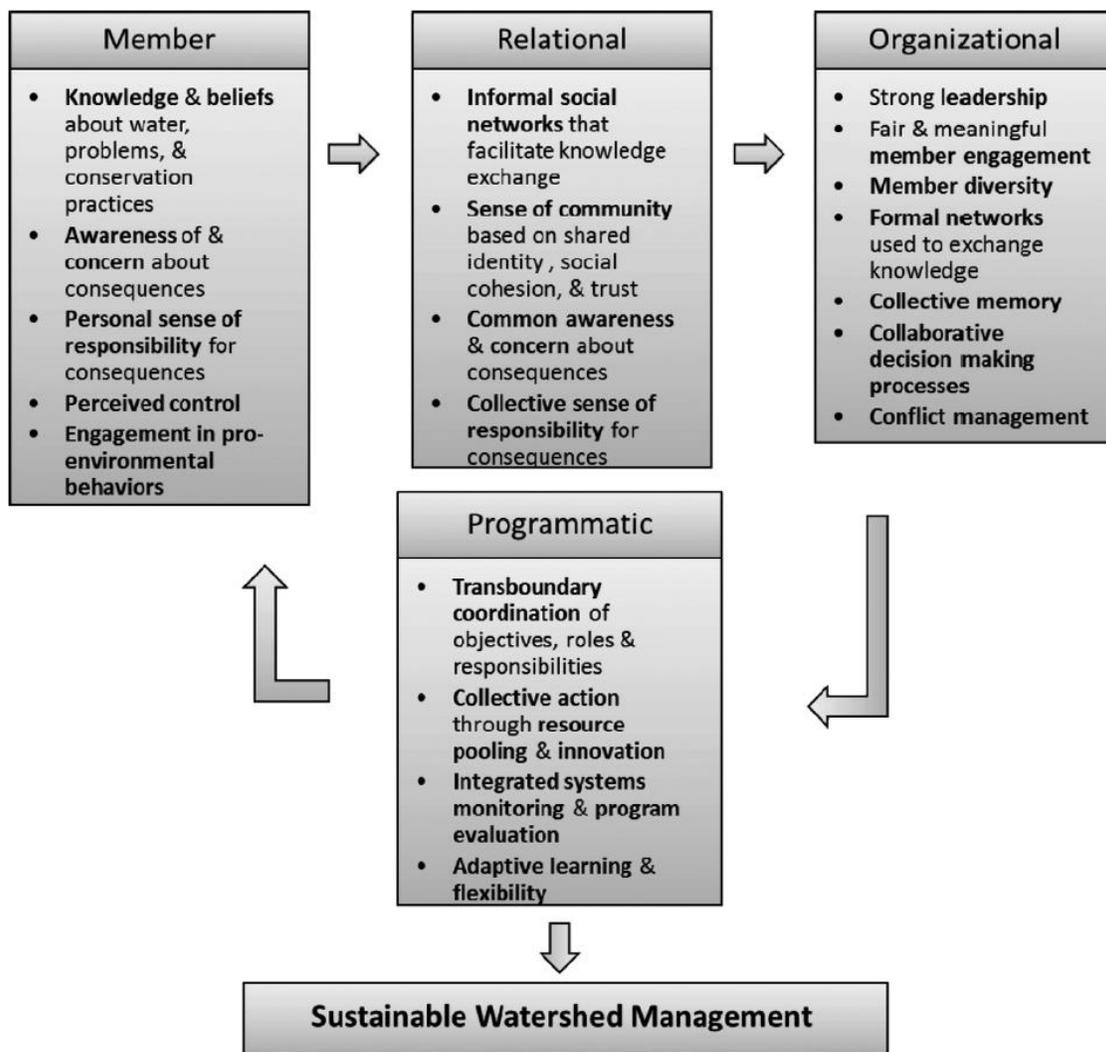
A Community Capacity Model (Davenport and Seekamp 2013: 1105)

In our review of the extant literature we found it beneficial to reconsider existing, and often competing, theoretical constructs pertaining to civic engagement. To that end, we decided to adopt the "opportunity and willingness" logical framework first developed by Most and Starr (1989). Under this frame of mind, we categorized identifiable correlates of civic engagement to those that provide individuals with the opportunity to organize and act, and

those that increase their corresponding willingness to engage in such activity. We consider socioeconomic standing, educational background, and proximity to the perceived source of concern (just to name a few) as factors that increase the opportunity for civic engagement for the simple reason that they tend to minimize the cost of action and elevate the cost of inaction. On the other hand, intangible attributes such as personality traits are considered to be affecting the willingness to be involved as they are indicative of idiosyncratic proclivities. On this basis we developed a model of civic engagement (presented in section 5) that was tested against our preliminary data obtained by semi-structured interviews.

4. Civic Engagement Data, Measurements, and Key Findings

There exist several strategies to obtain civic engagement measures, each with their own advantages and disadvantages (Table 1). These methods can be either quantitative, qualitative, or a combination of the two, while their appropriateness depends on the research question. Sample selection decisions, which we will not discuss in-depth here for brevity, also play an important role in the quality of acquired data and the validity of the results. For instance, when the sample is a group of farmers, extrapolated correlates of ECE cannot be generalized to nonfarmer individuals.

Table 1. Data Collection Methods for ECE Indicators.

Data Collection Method	Sample	Advantages	Disadvantages
Systematic panel surveys	True random sample of all adult citizens	Accuracy and reliability. High external validity. Limited susceptibility to exogenous factors. Comparable across time and space. Verifiable.	Very costly. Impractical. Low internal validity. Requires vast collaboration networks. Agnostic to specific behaviors and issues (e.g. reactions to non-poin source pollution).
Population-targeted panel surveys	Depends on the targeted population/area. Sample can be random or quasi-random.	Maintains reliability. Can target specific demographics and behaviors. Verifiable and comparable.	Very costly. Moderate susceptibility to exogeneity. Validity depends on sampling decisions.
Two-wave population-targeted surveys	Depends on the targeted population/area. Sample can be random or quasi-random.	Average cost. Feasible implementation. Allows for specific treatment effects to be measured. Average internal validity. Verifiable.	Temporally unreliable. Moderate susceptibility to exogeneity. Low external validity.
Self-reporting population-targeted surveys	Depends on the targeted population/area. Sample can be random or quasi-random.	Average cost. Feasible implementation. Average internal validity.	Unreliable. Unverifiable. Highly susceptible to exogeneity. Low external validity.
Focus groups	Nonrandom, geographically isolated.	Low cost. Easily organized and implemented. May provide insights beyond the analytical scope. High internal validity.	Unreliable. Unverifiable. Moderate susceptibility to exogeneity. Low external validity. Susceptible to groupthink.
Structured interviews	Nonrandom, geographically isolated.	Low cost. Easily organized and implemented. High internal validity. High accuracy. Moderate reliability.	High susceptibility to exogeneity. Low external validity. Ignores across case heterogeneity.
In-depth case studies	Limited subject, nonrandom, sample	Very low cost. Very high internal validity. Causal inference is possible. High accuracy.	No external validity. Heterogeneity and exogeneity are present. High rates of confirmation and observer bias.

Despite the availability of tools and methods and the voluminous literature on civic

engagement, during our extensive review of white and grey literature we were surprised to find

out that attempts to substantively evaluate empirical hypotheses are scarce and we were

unable to identify any systematic efforts to collect primary data on ECE or develop relevant

indicators. Some of the reasons behind the absence of such measurements are purely

theoretical or methodological, such as the fact that environmental stewardship can encompass

a variety of behaviors, the problematic quantification of civilian involvement, disagreements

over the most appropriate unit-of-analysis, the absence of commonly acceptable

operationalization of traits and attributes, and the lack of a cohesive causal process. The

absence of an interdisciplinary programmatic agenda, along with the logistics associated with

creating a robust community of practice, are also impeding the thorough examination of ECE

causes, determinants, and outcomes. That said, perhaps the single most important barrier to

data collection and the creation of reliable ECE indicators has been the monetary cost

combined with a lack of funding agencies willing to sponsor such initiatives. Just to offer a

single representative example, the Pew Research Center estimates that a simple dual-frame

telephone interview survey of 1,500 subjects, constituting a true-random sample of the

population, costs $100,000.[1] For most researchers and practitioners of ECE this amount is

prohibitive, more so if it were to be part of a repeated panel survey project. For these reasons

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[1] According to http://assets.pewresearch.org/wp-content/uploads/sites/12/old-assets/pdf/cellphone-peoplepress.pdf.

ECE researchers have, for the most part, relied on self-reporting surveys and structured interviews with restrictions in sample size and issue-linkages.

Notwithstanding the above, empirical research on ECE has yielded several important findings, of which the most prominent are detailed below. On the issue of collaborative resource management, Leach and Pelkey's (2001) meta-analysis finds that interpersonal trust, personal commitment, education and information about issues, along with leadership traits and availability of funding are the most important determinants of effective watershed partnerships. Bonnell and Koontz (2007) claim that the availability of resources combined with organizational capacity affect the quality of environmental outcomes and the likelihood of success of grassroots ecosystem stewardship efforts. Paulson (1998) alludes to the detrimental effects of intergroup competition, therefore implying that coordination mechanisms and monitoring regimes are key to ECE activities. Fernandez-Gimenez, Ballard, and Sturtevant (2008) note that collective awareness, collaborative monitoring, information diffusion, and pre-existing community trust improve the conditions necessary for ecological management. Lastly, Coelho et al. (2010) emphasize the importance of information exchange between local communities and stakeholders, arguing that the integration of the latter's concerns regarding collaborative management decisions has measurable advantages for regional sustainability efforts.

A number of empirical studies focus on assessing, building, and maintaining community capacity as a precursor to ECE. Evidence suggests that the proximity of a rural community to an area of environmental concern, along with the emotional attachment it has developed to the territory surrounding it, predicts the community's attitudes towards stewardship more

accurately that sociodemographic variables (Vorkinn and Riese 2001; cf. Brown, Raymond, and Corcoran 2015; Buta, Holland, and Kaplanidou 2014; Raymond, Brown, and Weber 2010). Building on these findings, Brehm, Eisenhauer, and Krannich (2006) contend that community attachment, common identity, and trust and respect among members create conditions conducive to grassroots involvement as they increase the capacity for action. Local governance also plays a role; the likelihood of success of these initiatives seems to be influenced by the willingness of local authorities to alert, educate, and encourage the public to get involved and develop a sense of ownership of their physical environment (Shandas and Messer 2008). Local governance may also facilitate cooperation between cross-cutting networks, while it has the ability to provide technical support and assistance in evaluating goals and progress (Fleeger and Becker 2008). However, Wagner and Fernandez-Gimenez (2009) caution against assessing ECE via social capital and community capacity. As their study reveals, collaborative involvement heavily depends on the quality of outcomes. If observed outcomes following a community project fail to meet expectations, the chances such an attempt will be repeated decrease, meaning that social capital may only affect the initial drive to action without ensuring longevity of involvement.

At the individual level empirical analyses are mostly concerned with personal traits or characteristics and their effect on attitudes and views towards ECE. Specifically, pro-environmental behaviors (PEBs) seem to be motivated by an individual's proclivity towards sustainability and their ability to comprehend the complexity of natural systems (Carfora et al. 2017). Individuals also appear to be motivated to act when they have already developed pro-environmental self-perceptions and identities, like considering themselves to be "vegetarian" or

"recyclers" (Nigbur, Lyons, and Uzzell 2010; Trudel, Argo, and Meng 2016). Political attitudes and social networks may push individuals to solidify or reject such identities, since people express an innate tendency to emulate behaviors they observe with greater frequency (Brick, Sherman, and Kim 2017). In all, both capacity and identity are crucial to engagement; however, although the literature provides a framework of understanding how capacity can be expanded to assume PEBs, it does not explain how one develops her identity or changes it after its initial adoption (Steg et al. 2014; van der Werff, Steg, and Keizer 2013).

All the above considered, unfortunately, not much scholarly attention has been paid to environmental civic engagement in the Mississippi/Atchafalaya River Basin area, particularly in the lower 4 states (MS, LA, TN, and AR). Rather, most notable attempts to engage with this subject are observed in OH, MN, WI, IA, IL, and IN. We believe this discrepancy between the two regions (upper vs. lower) can be attributed to the lack of developed and in-progress scientific agendas in the lower states, as well as the absence of incentives and available funding to study the issue-at-hand. We also noticed the complete absence of an ECE database similar to the SIDMA/SIPES social indicators website. As such, we possess limited capacity for within-state and cross-state comparisons of the ECE determinants.

Empirical ECE research conducted on the upper-MARB area falls under four wide categories: stakeholder motivations, community capacity, group capacity, and individual characteristics. Epigrammatically, landowners' likelihood of participation in civic engagement activities hinges on their normative predispositions and self-perceptions about their knowledge and abilities (Pradhananga, Davenport, and Olson 2015). Such motivations may be arrested by concerns about projected tangible costs versus the prospect of intangible benefits (Floress et al.

2017). Community capacity studies confirm the links between issue awareness, shared vision, place attachment, and capable leadership with environmental involvement, in line with prior literature on the subject (Brinkman et al. 2012; Pradhananga and Davenport 2017; cf. Devenport et al. 2016; Pradhananga and Davenport 2015; Pradhananga, Devenport, and Perry 2015). However, the role of intracommunity trust in building networks is not confirmed in Brinkman et al. (2012), triggering spuriousness concerns. To elaborate, one might wonder whether trust precedes or follows the networks necessary for capacity building within a community. Group capacity individual trait studies echo previous findings suggesting that social capital, information on issues and countermeasures, socioeconomic factors, education, and previous civic engagement experience are instrumental towards both ECE behaviors and the likelihood of achieving meaningful outcomes (Koehler and Koontz 2008; Mountjoy et al. 2013; Sulemana and James 2014).

4. Group Capacity and Civic Engagement in the Lower-MARB States.

Our team attempted to shed light on ECE determinants, particularly those associated with the emergence of grassroots environmental groups (GEGs). Specifically, we were interested in those conditions that pave the way for the creation of GEGs in the lower-MARB area; we want to know why individuals come together, what are the issues they are concerned with, and how do they achieve longevity and success. To our knowledge, this is the first such effort to collect and analyze original primary data from individuals already exhibiting civic

engagement behaviors in order to systematically evaluate the structures of opportunity and

willingness that led them to engage.

For reasons of theoretical clarity and precision, we define GEGs as formal nonprofit

entities (i.e. with a submitted organizational charter) comprised of individual stakeholders, thus

distinct from structures of environmental governance or academic institutions. Operationally,

we restrict our focus to those GEGs that did not have any full-time employees during their first

year of operations.[2] Furthermore, we assert that the formation of such groups has to occur

organically, in that external interventions in terms of material and/or organizational support

prior to the creation of a group undermines the "civic engagement" aspect as it eradicates the

crucial element of initial material cost. Environmental stewardship collaborative efforts that

were organized and funded by entities beyond the members of the local community are

ignored as we consider them to be neither "organic," nor "grassroots."[3] In other words, we

wanted to capture the conditions leading to authentic civic engagement instead of observing

the effects of externally motivated behaviors.

Our data collection method was based on semi-structured interviews.[4] Given our

geographic area of interest, we invested considerable amount of time trying to identify and

establish contact with GEGs as does not exist a relevant comprehensive database. We

encountered significant difficulties arranging and performing the interviews; most of the GEGs

we contacted were wary or unwilling to share their origin stories with representatives of

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[2] The ability to afford full-time employees during the first year indicates pre-existing access to external resources, thus suggests an "inorganic" creation process.
[3] Such as Superfund projects.
[4] We performed a pilot set of interviews on two civic engagement groups, albeit non-environmental, to improve and test our questions.

academic institutions. We believe this is due to the absence of a collaborative culture between researchers, stakeholder, individuals, and local governance in the lower-MARB area, as evident by our findings reported below. To gain access to some of these groups we resorted to contacting funding entities (such as foundations) and umbrella organizations (such as the Riverkeeper Alliance).

All in all, our sample consists of 21 GEGs with a particular emphasis on water management and conservation, with fourteen of those located in the lower-MARB area and seven elsewhere, which were utilized as the control groups for robustness purposes. Nine are located in Louisiana, five in Mississippi, three in Virginia, two in Florida, and one each in Delaware and New York. Eighteen of these are still active with the remaining three becoming defunct over the past 7 years. The majority of these groups (19) were established in the last decade; 4 were created less that three years ago, and 2 just within the past calendar year. Less than a half of these groups have an active internet or social media presence (n=9), while seven have no internet footprint at all.

Our questionnaire consisted of 9 thematic groups of questions (see appendix). We asked subjects about: 1) the origin stories of their GEGs; 2) the particular environmental issue they wanted to address; 3) the actions they took to address it; 4) the role of local and state governance in offering support or assistance; 5) exposure and outreach strategies; 6) their funding sources (if any); 7) their future goals and objectives; 8) the socioeconomic make-up of their organization; and 9) any other topic/issue they felt was important to our study.

Our findings have as follows. First, the two necessary conditions affecting the willingness of individuals to involve in environmental civic engagement activities are the

physical location of the targeted watershed and the magnitude of the identified problem (for

most it was surface pollution, for others bank erosion etc.). Both these factors are exogenous,

thus resistant to manipulation. In other words, one cannot significantly affect (or impose) the

presence or absence of these conditions; they are applicable only to certain communities and

individuals. In substantive terms, people living in considerable distance from a hypoxic

watershed will most certainly not be concerned about it, hence it is unlikely they will engage in

relevant ECE behaviors. We believe that location conveys a sense of ownership that is

consistent to prior literature on place attachment and human territoriality.[5] As expected, we

found that proximity has a resonating effect on ECE incentives; the closer an individual is

located to a watershed the greater the chance they will "adopt" it as their own. That said,

proximity as a variable of concern seems to suffer from diminishing effects. Beyond a certain

distance – either to or away – from a watershed it ceases to affect engagement. In contrast,

magnitude appears to affect willingness in an nonmonotonic fashion. The more potent the

problem is the more intense the call for action. However, if the issue-at-hand becomes

unmanageable from the perspective of concerned individuals, the likelihood they will engage

rapidly diminish. We believe this alludes to the importance of relative capacity and education.

Location and magnitude together create a target population that is now incentivized to

act to preserve a watershed. This population is anticipated to yield a number of individuals with

capacity and vision for action, although the size of the affected community appears to be

largely irrelevant to the number of stakeholders and potential interested parties that may

respond to the problem. Following the emergence of willing parties, the next two jointly

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[5] Territoriality refers to the psychological importance individuals attach to the territories they occupy.

necessary, but insufficient, conditions that maximize the opportunity for ECE behaviors are individual capacity and social capital. Through our interviews we discovered that the people who decided to create a group and organize around specific goals were educated on the impact of environmental degradation and on water management, and possessed organizational skills. The majority of these subjects had been previously civically engagement, either politically or environmentally. Almost all of them had the capacity to devote significant resources, particularly in terms of time, to perform their perceived civic duties. Most importantly, they exhibited a temporally persistent dedication to their cause. Individual capacity factors into the decision-making calculus by allowing citizens to perform a cost-benefit analysis of anticipated outcomes. As such, individuals with higher capacity do not perceive action-associated costs to be prohibitive.

Without reciting the entire literature on social capital, we found that tight-knit neighborhoods and communities were more likely to assume responsibility of a watershed. Again, this conveys sensibility from a rational utility perspective. Individuals with preexisting networks of positive social interactions encounter fewer limitations in disseminating information to their peers. With trust and respect present, the cost and effort of converting one's neighbors to "the cause" approximates zero. What is more, a vibrant and robust small network of like-minded individuals (e.g. a group of friends) undoubtedly results in identifying others with comparative capacity and leads to increased organizational efficiency and a productive delegation of responsibilities. Both individual capacity and social capital, then, can be conceptualized as vectors of the resulting GEG capacity for ECE.

If all the above conditions are met, then a GEG has most likely emerged. The mere presence of a GEG, however, does not relay any information about its ability to expand and maintain operations. Our interviews suggest an additional element is pivotal to this effect: exposure. Exposure (or outreach) is crucial for GEGs as it allows them to cultivate relationships with individuals beyond the original community and attract new members. Interview participants alerted us to the importance of personal networking and the potency of social media towards maximizing exposure. Subjects indicated the value in transposing dissimilar social networks by describing their outreach efforts in great detail. For instance, many used their connections via local churches to attract attention, while others approached acquaintances from their children afterschool activities. To that effect it became immediately apparent that direct interpersonal contact was as valuable to exposure as it was the group's social media presence. Both Facebook and Instagram were mentioned as outreach tools, with the latter being exponentially more useful in attracting attention given its heavy reliance on imagery. GEGs and their leaders sought and obtained attention to their activities by posting regular updates and pictures of the problematic areas and the outcomes of their actions. However, we observed that social media do not constitute a panacea to a deficiency of basic networking connections. In other words, they are not a magic solution that when applied it immediately explodes the number of unaffected people that all of a sudden become interested and involved. It acts, rather, as an accelerating catalyst to a wider underlying nexus of networks that are already in place within a community.

Having explained how they achieved exposure and attracted participants, our interviewees turned to issues of effectiveness in producing outcomes and meeting goals and

expectations. All our respondents, both active and defunct GEGs, pointed to their ability to attract funding as the primary reason for longevity or lack thereof. The most common sources of monetary (or material) support were nominal membership dues, small grants, and donations. In all cases, funds were used to cover overhead and buy equipment, such as trash bags, needed for ECE initiatives. Manual labor was mostly provided via volunteers depending on the specific course of action. In order to assess the true impact of external support, we were particularly interested in the opinions of representatives of defunct GEGs. According to them, the failure to meet their funding expectations was the cause of the demise of their organizational capacity. Not only they were unable to support their activities and reach their objective, they felt they were unable to obtain the legitimacy that often accompanies a grant. Based on these opinions, it is safe to assume that the material support offered to grassroots initiatives goes well beyond basic sustenance; in fact, money seems to convey some sort of official recognition (perceived as "endorsement") that is considered necessary for the members of a GEG to maintain interest in engagement.

A secondary element of GEG longevity, albeit non-monetary, seems to be official support from local authorities. From providing garbage trucks for river cleanup operations to non-binding resolutions of support during town-hall meetings, official support was instrumental to the community perceptions surround truly organic ECE attempts. Much like in the case of monetary support, the recognition of GEG efforts by local structures of governance reinforces their resolve to continue their activities. In contrast, GEGs that were denied requests for help or were otherwise completely ignored, found themselves struggling to incentivize their members.

In conclusion, our structured interviews of 21 GEGs allowed us to identify structures of opportunity and willingness surrounding the emergence of collaborative environmental stewardship and evaluate their impact towards understanding ECE-associated behaviors. Our findings, visually summarized below, shed light in a previously unknown aspect of organic civic engagement: the impact of interactive conditions in a stepwise manner. Although we feel confident that we have captured significant effects of the aforementioned condition, further work is necessary to discern precise causal mechanisms.
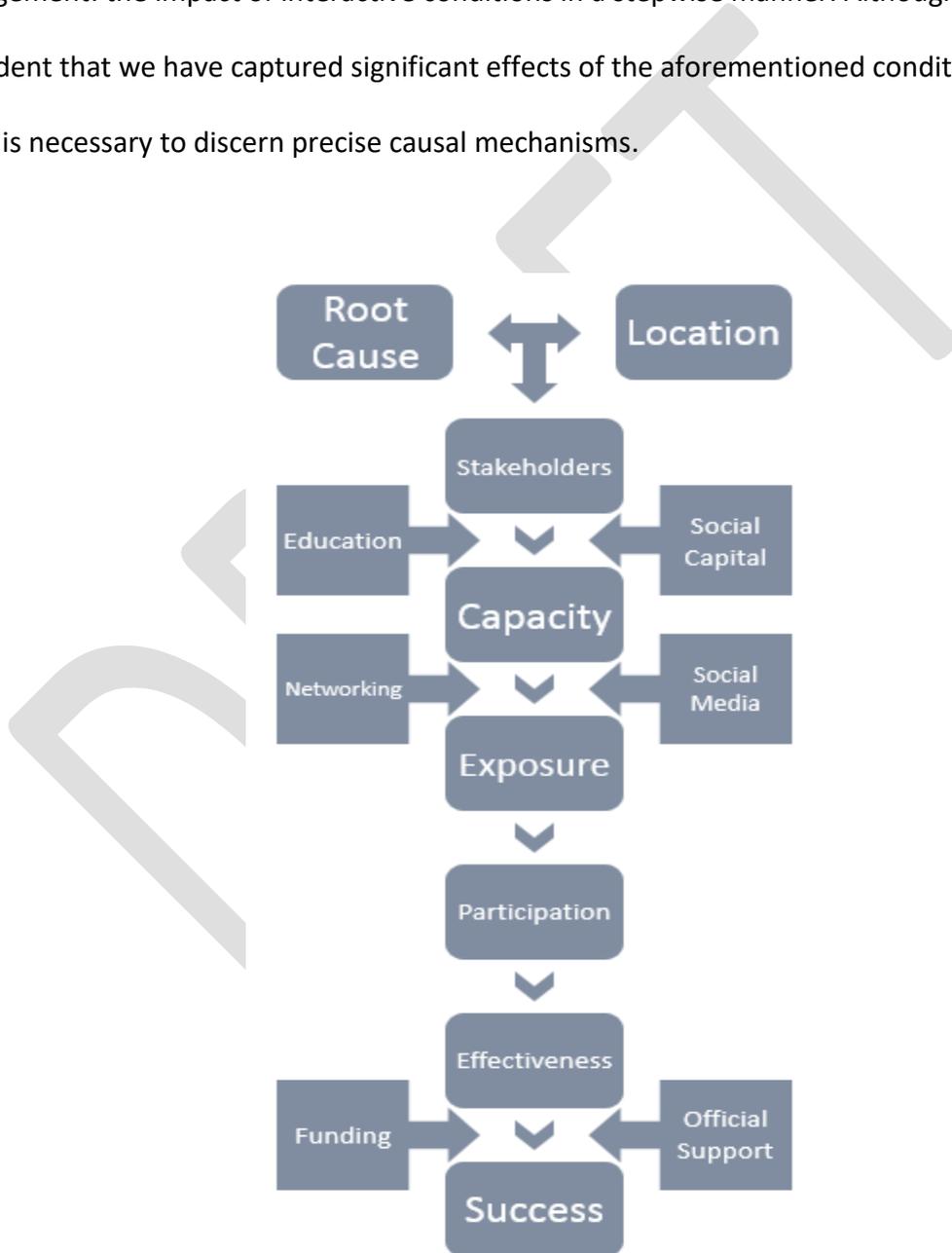
5. Recommendations

Based on our literature review and research, in this section we offer three actionable recommendations towards developing actionable ECE measurements. Specifically, we advocate for:

(1) *The creation of an "umbrella" organization, or center, that will facilitate interdisciplinary discourse and cooperation with funding agencies and government authorities on the subject of ECE.*

In order to develop measurements, there first needs to exist agreement on what exactly is being measured. To analyze ECE researchers, foundations, and state or federal agencies have to agree on common goals and objectives. This could potentially be achieved by establishing a new collaborative effort, housed at an academic institution. This center would be tasked with being the central node in a network of scientists, funders, and policymakers, providing them with guidance and facilitating coordination.[6]

(2) *The development of a clear and concise programmatic research agenda.*

A major part of the difficulties with understanding the root causes and measuring the impact of ECE relates to a confusion around the concept itself. Following Recommendation (1), we propose the creation of a programmatic agenda that is designed to identify specific research areas. Developing and maintaining an agenda (and corresponding theoretical advancements or findings) under a single roof would be beneficial to incentivizing scientific cooperation.

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[6] An example of such a collaborative effort could be considered the NSF's Research Coordination Network.

(3) *Establishing a common repository of ECE-driven data*.

Equally important to the above is the ability of interested parties to access, evaluate, and validate available data, as well as a hub for the collection of new data. This could begin with the very simple step of compiling a list of active GEGs in a single state, which would be expanded to include other states, relevant agencies, and potential ECE funding sources. Although such basic information is extremely important to scholars and policymakers alike, there have not been any efforts towards that end to date. The ultimate goal would be to create a research hub where publicly available data on ECE – drawn from surveys, interviews, or experiments – would be maintained.

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7. Appendix

Interview Questionnaire

1. Background
- History of the organization (e.g. How was the group organized? Who were the founding members? Why did you feel it was important to take action? What is the group's structure? What is your past and current membership?)
- Background of the individual (e.g. Have you had experience with activism? Have you organized environmental groups before?)
- Objectives and decision-making (e.g. What are your aims now and how have they evolved since the organization was founded? What is the decision-making structure?)

2. The issue at hand
- Specifics on the need for action (e.g. surface pollution, hypoxia, etc.)
- Magnitude of the problem (e.g. What was your perception of the issue? How has the issue been manifested in your view?)
- Affected population/area (e.g. Is this watershed vital to the well-being of the entire community?)

3. Actions
- Action plan (e.g. How do you organize and undertake clean-up initiatives? Can you describe your group's plan of action?)
- Goals and expectations (e.g. What is the process of "goal-setting"? What is your ideal outcome? Are your expectations fixed or evolving?)
- Success (e.g. Do you feel your actions have resulted in meaningful change? Would you characterize the group as "successful"?)

4. Governance
- Relationships (e.g. Are you in contact/cooperating with the local government? Have you reached out to policymakers?)
- Support (e.g. Has the local/state government offered material or immaterial support? Have you submitted any requests for support?)
- Impediments (e.g. Was it easy to communicate your goals to local governments? Have you experienced any difficulties in creating a network of stakeholders and policymakers? Do you have any suggestions for policymakers in regards to effective environmental governance?)

5. Exposure
- General (e.g. What do you think is the most beneficial medium of exposure to your cause?)

- Specific (e.g. the role of social media, online advertising, networking, collaborations with academic units)

6. Funding
- Costs (e.g. overhead, operational costs, specific action costs etc.)
- Income (i.e. sources of funding)

7. Future plans
- Longevity (e.g. Do you believe the organization is in good shape? Do you plan on continuing your involvement? Are the projects ongoing?)
- Maturation (e.g. Have your ideas and actions changed in substantive ways?)
- Actions (e.g. Are you planning on tackling other issues or projects?)

8. Socioeconomic information
- Demographics (i.e. estimates of average age, racial and gender composition of the organization)
- Education (i.e. mean education levels)
- Employment
- Special skills/expertise (e.g. past involvement with other organizations, grant-writing capabilities, retired policymakers, community organizers, etc.)
- Capacity (e.g. Do you feel your members have the socioeconomic capacity for civic involvement?)

9. Other (e.g. any other comments/remarks you would like to make?)