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Exploring Environmentalism amidst the Clamor of Networks: A Social Network Analysis of Utah Environmental Organizations

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Dwelling in a world awash in multiple environmental crises while science and social theory erode the last vestiges of the subject of humanism, it makes sense to imagine our world beyond the lens of humanism and turn to diverse methodologies in order to explore what is going on and how to promote changes that nurture ecological sustainability. In this essay we take on this task in relation to environmental communication. In what follows we explore the contours of the age after humanism, what we term the Age of the Animate Earth. In the wake of the theoretical and actual deconstruction of the subject, we offer networks as a key unit of analysis. From this perspective, we suggest social network analysis (SNA) as one viable method for doing environmental communication studies and perform this move through a SNA of Utah environmental groups.

Keywords: networks; Latour; Deleuze; animate earth; social network analysis

“The everlasting universe of things
Flows through the mind, and rolls its rapid waves”
— Percy Bysshe Shelley, “Mont Blanc”

“Beyond the edge of the so-called human, beyond it but by no means on
a single opposing side … there is already a heterogeneous multiplicity”
— Jacques Derrida, “The Animal that Therefore I Am”

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Foucault famously forecast the end of “man” in the conclusion to The Order of Things: “man is an invention of recent date” and as conditions change “man would be erased, like a face drawn in sand at the edge of the sea” (Foucault, 1994, p. 387). Events of the ensuing decades, such as the rise of corporations, new technologies, scientific advances, and climate chaos corroborate Foucault’s conjecture and suggest that the post-human tide has arrived. The Supreme Court’s Citizens United decision gifted corporations the right to free speech in the form of money, thus granting corporations more democratic power than people (Gilens & Page, 2014; Liptak, 2010). The accelerating onslaught of social media, from Facebook to Twitter to Tumbler, displaces the democratic citizen with the surveilled consumer (Schneier, 2015). Perhaps most strikingly, it turns out that people are composed of more nonhuman than human cells. Of the 100 trillion cells in each of our bodies, 90 trillion of those are not us. In something of a gut check, alien-like forms make up 90% of our living cells (Stein, 2012). Such events interrupt the world as it is, forcing us to rethink common sense concepts. The philosophical and pragmatic implications are transformative. At such a moment, it makes sense to imagine our world outside the parochial lens of humanism and to turn to diverse methodologies as we try to figure out what is going on.

In this paper, we take on this task, especially in relation to environmental communication. In what follows, we explore the contours of the age after humans, what we term the Age of the Animate Earth. We discuss the theoretical and actual deconstruction of the human subject and then suggest networks and assemblages as the ontological form of becoming. Our thinking is nourished by an underground rhizome that includes Deleuze, Latour, Bateson, and relational sociology (Emirbayer, 1997). Given our stance on networks and assemblages, we move to social network analysis (SNA) as one viable method for doing environmental communication studies and illustrate this move through a brief SNA of Utah environmental groups. The juxtaposition in the essay of continental social theory and SNA may be an unorthodox pairing, but in an age of transformative and disruptive events, it is productive for thinking itself to be unorthodox and adaptive.

Death Knells and New Beginnings

Nietzsche, Foucault’s inspiration and a harbinger of thinking beyond humanism, initiated an ontological earthquake that disturbed sedimented concepts:

how shadowy and transient, how aimless and arbitrary the human intellect looks within nature … it is human, and only its possessor and begetter takes it so solemnly-as though the world’s axis turned within it …. It is even a difficult thing for him to admit to himself that the insect or the bird perceives an entirely different world from the one that man does, and that the question of which of these perceptions of the world is the more correct one is quite meaningless. (1989, p. 246)

Nietzsche’s perspectivism fractures the humanist viewpoint. The deconstruction of the human has shaken and inspired thinkers from Foucault and Deleuze to Derrida and Latour to theorize the earth beyond Cartesian certitudes, forming a viral other
thinking that has inflected much of social theory. Still, theorizing at the edge provides precarious purchases and so in practice we are all too often modern critics invested in our autonomous agency, the secular substitute for a soul. Yet a rhetoric chained to humanism is reduced to deciphering intentions and imagining meanings. For example, as environmental communication critics we pore over John Muir’s texts, revealing the enlightened genius’ intentions for saving nature. In order to trace what is going on beyond a humanist frame, force must be thought beyond intentions and interpretations, beyond good reasons and rational subjects. There are no rational subjects. There are constellations of forces and complexes of networks. These constellations of forces are what Deleuze and Guattari term assemblages: “We will never ask what the book means … we will not look for anything to understand in it. We will ask what it functions with, in connection with what other things it does or does not transmit intensities” (1987, p. 4). To revisit the example of Muir, we might pursue how Muir’s texts acted in a surprising network of motley allies: Southern Pacific Railroad, Protestantism, the popular new medium of photography, politicians, Romanticism, nascent tourism, the rocks and waterfalls of Yosemite, magazines, D.C. lobbyists (even then), and so on (DeLuca, 2001). Rhetoric becomes the practice of tracing force in the making and unmaking of worlds. In tracking how communicative forces are deployed in transforming worlds, we are not asking what a discourse means or if it is true, but what it does.

In the extended wake of humanism, how to think and feel and sense differently is a vital question for communication scholars, especially for environmental communication scholars. We live the paradox of environmental communication: reliance on relatively detached science for knowing the earth and the numerous environmental problems plaguing it, yet performing subjective criticisms relying on the critic’s privileged vantage point. That is, we usually set up a subject-object dichotomy wherein we are the subjects examining a world of objects out there. There is a tendency for modern critics armed with privileged perspectives to decipher the meaning of human products in the technosphere: photographs, essays, social media, magazines, blogs, films, TV shows, video games, and zoos. The resulting technosoliloquies are enriching, but limited. Modern criticism entails, in practice, an implicit commitment to an atomistic subjectivity and a humanist view of the earth. Yet the earth is not made up of human subjects manipulating a world of inert objects, but complicated networks that always already entwine us in intimate configurations with the myriad things of the universe. As Latour elaborates, “To be a subject is not to act autonomously in front of an objective background, but to share agency with other subjects that have also lost their autonomy” (2014, p. 5). This sharing prompts a shift from a focus on autonomous entities to the connections and relations among entities, a move that provides insights about a world of networked ecologies.

Emirbayer’s advice in his pivotal “Manifesto for a Relational Sociology” is applicable to environmental communication scholars: we need to move beyond “rational, calculating actors” and “methodological individualism” (1997, p. 284); that is, scholars “are faced with a fundamental dilemma: whether to conceive of the social world as consisting primarily in substances or … in dynamic, unfolding relations” (1997, p. 281).
A focus on substances and methodological individualism leads to serious misinterpretations of the world. Domestication provides a telling example. Domestication, an absolute foundational event in human civilization, was not, despite anthropocentric assumptions, the result of the intentional actions of human subjects. Rather, domestication, which predates both literacy and science, was either the result of the intentional actions of nonhuman animals or accidental (Budiansky, 1999; Bulliet, 2008). Indeed, as McFarlane (2013) argues, given the centuries-long time frame of domestication, “There is no conceivable way that domestication was intentional and purposeful, let alone that the humans in question even had a concept of domestication” (p. 64). McFarlane (2013) uses the example of domestication to push for an “inhuman relational sociology,” for “(d)ivoring humans from nonhumans results in a systematically distorted understanding of humans” and the world (p. 53). Relational sociology (in concert with Latour, Deleuze, and others) suggests a focus on networks that promises that thinking can be different. Environmentalism writ large offers resources for thinking and acting differently.

Aldo Leopold provides a crucial example of thinking outside the realm of humanism with his concepts of the land ethic and thinking like a mountain. In the short passage “Thinking like a Mountain,” Leopold writes:

We reached the old wolf in time to watch a fierce green fire dying in her eyes. I realized then, and have known ever since, that there was something new to me in those eyes—something known only to her and to the mountain. I was young then, and full of trigger-itch; I thought that because fewer wolves meant more deer, that no wolves would mean hunters’ paradise. But after seeing the green fire die, I sensed that neither the wolf nor the mountain agreed with such a view. (1966, pp. 138–139)

Leopold’s concept of thinking like a mountain is usually received metaphorically. Yet perhaps we should read it literally as an acknowledgment of inhabiting an animate earth criss-crossed with networks of myriad nonhuman intelligences. What if thinking like a mountain is not a metaphor but an ontological imperative?

Gregory Bateson, in Steps to an Ecology of Mind, provides an in-depth exploration of what it means to live amidst an array of assemblages and networks on animate earth. In the essay “Pathologies of Epistemology,” Bateson describes Mind as

a necessary, an inevitable function of the appropriate complexity …. We’ll come later to the question of whether a man or computer has a mind. For the moment let me say that a redwood forest or a coral reef [does] …. What thinks is the total system … (1972, pp. 482–483)

Bateson illustrates this Mind, the system, with the example of people and Lake Erie —“if Lake Erie is driven insane, its insanity is incorporated in the larger system of your thought and experience” (1972, p. 484). People, industrial practices, forests, insects, soil, weather, and Lake Erie comprise a Mind/assemblage/network. Bateson argues that the evolutionary unit of survival (and analysis) is not the organism, but the organism in an environment, networks or what Deleuze and Guattari term assemblage: “assemblages are complexes of lines …. A social field is defined … by the lines
of flight running through it … Establish a logic of the AND, overthrow ontology, do away with foundations, nullify endings and beginnings” (1987, pp. 505, 90, 25). A society, a world, the earth, is composed by and of its assemblages/networks.

Assemblages and Networks: Thinking in the Age of the Animate Earth

Bateson’s Mind, Deleuze and Guattari’s assemblages, and Latour’s networks are concepts that enact a theoretical break in modernism’s triumphant industrial genocidal rampage and open spaces and lines for thinking differently beyond the confines of the subject and humanism. To start, they all challenge “I”, that most provincial of linguistic habits and solipsistic beliefs. If, as environmental scholars, we acquiesce in the habit of “I” we guarantee a certain defeat before we begin, enabling a bisecting of the world between humans and everything else, between the subject and inert objects, losing sight of “a world animated by all sorts of entities and forces” (Latour, 2007, p. 481). Deleuze proffers a different subject: “subjectification isn’t even anything to do with a ‘person’: it’s a specific or collective individuation relating to an event (a time of day, a river, a wind, a life … ). It’s a mode of intensity, not a personal subject” (1995, p. 99). For Deleuze, the I, the subject, the body, is a composition of forces, not the property of a discrete entity. As Deleuze elaborates in Nietzsche and Philosophy, “Every relationship of forces constitutes a body—whether it is chemical, biological, social or political” (2006, p. 37).

Latour develops this pivotal point, warning “be prepared to cast off agency, structure, psyche, time, and space along with every other philosophical and anthropological category, no matter how deeply rooted in common sense they may appear to be” (Latour, 2007, pp. 24–25). In abandoning the ontology of Western humanism, the world of subjects and objects, Latour presents a fundamental challenge to the founding chant of Western philosophy, “I think, therefore I am.” Instead, Latour understands all actants, humans as well as other entities, a plethora of entelechies, to be constituted in and through flows of networks. Any actant is a contingent knot, an ephemeral event amidst cascading networks that are themselves ceaselessly in flux.

To be a realistic whole is not an undisputed starting point but the provisional achievement of a composite assemblage…. Subjectivity is not a property of human souls but of the gathering itself…. Action is not done under the full control of consciousness; action should rather be felt as a node, a knot, and a conglomerate of many surprising sets of agencies. (2007, pp. 208, 218, 44)

A subject, an actant, is a thing in the ancient sense of the word—a gathering. This line of thinking offers environmental communication scholars a flat ontology in which grass, social media, rocks, PM2.5 particles, cryptobiotic soil, and people are all actants; it offers us a way to conceptualize earth as animate and humans as, in Leopold’s words, plain members of the land community (1966, p. 204).

We suggest the Age of the Animate Earth to force a grappling with assemblages and networks that are always already more than human. A focus on the human is a reduction and truncation that distorts thinking. An animate earth places all assemblages in chaotic communications, rather than only one select species deemed
capable of “rational” speech. By shifting to an animate network perspective, instead of seeing the world as a collection of objects, it instead becomes what Latour terms “the parliament of things,” echoing the archaic roots—gathering, assembly, meeting (1993, 2000). The human is a gathering composed of a multiplicity of networks, from microbiota in intestines and fungi in soil and smartphones in pockets to highways dissecting landscapes and streams of images inundating the globe and rain blessing forests. “Nature is not attributive, but rather conjunctive: it expresses itself through ‘and,’ and not through ‘is.’ This and that—alternations and findings, resemblances and differences, attractions and distractions, new lines and abruptness” (Deleuze, 2004, p. 304). It is impossible to differentiate where one “individual” begins and the other ends. The subject becomes plural via networks and assemblages of engaging forces.

The Age of the Animate Earth conceptualizes things in terms of becomings and networks, abandoning autonomous human subjects and instead entering into relational engagements. We frequently spend time talking about the world, rather than conversing with the world. A shift to the animate recognizes that everything is communicating in a cacophonous concert of voices, scents, touches, and textures. As eco-writer Abram notices, “It is the animate earth that speaks; human speech is but a part of that vaster discourse” (1996, p. 179), for humans only exist in “perpetual reciprocity with the myriad things” inhabiting the earth (1996, p. 270).

In order to explore social change today, we must shift our methods to ones capable of dealing with the clamor of networks that create, carry, and connect things, from humans to rocks to slugs to stores to viruses to smartphones to trees to subways to ideas to maps to winds to legends to money to information to … As the Internet becomes the central organizing principle of post-human societies, social theorists have reimagined society literally and metaphorically as a network (Benkler, 2006; Castells, 2012; DeLanda, 2006; Kadushin, 2012; Latour, 2007). The coincidence of social theorizings of networks and the creation of digital networks intensifies the shift that we call the “network turn.” As Latour argues, “we have the social theory of our datascape. If you change this datascape, you have to change the social theory” (2011, p. 802). Latour at times puts it stridently, “there is no greater intellectual crime than to address with the equipment of an older period the challenges of the present one” (2004, p. 231). In worlds composed of networks, SNA provides one way into beginning to trace networks.

Analyzing Environmental Activism: A Relational Approach to Engaging Worlds via Social Network Analysis

Bourdieu, in twisting Hegel’s famous formula, declares that “the real is the relational: what exist in the social world are relations” (Bourdieu & Wacquant, 1992, p. 97). Social phenomena are immanent to and “enmeshed in relations of interdependency” instead of operating “on a separate order or reality” (Powell & Dépelteau, 2013, p. 2). “The relation between the social agent and the world is not that between a subject (or a consciousness) and an object, but a relation of ontological complicity—or mutual possession” (Bourdieu & Wacquant, 1992, p. 20). As astrophysicists do not study each
planet’s gravitation without regard to their relationship in the solar system, or electrical engineers do not study electronic components independent of their interactions, to study actors apart from their relational contexts bespeaks a humanistic bias (Freeman, 2004).

Elias complained about the limiting but common assumption of *Homo clausus* (people experiencing themselves as in a “closed box”) in social science studies and argued for *Hominis aperti* or “open people” situated in complex interdependencies (Elias, 1978). Indeed, the image of atomistic, independent individual actors has been the cornerstone of mainstream practices in social sciences for decades, including but not limited to schools of thoughts such as “statistical regression-based approaches,” “rational choice theory,” “categorical approaches that highlighted shared attributes rather than location in relational settings or configurations,” and “monological accounts that failed to think in dialogical or field-theoretical terms,” to borrow the list enumerated by Emirbayer (2013, p. 209). Such research practices function as “a sociological meatgrinder,” wrote Barton (1968), which remove individuals from their social contexts and strip the “social” part from the social phenomena researchers purport to study. A relational reorientation of sociology represents an “anti-categorical imperative” that battles substantialist thinking (Emirbayer & Goodwin, 1994). With the view of “relational realism” (Tilly, 2004), theory and research need to approach social processes as consisting in “relations, interpretations and actions” that are “mutually generative” (Mische, 2011).

SNA is such a perspective or paradigm that represents and enables ontological and epistemological shifts from the conventional model of social science research that assumes autonomy of, and independence among, individual entities. It views individual actors as embedded in networks and social systems as “networks of networks” (Tindall & Wellman, 2001, p. 271), emphasizing “the primacy of relations over atomised units” (Marin & Wellman, 2011, p. 22). SNA focuses on “relations, not attributes,” “networks, not groups,” and “relations in a relational context” (Marin & Wellman, 2011, pp. 13–14). Now applied in fields ranging from physics and biology to social sciences and computer and information sciences, SNA has evolved beyond simply a metaphor or an analytic tool to a productive paradigm in the past few decades¹ (Freeman, 2004; Kadry & Al-Taie, 2014).

The SNA paradigm provides theoretical and methodological tools for understanding the increasingly networked ecology. In a manner that complements Latour, SNA pioneer Kadushin explains,

> A network is simply a set of relations between objects which could be people, organizations, nations, items found in a Google search, brain cells … [SNA] is concerned with social networks, and what passes through these networks—friendship, love, money, power, ideas, and even disease. (2012, pp. 3–4)

Basic concepts of SNA can be traced back to mathematical graph theory, which comprises a set of points (i.e. “vertices” or “nodes”) and lines connecting these points (i.e. “links” or “edges”). The primary interest of SNA lies in relational properties of networks, with the foci of investigations on structure and position as either explanatory
mechanisms or outcomes to be explained. As structure and position cannot be examined without the building elements of nodes, SNA promotes and enables cross-level thinking and research and allows us to overcome binary, dichotomous thinking embodied in popular dualisms such as individual versus society or agency versus structure.

Why SNA for environmental communication? The reasons are both philosophical and pragmatic. Philosophically, it moves environmental communication scholars beyond quasi-Cartesian contemplations and atomistic individuals, instead focusing thinking on relations on an earth of ecological networks. SNA inclines scholars to attend to relations and networks, not entities as enclosed objects, joining Latour in disavowing a dead world of inert objects, in favor of “a world animated by all sorts of entities and forces” (2010, p. 481), a cacophonous kakosmos of things composed in complicated relations.

Pragmatically, SNA provides a way for academics and activists to map assemblages and forces and to trace whether and how environmental campaigns and movements work. Speculating on the impact of media campaigns and activism from the safe cocoon of offices has been common practice for environmental organizations due to lack of funding, personnel, or experience and expertise to conduct actual campaign evaluation work. It is, however, often neither revealing nor productive. SNA is one way of capturing the dynamics in the field of environmental movements. It enables us to trace what is happening on the ground.

Additionally, in a time of disruptive and transformative events, environmental communication as a “crisis discipline” (Cox, 2007) should avail itself of diverse methodologies. So far, SNA is markedly absent from environmental communication scholarship, which reflects the general absence of SNA in the discipline of communication. Only in organizational research does SNA have some presence (Monge & Contractor, 2003). As Tindall and Wellman (2001) put it, “Although people often view the world in terms of groups … they function in networks” (p. 266). Despite the recognition of the importance of interorganizational networks (Borgatti & Foster, 2003), however, empirical studies are surprisingly few (Kadushin, 2012; Provan, Fish, & Sydow, 2007).

Spearheaded by relational sociologist Diani (1992) and Diani and McAdam (2003), a network perspective on social/environmental movements has gained currency in the past couple of decades. In this network approach, social movements are conceived and studied as networks of interactions among individuals, groups, or associations, instead of as “phenomena” or “episodes” (Diani & Bison, 2004, p. 282). It is characterized by a shift of attention away from concepts such as political opportunity structure, grievances, and resources previously dominating the scholarship on social movements to social ties, linkages, and interactions between actors involved in dynamic processes. For example, Ansell’s (2003) survey study on the San Francisco Bay Area environmental movement centered on whether and how an organization’s positional, relational, and structural embeddedness in a network may shape their collaborative governance. Recent research has also seen the application of SNA by extracting relational information from Web resources. Hoffman (2009) examined the different roles Environmental Non-governmental Organizations (ENGOs) play in the corporate
network with collaborative information reported on their websites, and suggested the ENGO-corporate relationships are more complex than what is typically dichotomized as “dark greens” vs. “bright greens” (the former referring to groups that work against the system and confront corporations; the latter work with the system and form alliances with corporations). Ackland and O’Neil (2011) examined the hyperlink and online frame networks among environmental activist organizations to identify patterns of symbolic exchanges.

Case Study: Networks of Environmental Organizations in Utah

The State of Utah in the USA has many features that make it an ideal candidate to explore the scene of environmental activism. First, approximately 70% of Utah is federally owned, and is composed of three distinct regions: the Rocky Mountains, the Colorado Plateau, and the Great Basin. The diversity of its landscape results in a wide range of environmental issues. Second, Utah, like many other western states, has a legacy of mining and fossil fuel extraction. The Rio Tinto Kennecott Copper Mine outside of Salt Lake City is one of the largest open pit mines in the world. Uranium mines were prevalent during World War II and the Cold War, and currently coal and natural gas extraction are active in the state. Finally, Utah’s population has increased quickly. Not only does Utah have one of the highest birth rates in the USA, the Wasatch Front in northern Utah is one of the most heavily urbanized areas in the country. All of the above-mentioned issues result in numerous governmental and non-governmental organizations focused on diverse environmental issues.

Our case study represents an initial effort to map out the communication terrain among the environmental organizations in Utah. Using SNA, we seek to identify the communication network structure by addressing a few basic questions. First, do environmental organizations communicate with each other or do they largely function as isolated islands? Second, what are the important organizations from a network perspective? Third, what subgroups, if any, may there be in this network? We obtained a list of all Utah-based environmental organizations and invited them to participate in an online survey. Among other questions in the survey, one question asked each organization to name up to five other Utah-based organizations that they had communicated with in the past six months. Thirty-four of 85 organizations provided data on this relational question. Based on these data, a network was constructed that consisted of 80 nodes (representing 80 separate environmental organizations) and 173 unique edges (i.e. direct communication ties among the organizations in the network). Figure 1 depicts this network.

There was only one component of the graph, meaning that every organization was connected to at least one other organization. In other words, there were no unconnected, isolated organizations or separated “islands” of organizations in this network. Every organization could be reached by another via direct or indirect paths. The network was only sparsely connected, however. The density was .027, corresponding to 2.7% of the total number of possible ties among the organizations included in the network. To get an idea of the overall efficiency of communication
flow in the network, we turn to the notion of geodesic distance, which refers to the shortest path from one node to another. The average geodesic distance in this network was 3.41, meaning that on average it would take about three and a half “hops” for any one organization to reach another. The two farthest apart organizations in the network would need to go through seven organizations in-between to reach each other.

In Figure 1, dark blue nodes represent non-government organizations and bright blue nodes represent government organizations. In this network, 55 organizations are non-governmental and 25 are government organizations. It appears that the non-government organizations and government organizations were loosely clustered together, respectively. On average, among non-government organizations, it took 3.02
steps to reach another organization, and among government organizations, it took 2.73 steps to reach one another.

Not all connections in a network are created equal. Important to network analysis are a set of “centrality” measures, which differentiate nodal actors in terms of their importance and influence in the network. In Figure 1, we chose to depict the size of the nodes as proportionate to their “betweenness centrality.” More specifically, betweenness centrality measures “how often a given vertex lies on the shortest path between two other vertices” (Hansen, Shneiderman, & Smith, 2010, p. 40). A larger betweenness centrality indicates that the organization serves as a crucial bridge or link in the information flow between organizations, the removal of which would eliminate important pathways in the network. In other words, this metric captures the extent to which an organization is an intermediary between other organizations and accordingly has power of controlling or brokering the information flow. In our network, the five organizations highest in betweenness centrality measures were Heal Utah, Utah Society for Environmental Education (USEE), the Nature Conservancy (NC), Wild Utah Project (WUP), and Department of Environmental Quality (DEQ). Figure 2 depicts the “subgraph images” of these five organizations with two levels of adjacent nodes (i.e. those that were one or two degrees away from the focal organizations), which clearly shows how these five organizations bridge with other organizations in the network. Removing them would disrupt the network and reduce its efficiency of communication.

For example, the DEQ is the connecting point for the cluster of water-related government organizations such as Utah Division of Water Quality, Utah Division of Drinking Water, Central Utah Water Conservancy District, and USEE, an important non-government organization which is in turn connected to NGOs such as Friends of Great Salt Lake, and organizations dealing with other issues such as Utah Division of Forestry and Fire and State Lands (which is connected with Tree Utah, NC, etc.). In other words, it serves as a bridge between governmental agencies specifically focused on water issues and non-government organizations as well as organizations with other issue foci.

To further identify patterns of connectivity in the network, we used clustering analysis that uncovers more densely connected subgroups or clusters. Clusters are “pockets of densely connected vertices that are only sparsely connected to other pockets” (Hansen et al., 2010, p. 101). Six distinct clusters were identified, depicted in different colors in Figure 3. Each cluster was then explored qualitatively for characteristics or similarities that could aid in interpreting the cluster results. It seems that the derived clusters are organized around shared goals or issues of interest. In Figure 3, the gray curves represent the aggregated number of ties across the clusters.

Utah’s wide range of environmental issues produces governmental offices mandated with the creation and regulation of environmental policies. “Resource Regulation” organizations such as the Division of Environmental Quality and the Division of Oil and Gas Management frequently maintain their affiliations with other governmental organizations such as Utah Department of Water Quality. Given Utah’s large and diverse geography, one obvious environmental concern centers on wilderness
conservation as exemplified by local chapters of the Sierra Club and the Audubon Society. This clustering on “Wilderness” issues extends to local, grassroots organizations such as the Southern Utah Wilderness Alliance (SUWA), Save Our Canyons (SOC), and WUP. Pollution issues are also salient in Utah, specifically air quality that in turn sparks an engagement with energy use and CO₂ emissions. As a result, energy issues become closely linked to air quality issues. Focusing on “Air and Energy” issues, non-governmental organizations like Utah Physicians for a Healthy Environment and Utah Clean Energy are frequently challenging regulatory governmental institutions. Given that Utah is a major flyway for migratory birds

**Figure 2.** Subgraph images of the five organizations highest in betweenness centrality.
whose habitat is in riparian areas along rivers and lakes, the cluster of “birds and water” is a logical one. Non-governmental organizations such as Friends of the Great Salt Lake and HawkWatch International work with governmental organizations like the Utah Division of Wildlife Resources and the Bureau of Land Management to address issues surrounding riparian areas and the birds who live there. Organizations focused on “Education and Trees” work to connect humans with forests, focus on the planting and care of trees and forests (such as TreeUtah and the Utah Division of Forestry), or education issues surrounding trees and forests (such as Friends of Alta). Finally, when it comes to a focus on “Sustainability,” governmental agencies like the Salt Lake City Mayor’s office and the Salt Lake Office of Sustainability collaborate with non-governmental agencies like the Center for Green
Space Design or Wasatch Community Gardens. In contrast to the “Wilderness” organizations, “Sustainability” organizations focus on environmental well-being for humans.

**Tracing Networks: Insights and Limitations**

In the Age of the Animate Earth, starting our studies with the atomistic individual makes little sense if we want to understand the world and how social change happens. Thus, in this paper we offer a turn to networks and SNA. As an addendum to our philosophical argument, our SNA is meant to be a brief demonstration of the promise of this orientation, not an exhaustive study. Still, even this brief analysis offers insights. At a general level SNA suggests that mass communication campaigns designed to appeal to individuals may be mis-allocating their resources. Mass communication campaigns via advertising on television or radio or billboards are blunt instruments that miss more than they hit. So, for example, environmental organizations or scholars that want to intervene on an issue should look at the networks among individual actors (members of the public and activists or environmental groups) and identify linkages and critical bridges that can most efficiently facilitate or block the flow of communication. SNA enables such a relational view and analysis. As our analysis of Utah environmental groups suggests, there are certain groups one should focus on. In the Utah environmental network of dozens of groups, we can identify groups with high levels of betweenness, which thus function as crucial bridges.

SNA, by lifting researchers above their “immediate circle” (Kadushin, 2012), also provides a productive corrective to our often-unexamined assumptions. For example, in our Utah environmental SNA, our common sense assumptions about the critical bridge groups were wrong. Before our SNA, we assumed that the most important environmental groups would deal with the most issues and the most popular issues, have national presence, and have the most money. These assumptions turned out to be incorrect. Out of the five most important bridge organizations, four of them are NGOs and three of those four are local groups with a rather narrow focus. This is most clear with the most important bridge organization, Healthy Environment Alliance of Utah or HEAL Utah. HEAL’s focus is on nuclear and toxic waste, which is a rather narrow niche and not particularly popular topic. HEAL is not trying to save cute animals or sublime landscapes, two traditionally popular environmental causes. The issues that HEAL deals with do not offer spectacular visuals and charismatic megafauna. Still, HEAL is a central bridge organization in the Utah environmental social network. Being local and focused on relatively narrow topics is characteristic of other important bridge organizations, including USEE, WUP, SOC, and SUWA.

While our SNA study did provide a valuable informational map about communication patterns among Utah-based environmental organizations, there are important limitations to SNA and our study to acknowledge. Below we reflect on and ponder these limitations.
Measurement issues

First, the specific relationship we focused on was “communication” among the organizations. While this choice was meant to capture a wide range of networking behaviors and the more “recurring pattern of ties” (Ebers, 1997), it also verged on being vague and broad. In addition, the relationship ties between organizations were measured as a binary (i.e. the presence or absence of a relationship) as opposed to a variable scale measurement (i.e. valued on a specific scale of relational strength or frequency) (Borgatti & Foster, 2003). As a result, our measures did not allow us to differentiate the quality or strength of the reported connections.

Another concern with our survey is that one person from each organization was asked to represent the organization and respond to the survey. On the one hand, there are concerns with self-report measures in SNA research, such as the respondent’s memory limitations and social desirability bias. Studies that investigate the quality of social network survey data, however, have shown that although respondents were less accurate in recalling “time-specific episodes,” their reports of “stable patterns of social interaction” were in general reliable and valid (Marsden, 2011, p. 373). There has been convincing evidence that “survey responses can reliably and validly reflect underlying social network phenomena” (Marsden, 2011, p. 381).

On the other hand, who responded to the survey could affect our findings. To have a better picture of our survey respondents, at the end of the survey, we gathered information regarding respondent experience at the organization. Among the 28 respondents who completed this section, 26 were full-time staff at the organization at the time of the survey. Except for one respondent who reported being a volunteer for the organization, all others had positions such as executive director, associate director or co-director, and program managers or coordinators. Half of all respondents (14) reported working at the organization for more than 5 years, eight respondents worked at the organization for 3–5 years, and the remaining six worked 1–3 years. No respondent had less than a year of experience with the organization. As a result, we are confident our respondents had adequate experience with, and knowledge about, their organization to report on overarching organizational behavior.

The approach of having an individual respondent represent and report on the collective’s ties also raises questions about the role of the interpretant in SNA. The authors of this piece performed the interpretant via their own act of analyzing. That is, these interpretations were constructed with respect to one’s own perspective-taking and realm of experiences. If we take relational ontology seriously, the subjective voice should not be deemed troubling as the interpretants are part-and-parcel of relational realism. In the perspective of “relational realism” (Tilly, 2004), the interpretant is “the product of the action involved in the ‘addressing’ relation, which brings forth the new interpretations—and thus, by extension, new relations among actors mediated by interpretations of objects in the world” (Mische, 2011, p. 90). In other words, the interpretant engaged in relational
interpretation always actively produces relations. The production of these new relations constitutes new realities. There is no neutral, objective “reality” of the network out there to be captured. The network can never escape the subjectivities of its constituting actors.

Response rate

Survey non-responses are one of the three major causes of missing data in SNA. Burt (1987, p. 63) declares missing data “a curse to survey network data,” which renders an incomplete network and compromises the validity of findings. In our survey, 34 of 85 organizations responded to our invitation to participate in the survey, yielding a response rate of 40%. This was despite recruitment efforts that included sending three reminders before closing the survey, as well as offering monetary incentives for participation. This response rate aligns with previous social network research on environmental movements involving organizations or activists. Earlier network studies show equivalent or lower response rates. For example, the response rates for a study of the British Columbia Wilderness Preservation movement ranged from 11% to 35% across three groups (Tindall, 2002; Tindall, Cormier, & Diani, 2012). In other studies, the response rate for members of Canadian environmental organizations was 32.3% (Tindall, Robinson, & Stoddart, 2014), for the Bay Area environmental movement 40.2% (Ansell, 2003), and for the British environmental movement 43.7% (Rootes & Miller, 2000).

To better understand the biases, we examined the organizations that did not respond to our survey. Two factors stood out about these organizations. They were either marked by low activity or high financial autonomy. For the first category, those organizations have websites that are updated infrequently, and they do not provide information regarding opportunities for public engagement. It is likely that some organizations do not have an active staff to respond to the survey. For the second category of high financial autonomy, these organizations—mostly governmental organizations and a few non-governmental organizations—are typically funded by larger institutions. The financial structure of the organizations provides a certain degree of autonomy that may reduce the need to network with other organizations. As our invitation letter to participate in our study specified that the goal of our research was “to explore the network connections amongst environmental organizations” and “questions will be asked about the communication between your organization and other environmental organizations in Utah,” it is possible that the groups who were not active in networking with other groups—due to either low activity in general or high financial autonomy—were less motivated to participate in our research. Therefore, our findings may reflect a bias toward the more actively networking organizations. A similar bias has been observed in other research projects as well (e.g. Ansell, 2003). Significantly, through simulation analyses by Costenbader and Valente (2003), it was shown that non-responses in SNA survey research were much more likely from actors that occupy peripheral positions in a network.
Toward a mixed-method approach to SNA

Our case study was based on numerical survey data, from which social relationships were mapped out and the basic structural properties were identified and interpreted. What we provided was a contour of the “outside” of the network. Whereas the visualization and mapping help shed light on the structure or the “form” of the network, the “content” or the process of the network dynamics needs to be addressed with additional qualitative approaches to SNA. Future research needs include “narrative descriptions of relations that are the ‘inside’ of the network, that is, ‘what is ‘going on’ within a network” (Crossley, 2010). In other words, the formal techniques of SNA alone cannot address important questions regarding the constitutive and communicative processes that lead to and sustain the observed network. Due to this lack, there has been a push for a mixed-method approach to SNA. The addition of qualitative explorations can complement the quantitative approach by adding “an awareness of process, change, content and context” and render a more grounded understanding about “the quality and/or strength of relations” (Edwards, 2010, p. 5). A mixed-method approach is important to develop as it allows SNA to “refocus attention upon the lived realities of social relations” (Edwards, 2010, p. 24). The application of a mixed-method approach to future research would align itself with the theoretical framework of a relational ontology. Instead of limiting research to one approach, a mixed-method approach engenders unexpected perspectives and relationships.

The upshot

In a world awash in multiple environmental crises, there is a lot of work to do. Living in the post-human Age of the Animate Earth amidst the clamor of networks, we need to reorient and diversify our forms of analyses as we seek to understand what’s going on as a first step to promoting changes that will enhance the ecological integrity of the earth. As Powell and Dépelteau (2013, p. 7) usefully claim, “the ordinary perception of ourselves as bounded wholes separate from the world around us is mistaken.” As individuals we are more not ourselves than ourselves. This is true ontologically, biologically, technologically, intellectually, linguistically, and so on. It turns out we as individuals are not a source of anything, even ourselves. Instead, we are born into and live through networks and assemblages. Biology, the social sciences, and social theory make this clearer every day. As a consequence, we must shift our analyses from the individual subject to the networks and assemblages that compose the social worlds and us and earth we inhabit. SNA provides one way of starting to explore our networked worlds.

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Notes

1. Freeman (2004) detailed the history of the development of social network analysis. The modern field of social network analysis emerged in the 1930s, spearheaded rather independently by three schools of scholars: Jacob Moreno and Helen Jennings, a psychiatrist and a psychologist, W. Lloyd Warner, an anthropologist, and Kurt Lewin, a psychologist (Freeman, 2004). Harrison C. White’s center of social network research at Harvard, established in early 1970s, drew attention to the “broad generality of the structural paradigm” of SNA (Freeman, 2004, p. 127). In 1978, the founding of International Network for Social Network Analysis (INSNA) signifies the institutionalization of the field (Otte & Rousseau, 2002). In a study measuring the growth of the SNA field from 1963 to 2000, Otte and Rousseau (2002) observed a significant takeoff around 1981. The late 1990s saw a revolutionary expansion of the field with the entry of physicists (represented by Duncan Watts & Steven Strogatz, 1998) and biologists. There was a steep climb in the number of articles indexed with “social networks” in the title in Google in 2000 (Borgatti & Halgin, 2011).

2. For example, in our discipline’s only environmental journal, the deservedly esteemed Environmental Communication, no article has yet used a social network analysis approach (to our knowledge).

3. The study was reviewed and approved by the Institutional Review Board for research involving human subjects.

4. After identifying all the governmental organizations and non-governmental environmental organizations based in Utah, we sent a request to the key personnel (manager or director) in each organization to participate in an online survey conducted via www.onasurvey.com. A $30 donation was promised and granted to each organization upon their completion of the survey. Six organizations also won an additional $100 in a lucky draw.

5. The exact wording for this question was “In the past 6 months, what are the Utah-based environmental organizations with which your organization has communicated with?” This is a typical sociometric question asked in social network analysis surveys. A roster with all the 85 organizations was embedded in the survey for the respondent to choose from. We chose the “fixed choice” design by limiting the number of nominations to five. We further instructed respondents that “although you may have communicated with more than five organizations, please select no more than five by prioritizing those with which you’ve worked with more closely.” Such a design has pluses and minuses: It simplifies the task and reduces the burden for respondents, but at the same time could induce measurement errors by limiting or inflating the number of an actor’s associates (Marsden, 2011). By asking each organization which other organizations they “communicated with,” we were using a nominalist (i.e. generating network via name generation) instead of realist (i.e. observing relationships to construct a “true” network) approach.

6. Other common centrality measures include degree centrality (the total number of connecting ties attached to a node), closeness centrality (how close is the node to other nodes and thus can transmit information efficiently), and eigenvector centrality (the extent to which a node is connected to well-connected others). In our graph depiction, we chose to focus on betweenness centrality as it indicates the strategic location of a node and can potentially influence the communication flow of the network (Freeman, 1979).

7. The Clauset-Newman-Moore clustering algorithm was used.

References


