

AN ACTOR-NETWORK ANALYSIS OF THE ARIZONA TRAIL

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Dedication

*For the ones who had a notion
a notion deep inside
that it ain't no sin
to be glad you're alive*

(Springsteen 1978)

Table of Contents

Acknowledgements.....	ii
List of Figures.....	v
Abstract.....	vi
Chapter 1 Introduction.....	1
Chapter 2 Literature Review.....	4
Chapter 3 Methodology.....	22
Chapter 4 Results and Analysis.....	33
Chapter 5 Conclusion.....	66
Bibliography.....	75
Appendix.....	79

List of Figures

	Page
1. The Actor-Network Process.....	5
2. An overview of the current physical location of the Arizona Trail.....	23
3. The author's whiteboard diagram of some of the Trail's relationships.....	27
4. The author's first encounter with the Arizona Trail's viewshed near Mica Mountain.....	31
5. The author's trail crew working on the Arizona Trail in the Sonoran Desert.....	32

Abstract

Trail spaces have been depicted many ways but no other approach offers the thorough and inclusive qualities of actor-network theory. In this analysis of the Arizona Trail, actor-network theory evinces the relationships that create, sustain, and reify the Trail. The physical space called the Arizona Trail is more than a state-long footpath due to the variety of actors and relationships involved. It is a living network that pulses with actors' relationships instead of being driven by a singular hero. The network changes and grows as actors convince others to enroll via the process of interpellation.

Chapter 1: Introduction

The Arizona Trail runs from Nogales, on the Mexican border to the Utah state line on the Kaibab Plateau, a 24 inch-wide, 807 mile-long tour of the Grand Canyon State. It is the most recent addition to the United States' national system of trails, having been deemed a National Scenic Trail in 2009. Construction of the full navigable route was completed in the Spring of 2011. The Trail is one example of an amenity landscape, a commoditized piece of land important for its recreational and other non-industrial possibilities. Hikers, bird watchers, mountain bikers, and other human users appreciate the trail for its opportunities and access. It provides a living case study of geography's ongoing inquiry into the relationship between humans and the environment, including the way humans assign meaning to landscape. It is also a managerially complicated beast, crossing land governed by a variety of national agencies, state land agencies, corporations, and individuals. Caretaking duties are shared by some of those groups, plus non-profit organizations.

Beyond immediate management, the Trail is made possible by a vast network of relationships between beings, places, processes, and ideas (all actors). Popular narrative and historical accounts focus only on human or structural agency in the Arizona Trail when the richer story includes networked influences and actors previously unconsidered. There are a lot of individuals and actions related to each other to consider when one starts exploring the Arizona Trail. Actor-Network Theory elucidates the relationships that create that network.

Actor-network theory comes from the French school of post-modernism and non-representational theory. Its basic position is that everything and anything exists (either materially or in our minds) because of a network of relationships that support it. Any thing that participates in a relationship is an “actor.” In ANT those actors range from persons to other animals to abiotic forces to ideas to institutions. Where other theories limit potential agency to one or two variables, ANT includes any possible influence. That allows for a more thorough analysis of research questions.

This research was first motivated by narrow explanations and descriptions of trails. Trail accounts tend to be histories or personal accounts, the kind popular with famous trails like the Appalachian Trail or Continental Divide Trail, or guidebooks written to direct a trail user to water sources or campsites. Some local ethnographies include mentions of trails that pass through and describe the trail only in terms of, say, its former use as a settlers footpath. People who use or champion trails are generally romantic or enthusiastic about their use because it is tied to other meanings or experiences. This research recognizes that a Trail can be, and is, all of those things. And if it is not all of those things, perhaps it ceases to be a trail. The secondary motivation for this research was a personal interest in the Arizona Trail.

Research Question

In this research, I apply ANT to understand how the Arizona Trail *is*, to answer the research question “What is inside the Trail’s black box?” or, more colloquially, “What/how is the Arizona Trail?” To that end, I deconstruct the Actor-Network of the Arizona Trail by tracing the translation of interests through relationships and how those

relationships create not only a physical trail but an entity evoking the meaning “trail.” For a point of reference, I use Patagonia, Arizona as an Obligatory Passage Point in the trail’s actor-network. I justify and ground my research in literature from political ecology, rural geography, deep ecology, landscape ecology, and, in aggregate, actor-network theory. Using interviews and engagements with human and non-human actors, I trace development of relationships in the Arizona Trail’s actor-network that make the trail possible. Logical extension of actor-network theory would include relationships so distant to my observation starting point that perhaps every entity would come to be included. As mitigation of that never-ending network proposition, I have bounded this research to what is immediately observable from Patagonia and one or two relationship arcs out.

Paper Arrangement

This paper is arranged in five chapters. First is the Introduction, which, as you can tell, frames and outlines the rest of the paper. Chapter Two, the Literature Review, describes the prior research and theoretical basis I use to justify this study and my approach to it. Methodology in Chapter Three explains the specific means by which I conducted this research and the limitations therein. Chapter Four covers Results and Analysis. I write about unpacking the story of the Arizona Trail to get to its network core and also describe and analyze the main findings of my research. The paper concludes in Chapter Five with recommendations for further research and reflection on my research’s place in a general canon.

Chapter 2: Literature Review

NB: Actor-network theory employs many jargon terms which are described in-text or in footnotes. Those vocabulary are developed throughout this paper and are further explained in Appendix A.

This paper requires understanding from many fields, which are divided into two main applications. First, I describe literature informing actor-networks in theory. Those fields, linguistics, spatiality, and nature-science hybrids, make Actor-networks possible. My second set of literature informs this application of Actor-Network Theory and describes the context within which the actors relate. In this practice, Actor-Network Theory draws from many disciplines including political ecology, rural geography, deep ecology, and landscape ecology. My project further applies ideas from land stewardship, amenity landscape, and public resources research.

I. Actor-Network Theory

Network Topology & Spatiality

Actor-Network Theory (ANT) describes any and every entity as a network in which actors problematize, interpellate, and enroll via relationships with other actors. Relationailty, or centrality of relationships, is crucial to ANT for without relationships, the network does not exist. The problematization-interpellation-enrollment cycle continually reifies the network. One actor (the focal actor) *problematizes* by defining an interest or goal for the network. That actor *interpellates* by framing the interest in terms

amenable to other actors or by making it sound appealing or beneficial for those actors to join. *Enrollment* occurs when an interpellated actor accepts the interpellation and joins in the goal of the network. Once enrolled, actors interpellate the problematization to others actors. If an interpellation is not convincing, an actor *refuses* to enroll and a different interpellation may be tried. For a model of the basic actor-network process, see Figure 1.1. In the case of an obligatory passage point, enrolled actors could also engage the network with a new problematization (Latour 1997). Some network problematizations or actor arrangements can produce artifacts, physical manifestations of the network (Murdoch 1996). In this study, the physical footpath of the Arizona Trail is that artifact.

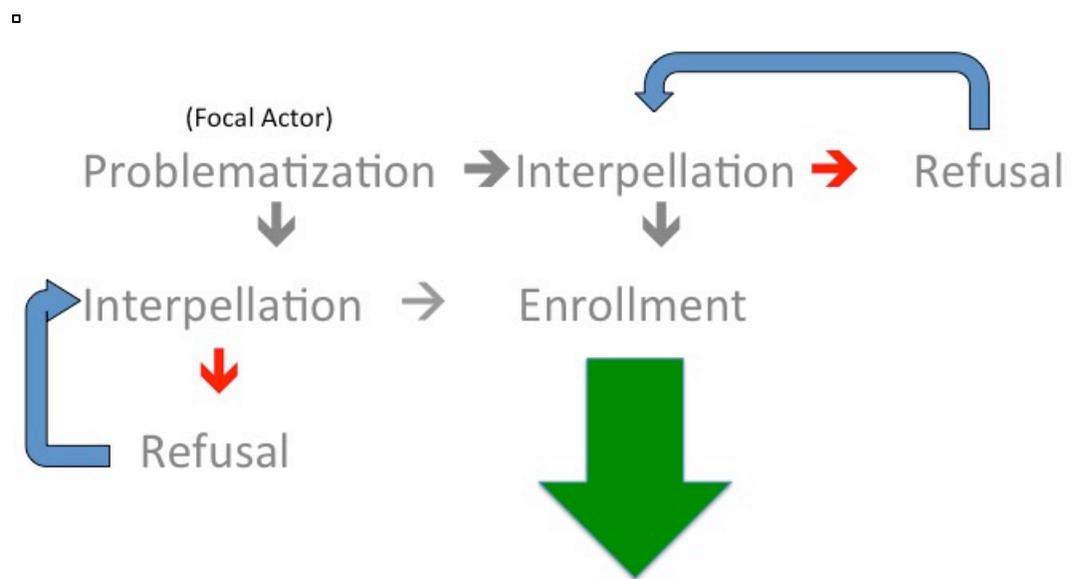


Figure 1.1: The actor-network process

Spatiality in Actor-Network Theory is unconventional (Law 1999). It is created by the network’s relationships and is thus called *relational space*. Unless specified otherwise, any reference to “space” in this paper refers to relational space. Like relationships that make up the network, its space is dynamic (Deleuze 1988). As relationships change, space shifts and bends. Because those relationships are always

changing, describing a specific actor-network like that of the Arizona Trail, is actually describing a snapshot of the network (Serres and Latour 1995). Relationships are described in a singular state and, where possible, also described in terms of their change.

In addition to creating space for the network, relationships are its *raison d'être* and conduits for its propagation. Thus, topology and spatiality are inseparable. The specific mechanisms by which relationships propagate the network are agency and affect (Haraway 2011). Each actor has the quality of agency, meaning capacity to act or influence another actor; capacity for affect. When a relationship exists between actors, they affect one another. Affect is the means by which actors interpellate problematizations because interpolation requires a relationship. Network dynamacy lets actor relationships adjust depending on many factors further explored in this paper.

Post-Structuralism

As a post-structural theory, ANT notably rejects nature/society dualism common in other approaches (Murdoch 1997). To separate “natural” and “societal” actors would be antithetical to ANT’s openness to any influence. Much of the early literature on ANT as a product of technological sciences examined the possibility of computers and other machines as actors. Structural theories would not have allowed agency for man-made entities like computers. When applied outside of technological sciences and specifically to social sciences, ANT accepts human, non-human, institutional, environmental, abiotic, and intangible actors.

An example of a non-human animal as an actor is found in Geodecke and Rikoon (2008). Approaching otter re-introduction in Missouri in an Actor-Network framework,

Geodeke and Rikoon (2008) describe the agency of the otters in their relationships. Otters refuse enrollment in the network when they do not limit their habitat as expected and planned for by the Missouri Department of Conservation (DOC). The DOC-instigated interpolation failed to influence the otters. Imported otters occupied the landscape in patterns most conducive to their subsistence and habitat needs remembered from their Louisiana home, upsetting the species management plan from the state and well-intentioned otter savior campaign from local conservationists. Neither government nor organization-sponsored interests could manifest as Obligatory Passage Points because otters did not accept those actors' interests.

Material-Semiotic Hybrids

The results and analysis chapter (4) describes the Arizona Trail as having three layers: the outer or “black box” layer, the middle exploratory narrative history layer, and the innermost, yet most extensive, actor-network layer. Actor-network theory is necessary because of how much “black boxes” obscure (Latour 1988). Every *thing*, every object, person, place, idea, entity etc, has a “black box” making it appear simple and unquestionable. These are what we encounter every day. We think “I am going to get coffee” where “coffee” is the black box; we accept the idea of “coffee” without question. In a more contextual example, one might say, “I hiked the Arizona Trail” and it would be understood as that person taking a walk on a trail. However, actor-network theory describes how the “Arizona Trail” is much more.

Actor-network theory relies on each actor being a material-semiotic hybrid, a singular entity encompassing both a titular object and its associated cultural values. (Law

and Hetherington 2000, Haraway 1996) bases actor-network theory on an examination of Louis Pasteur's laboratory and by extension, on laboratory science in general. The materials in the laboratory and the tests performed with them were not isolated or singular events with a linear narrative. To understand and to critique Pasteur's experiments, one need to consider the other influences and meanings implicit in the laboratory. Questions might include: Why is the laboratory equipment arranged in this room? What makes Pasteur a scientist? What made Pasteur consider this study? How is knowledge gleaned from observations limited? Why do we rely on laboratory science? Pasteur's laboratory was a physical laboratory but as a material-semiotic hybrid, it brings more meaning as it includes cultural implications and assumptions. As a black box, the laboratory obscured not only answers to those questions but the existence of questions. To create a fuller picture of what something is, it needs to be examined as a hybrid.

II. ANT Applied to this Study

Applications of ANT outside information sciences are a small but growing field. Many research endeavors on similar topics fall completely within a field or approach described subsequently. Combining their epistemologies allows for use of a robust ANT analysis. The ANT approach to this study called on many pertinent disciplines.

I use political ecology and rural geography literature as a framework for politics informing ecological processes, and vice versa. Deep ecology then provides justification for the role of non-human actors in the actor-network. Landscape ecology compliments deep ecology with its discussion of heterogeneous land use. As public land, the Arizona Trail is informed by another body of literature on stewardship of amenity landscapes. The

section on land management highlights the complexity of power and interests informing politics of conservation. I then discuss Actor-Network Theory itself. A lone model paper surfaced during research and provided some framework for approaching an amenity landscape with ANT.

Political Ecology & Rural Geography

Political ecology comes from a normative and neo-Marxist tradition couched in the academic distinction between the First and Third Worlds (McCarthy 2006, Robbins 2004). Neo-Marxists wrote with concern for those disenfranchised of land-use rights through the end of the Twentieth Century. The First World/Third World distinction no longer stands as scholars recognize the myriad substantial similarities between spatially disparate issues of access to resources (Schroeder et al. 2006). Peasants in post-industrial countries like the United States face many of the same political-ecological quandaries as peasants anywhere. However, the neo-Marxist history of political ecology provides context for the discourse on social justice ideals still permeating political ecology literature.

Residents of the rural southwestern United States experience ecological circumstances and sociopolitical structures that make agriculture untenable. Many find it necessary to pursue other profitable uses for land. Blaikie and Brookfield (1987) acknowledge dynamic relationships among those with some stake in the landscape, and between those groups collectively and a/biotic limitations of the land itself. Greenberg and Park (1995) consider political ecology to encompass a political economy that studies value and power provided by landscape while considering roles for traditional ecological

processes. Those definitions combined encompass what this study draws on from political ecology, especially in the Actor-Network. Robbins (2004) further emphasizes the politics in political ecology because its “ecological strands connect disparate groups, across class, ethnicity, and gender. In this way, local social/environmental conditions and interactions have delimited, modified, and blunted otherwise apparently powerful global political and economic forces” (Robbins, p. 15).

The United States Forest Service (USFS) is the country’s largest rural landholder. 1990’s National Forest-Dependent Rural Communities Economic Diversification Act shifted the USFS mandate “from emphasizing top-down, federally established timber harvests to encouraging local, amenity-based economic diversification and business creation in forest-dependent communities” (Che 2003, p. 964). Poor timber growing seasons and cheaper timber imports forced the USFS to seek alternative income. Without a focus on resource extraction, the USFS concentrated on promoting amenity landscapes. Under the Act, the USFS pledges “to provide assistance to rural communities that are located in or near National Forests and that are economically dependent upon natural resources” and “to aid in diversifying such communities’ economic bases” (National Forest Service). When the USFS instituted those top-down changes, those dependent on USFS logging jobs sought other income.

When USFS job opportunities lagged, residents turned to commodification of the rural landscape instead of land’s raw resources. Rural residents, unable to rely on extractive industries like mining and agriculture and land-intensive activities like ranching, turned to selling the land and associated experiences as an amenity (Che 2003). Fueled by a demand from recreation-seeking tourists and residential developers, the new

service sector model worked (Che 2003). Patagonia, AZ exemplifies that trend. Rural residents restructured their economic activity to fit with new market demands. With new land uses providing income, local residents capitalized by taking agency for amenity landscape management (Che 2003).

Rural geography as a field began in the 1950s as a descriptive tool for a discrete type of area: rural, not urban (Woods 2005). Similar to political ecology, radical rural geography in the 1980s contested existing power structures that exacerbated socioeconomic inequalities (Woods 2005). Tuning away from overt normativity in the 1990s, rural geographers produced phenomenological discourse on human interaction with landscapes (Woods 2005) but retained interest in economic and agricultural structures (Woods 2005). Multilayered factors, from individuals' meaning gleaned from landscape to formal government policy on crop production, inform rural land management. Competing interests at multiple scales do not fit traditional actor structures, necessitating ANT, which can accommodate that range.

Southeastern Arizona experiences the rural geography trends Woods describes (Woods 2005, Hackenberg and Benequista 2001). Benson, a town approximately 50 miles northeast of Patagonia has several qualities relevant in this research's rural geography and land use contexts: proximity to Tucson, proximity to Mexico, location in the Sky Island ecological area, and location near a major interstate. Excepting the last, Patagonia shares those qualities. Interest in that combination of qualities sparked many competing conservation models and motives in the area (Hackenberg and Benequista 2001). Active public and private conservation efforts and actors include the San Pedro Riparian National Conservation Area, The Nature Conservancy, the city of Tucson,

Southwest Center for Biological Diversity, North American Development Bank, and the Environmental Protection Agency. The authors give structural credit for Benson's complex land management scheme to those multiscale interests. Proximity to Tucson facilitates engaging large groups with conservation goals. Named an "overdetermined system" (Sheridan 1995) in reference to that complicated regional, national, and international land use context, the Benson area has diverse opportunities for enrollment in a land use actor-network. By geographical proximity, those same opportunities for actor-network analysis are present in Patagonia.

Contention over limited natural resources is not new to Arizona and examination of how other resource use conflicts proliferate may indicate useful relationships for land use. Water, a famed limited resource in Arizona has agency of its own. Humans may profess to manage nature but cannot discount nature's agency (Sheridan 1995). The Central Arizona Project (CAP), which exemplifies contentious government control of a public resource. CAP, a top-down and judiciously enforced policy, limits the amount of water Arizona residents can draw from the Colorado River in an effort to ensure that the greatest number of people reap the greatest benefit. The case study describes CAP in terms of competing interests among stakeholders, an appropriate framework for any limited public resource. Similarly, the Arizona Trail represents public and private interests competing for land. Like water, land has physical limitations and strengths that legislation and the private sector do not figure into their calculations for use.

Amenity Landscape Management

As the federal government remained the deeded stewards of much public land, policy and politics continued to influence management decisions, activity on, and development of that land. Most of the federal lands fall under the jurisdiction of one of four agencies: the National Park Service, US Forest Service, Bureau of Land Management, or Fish and Wildlife Service. Structural limitations and decision-making processes of such a system are well documented (Fretwell 2009). Monetary deficits faced by those agencies stem from decreased federal funding and declining extractive industries including timber harvesting and mineral mining (Fretwell 2009). Federal land competes with state, tribal, and private land for recreation opportunities, an area in which increased public participation means increased funding allocations (Fretwell 2009). Thus, federal land stewards face oft-competing pressures to allow a variety of user types while not placing undue stress on ecosystems by encouraging additional users and uses. Further complicating that calculus is the common instance where lands with different access rights abut. For example, one Coronado National Forest section is adjacent to the Empire-Cienega National Conservation Area, creating a scenario where an immaterial border separates restricted national forest from mechanized equipment- and hunter-friendly BLM property. The Arizona Trail traverses land managed by a variety of agencies public and private, manifesting competing land use privileges throughout its corridor.

The United States National Park Service maintains a distinct type of amenity landscape in national parks, due in part to the tenuous and temporal web of agreements that holds them together. Although the Arizona Trail is managed by the USFS, studies of NPS amenity landscapes describe similar principles of actors' interests. Privileging land for national parks takes coordination and concerted efforts from a number of parties

between government agencies and the American people. Competing interests in the founding of Kings Canyon National Park included the US Forest Service, Park Service, dam developers, local pastoralists, and Los Angeles residents interested in water supplies, on top of the contention over the wilderness status of the land (Dilsaver 1990). The Park Service won management over Kings Canyon and determined it a wilderness area but could not shake the Forest Service, as the latter provided necessary firefighting services. Compromises and negotiations both on the ground and in legislation created a National Park but could not shake the competing interests in use of and access to the land's resources (Dilsaver 1990). Issues faced by Kings Canyon and levels of structural coordination stabilizing the park are not unique to that unit. Dilsaver and Wyckoff (2005) found similar administrative questions and sociopolitical activity at park borders at Yellowstone and Glacier National Parks. Land use and access rights for residents near those parks emerged as sociopolitical contentions during those parks' establishment and are not entirely resolved in the present day (Dilsaver and Wyckoff 2005). Similar public and private interests compete in similar public and private arenas to construct many public amenity landscapes, including the Arizona Trail.

Ecology

Deep Ecology

As a theory, deep ecology emerged in the early 1970s, reacting to increased awareness of anthropogenic environmental degradation. Seeing that humans cause terrestrial, oceanic, and atmospheric pollution led Naess to consider the other life forms impacted by human actions. In the 1960's Naess was concerned about protecting a

particular valley in Norway and saw understanding the total ecology of that valley as paramount to convincing others to preserve it. The adjective “deep” indicates citizens’ “willingness to openly and publicly question every policy, practice, assumption, and value that propels the ecocultural unsustainability crisis and our willingness to consider and, if called for, embrace radical change” (Glasser 2011, p. 58). Deep ecology echoes much of the normative language typical of early political ecology but instead of examining socioeconomic structures looks at interactions between all carbon-based life forms. Although it rejects anthropocentrism as a philosophy, it is a subject written for people and necessarily offers critiques and explanations of human impact.

Deep ecology fits my research as it insists on equality of agency for non-human actors. A primary tenet of deep ecology promotes respect for all life. Part of that respect forces acknowledgement that plants and other animals are not pawns in an anthropocentric game, and should not be treated as such. Without anthropomorphizing other animals or plants, deep ecology acknowledges their inherent agency.

Deep ecology’s goal of sustainable development is central to its applications for the Arizona Trail. Firstly, the trail is designed to minimize users’ impact on the ecosystem. With human traffic confined to the trail’s corridor, malaise borne of human intention or ignorance will not reach as much of the surrounding ecosystem. That accounts for how many human visitors unaccustomed to interacting with non-human life forms lack knowledge of and respect for those others. Secondly, the presence of the trail adds heterogeneity to the landscape mosaic, as further discussed in the landscape ecology section. Thirdly, the trail passes through southeastern Arizona to access beautiful, interesting, and biodiverse ecosystems and landscapes. The sections of the trail near

Patagonia traverse the region's famed "Sky Islands", a collection of individual mountaintops that host unique ecosystems because the inhabitants cannot migrate to other mountaintops without crossing inhospitable desert. Taking the interactions and relationships of all life forms into account allows for the most comprehensive analysis of the Arizona Trail.

Landscape Ecology

Heterogeneity of landscape, the crux of landscape ecology, directly applies to my research. Trails exemplify anthropogenic landscape fragmentation, a condition known to impact ecosystems (Knight 2000). Outdoor recreation disturbs the existing landscape, and by extension, ecosystem. Impact begins with cutting of the tread and corridor then continues with every trail user. Although generally considered low-impact, human foot traffic on established trails is the second-most influential factor on decline in speciation, behind only off-road vehicles (Knight 2000). When actors in the Arizona Trail's actor-network deliberately locate the trail in areas least susceptible to biodiversity loss, flora, fauna, and landscape heterogeneity all enroll in the network.

The tread of the trail and the physical corridor of the trail can further function as both travel corridors for flora fauna and obstacles to species movement. Modified fauna activity near trails is well documented (Knight 2000, Mace and Waller 1996, Cassirer et al. 1992). Existing flora use trails as conduits, either by employing fauna traveling the path or by capitalizing on the ease of seed movement along cleared ground (Knight 2000). Invasive flora can access locations further from the trailhead and thereby deeper in the landscape via trails as well (Knight 2000). Furthermore, trails impact abiotic

ecological activity. Trail presence introduces a fire break, an important landscape feature in a fire-prone area such as the US southwest. The more severe the trail's impact on the encompassing ecosystem, the more complex its actor-network becomes.

III. Response to Critiques

Through my research on the Arizona Trail as an Actor-Network Theory case study I reconcile critiques leveled at political ecology as an approach, deep ecology as an epistemology, and ANT as a tool.

Critiques of Political Ecology

One source of dissatisfaction with political ecology is the limited scale of application. Utility to save only “two whales trapped in the ice, one hundred elephants in the Amboseli National Park...or thirty platane trees on the Place du Tertre in Paris” does not satisfy Latour (1997, p. 229). My research overcomes that issue by its relevance beyond the singular Arizona Trail. Similar actors exist for all public amenity landscapes in the United States. The US Forest Service formally stewards public lands throughout rural America. The hundreds, if not thousands, of miles in each National Scenic Trail contain their own OPPs that Actor-Network Theory can elucidate. Relationships within the Actor-Networks will differ and my case study research provides another model to make determining those relationships easier. By its nature, the Actor-Network is malleable and my research is then also useful for understanding translation of any land management goal.

Neumann (2005) takes issue with political ecology's fixation with offering critiques without recommendations for alternatives. The places where political ecology might make a great material difference are the places where it would be most difficult to enact political change (Neumann 2005). Although Neumann writes about the "Third World", recall here the discussion on the lack of theoretical difference between political ecologies of the First and Third Worlds. Actor-Network Theory comes in again here to also reconcile this critique. ANT models demonstrate the diversity of ways values enter and are translated by actors through the network. Agency is not limited to political bodies nor are all values perpetuated by political bodies (or by any actor) guaranteed to translate to other actors.

Latour (1997) further criticizes political ecology for marginalizing the "totality" of nature by forcing it into structural frames. To resolve that critique, Latour's ANT and classical political ecology must meet at a middle ground. Like many issues in geography, this is one of scale. At the network level, the relationships are too fluid for structure but at the level of individual actors, there is a role for structural foundations. Thorough comprehension of actors' roles in the Actor-Network necessitates understanding the political landscape much of government land management policy and practice come from. Structure of government land stewardship begs for hierarchy. When multiple land management agencies interact, as happens in the Arizona Trail's Actor-Network, we must remember those agencies' actions as actors are in part based on the political and budgetary rules supplied by the United States' government. As those agencies help produce amenity landscapes, they become part of Latour's "totality" of nature (1997).

Robbins (2004) recommends an actor-network theory approach as a promising future for political ecology. The linear chain of events posited by other theorists is too reductionist and instead, a two- or three-dimensional network model more accurately describes situations analyzed in political ecology. Under his term, “hybridity theory,” Robbins (2004) calls for inclusion of non-human characteristics and agents in considerations of political ecology. He includes not only the non-linear network configuration but also the deep ecological acknowledgement of non-human life.

Political ecology and actor-network theory can work in concert to address many of the critiques of raw political ecology. One tenet of actor-network theory is that all actors have an equal opportunity for agency; one actor is not more powerful than another. In that way, actor-network theory is a descriptive theory that works with prescriptive analyses. Political ecology’s main tenet stems from use/abuse of power. An actor-network analysis would allow many actors to be accommodated for and their relationships explored. Outside the confines of traditional government and enfranchisement structures, more actors are able to be seen. The actor network can thus be plugged back into a political ecology framework for more robust analysis.

Critiques of ANT

Political ecologists also take issue with Actor-Network theory, especially critiquing its post-structural origins. Peet and Watts (2004) offer a counterpoint to Latour (1997). They find ANT lacking as a model for political ecology studies because it is too hasty to dismiss control exerted by capitalist and traditional political structures. Where Latour found too much focus on formal structures, Peet and Watts call for more of the

same. They privilege the influence of capitalism and market processes and do not find ANT adequate for inclusion thereof. Resolution of Peet and Watts' critique requires more than the coarser scale of inquiry which helped the previously discussed conflict, as they would privilege capitalism at every scale. The ANT response to Peet and Watts that I validate with my research is that Peet and Watts and actor-network theorists start from ontologically commensurate points. As a case study of applied ANT, a fundamental assumption of this thesis is that the Actor-Network exists. Given that same starting point, Peet and Watts project capitalist bodies as focal actors (those actors successfully translating their interests through the network) because they want to see a capitalist network. Peet and Watts limit themselves by translating only the interest of capitalism through the network. Proper application of ANT requires an objective view of the translation (problematization-interpellation-enrollment) process.

My Research & Patagonia as an Obligatory Passage Point

My research lies at the juncture of those bodies of scholarship previously described. It draws from their benefits but cannot rely on one study area alone. The complexity of the Arizona Trail cannot be adequately explained by structures such as government management and economic systems. Nor can ecology account for the trail's anthropocentric stewardship influences. Deep ecology supports accommodating those actors. Political ecology and rural geography support inclusion of local communities. Amenity landscape management supports including formal public and private stewardship frameworks. Where alternative approaches do not recognize actors, Actor-network theory accommodates them. Instead of an historical narrative about the creation

of the Arizona Trail, I am deconstructing the relationships of the Actor Network to better understand how the Trail functions via one of its OPPs.

My exploration of the Arizona Trail's actor-network begins with Patagonia as an OPP. The entirety of the Trail's actor-network would be too cumbersome to study so Patagonia is the entry point for my inquiry. Dale Shewalter originally conceived of the Arizona Trail as a state-length continuous footpath with access to desirable viewsheds. Many interpellations of the Trail are consistent with that goal and some actors interpellate the trail in terms not included in the focal actor's ideal. Patagonia becomes an OPP because in order for all the actors in the Arizona Trail to satisfy their relationships that make the Network, they must address issues that converge around Patagonia. And in many cases explored in this paper, actors' relationships that converge on Patagonia sometimes necessitate alternative problematizations of the network.

Chapter 3: Methodology

This chapter describes the techniques and methods, and logic thereof that I used to complete this project. It begins with an explanation of the initial design and the study area. Next, I describe my data collection phase followed by the framework I used for analysis. The chapter concludes with the unavoidable positionality I brought to this project.

Research Design

This research uses a single case study model with multiple units of analysis. The study identifies how the social object of the Arizona Trail is translated by individuals, groups, and communities, and how that translated idea results in the physical trail. I employed qualitative analysis using a priori coding of secondary and primary materials and interviews based on actor-network theory. That facilitated this critical study of how the idea of the Arizona Trail is problematized, interpellated, and produced as a physical trail.

Study Area and Context

Actor-network theory necessitates a particular approach to the concept of spatial area as it strives to overcome the “tyranny of geography” (Latour 1996). Physical proximity does not correlate with network enrollment, limiting the utility of a physical study area. Instead, relationships between actors create networks, regardless of geographic space in between. Thus, the study area for this research is partly a physical

space since, as a spatial object myself, I understand the world in spatial terms. And the study area is moreover a relational space created by the network of relationships sustaining the Arizona Trail. That idea is explored more fully in Chapter Four.

In terms of physical space, the Arizona Trail is a linear, somewhat sinuous object running the length of Arizona. Its southern terminus is on the Mexican border, 39 miles east of Nogales.

The northern terminus is on the Utah border, 31 miles west of Page, AZ. In between, the Trail traverses diverse landscapes from Sky Islands to the Grand Canyon to the Kaibab Plateau. The Arizona Trail Association divided the trail into 43 administrative Passages, sections of trail ten to

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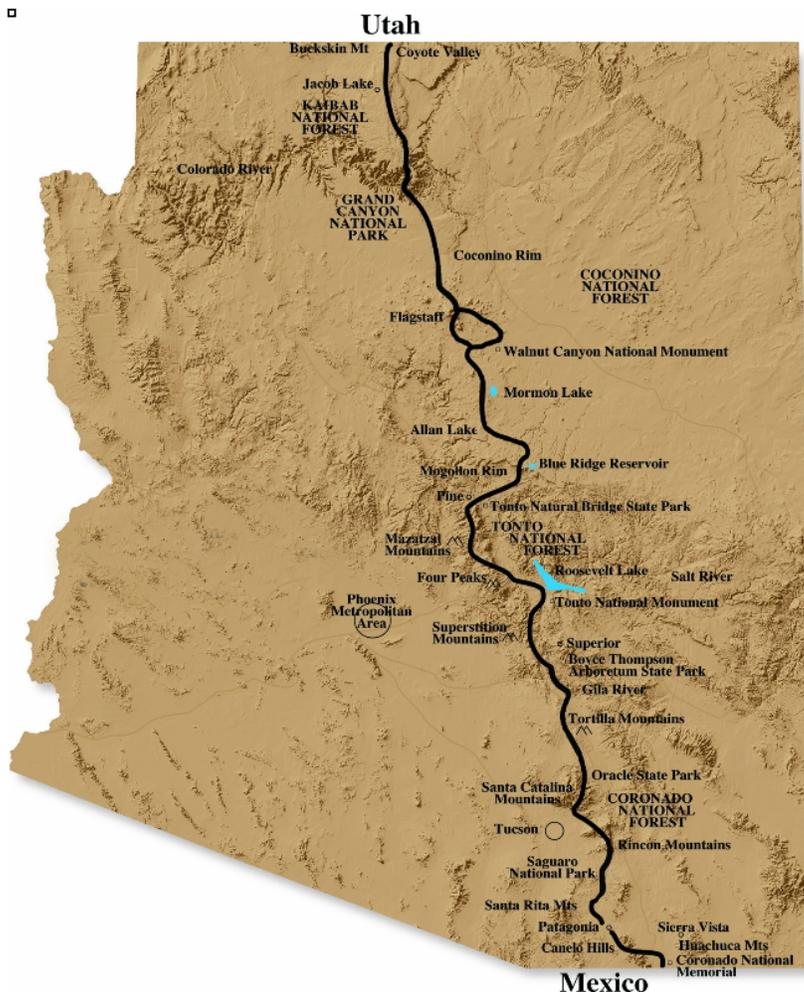


Fig 3.1 An overview of the current physical location of the Arizona Trail. Patagonia is in the lower center-right of the image (Arizona Trail Association http://www.aztrail.org/at_map.html)

36 miles long. Passages 3 and 4 converge at the 1.2-square miles town of Patagonia, AZ. Passage 3, Canelo Hills West, starts at Canelo Pass and covers 16.6 miles before terminating in downtown Patagonia. Passage 4, Temporal Gulch, starts in downtown Patagonia and its northern terminus is 22.3 miles away at Gardner Canyon Road. Canelo Hills West picks up Harshaw Road and uses county and town roads before terminating at the Patagonia Post Office. Temporal Gulch similarly follows town, county, and Forest Service roads before turning into a footpath back in the Coronado National Forest.

This description of the physical trail and surrounding area is only included to provide context to the reader. Patagonia is not important to this study because of its physical location, but because it participates or facilitates relationships between actors that are important to the network. Unless specified otherwise, when I use “Patagonia” in this study, I refer to the “Patagonia” that is located in the actor-network and participates in relationships with other actors. Those actors may act in the physical area of Patagonia previously described but need not have an actor-network relationship with Patagonia. This study further frames Patagonia as an Obligatory Passage Point (OPP) due to its location and relationships in the network. By forcing problematization of the Trail as described in Chapter Four, Patagonia situates itself as an OPP.

Data Sources and Data Collection

Collection of data began in Fall 2011 and continued through Fall 2012. I began with collection of secondary data to better inform my inquiry of primary sources and continued collecting secondary data as needed through the project. Secondary data came from published maps, government documents, publications of nonprofit organizations,

and news sources local to Patagonia, Arizona. The Arizona Trail Association, the trail's non-profit booster and maintenance organization, publishes passage-by-passage descriptions of the Arizona Trail as well as topographical maps of trail passages. The United States Forest Service maps pay particular attention to who stewards the land the trail passes through and what wilderness designation, if any, those parcels of land have. The USFS maps are only available for sections of the trail through or proximal to USFS land. Santa Cruz County, home of Patagonia, also produced a trail inventory to monitor the presence and state of hiking and multi-use trails in the county. Resources from all those sources were secondary data.

Many non-profit organizations concerned about the trail published information and opinions on their websites or in their newsletters. As additional sections of the trail were completed, organizations documented those developments for their memberships. Arizona Trail Association newsletters were particularly valuable for both historical and contemporary trail news. Local news sources including the Patagonia Regional Times report on residents' and businesses' interests in land use in the area. Additional secondary data came from records of town meetings, archived news publications, and historic land use records. I found those documents in the Patagonia Town Library and Patagonia Town Hall.

Primary data came from in-person, phone, and e-mail interviews with human parties that have experience with the Arizona Trail. Interviewees included USFS personnel, NPS personnel, trail maintenance crew members, leaders and members of relevant non-profits, and recreational trail users. Passage Stewards described maintenance events. Wildland firefighters described damage they mitigated. Business owners

described motivations and changes they had made. As one interviewee described interacting with another individual or agency, I used snowball sampling to contact that second party for an interview, and so on, as a way of constructing the actor-network.

I also solicited information directly from trail users, both those I personally witnessed using the Trail in Patagonia as well as those people who documented their Arizona Trail trips on www.trailjournals.com. Because most of the interview questions were open-ended, in-person and phone interview times ranged from 20 minutes to one hour with an average time of about half an hour. Additional data were solicited from voluntary responders to a flyer posted in the Patagonia Post Office in May 2012 asking for anecdotes, information, or opinions on the Arizona Trail. Responders to that flier corresponded via e-mail.

Further data gathering occurred as I observed and documented non-human actors including abiotia. To compile those data, I walked parts of Passages 3 and 4 and made participant-observer notes on the physical trail, abiotic forces at work, animal tracks, and trailhead use. I also studied coarse-scale phenomena, both physical and temporal, to evince more actors with whom relationships occur. Some of that research was necessarily from secondary sources and some was from my own observations after living in southeastern Arizona for an extended time.

Information from interviews and documents was coded with Actor-Network Theory in order to trace actors' interests through the translation process. Using a problematization-interpellation-enrollment model, I determined the actors, the phase(s) of the trail's development in which they participated, and finally the effects of their participation. I mapped relationships between actors in a web to understand and piece

following sampling of questions to tease out the relationships and interests that create the Arizona Trail:

What factors were considered when deciding where to route the trail?

What kind of opposition, if any, did/does you/ your organization encounter in building/maintaining the trail?

How would you describe emergency or crisis management regarding the trail?

What are your primary considerations in caretaking of the trail?

How would you characterize trail users you have met?

How has the presence of the trail affected your land use?

What, if any, changes have you noticed in town now that the trail passes through?

How would you describe decision-making process regarding the trail?

How would you describe your experiences with the Arizona Trail?

Analysis of Data

I used the data I collected via my methodology to construct each section of the analysis chapter, starting with the actor-network. That project began with reviewing interview transcripts and field notes. Each instance where I observed an actor creating or using a relationship with another actor, I classified it as Problematization, Interpellation, Enrollment, or Resistance/Refusal. Problematization consists of defining a goal or action plan for the network. In this research, I found Dale Shewalter provides the initial problematization of the network and that enough resistance leads to new problematizations. I coded for interpellation where an actor shares information encouraging others to join the network. Enrollment occurs when an actor agrees with an interpellation and joins the network. Resistance/refusal occurs when an actor encounters

interpellation and does not enroll. Using those classifications, I traced relationships through the Trail's actor-network. The network provides a picture of how the Arizona Trail was created and is sustained.

Describing the actor-network in the present necessitated leaving out the Trail's historical narrative. Any context or historical anecdote useful for understanding why the actor is as it is was written out for the narrative history section of the analysis chapter. The Arizona Trail Association supplied the meta-narrative for Chapter Four. They pitch the meta-narrative as a heroic story of the founding and sustainability of the Trail. Once amassed, I reversed the order of the three descriptions of the Trail so that they are assembled like a matryoshka doll. The outer layer, the meta-narrative is simple but obscures a great deal. The middle layer, the narrative history, while not simplistic does not provide much detail as to why and how parties interact the way they do. The core, the actor-network obscures nothing because it is theoretically boundless. For the purposes of this finite paper, I limit the description of the network to what is observable around Patagonia and relationships those actors participate in.

Although this application of actor-network theory refers to the physical and cultural artifact of the Trail, I frame the description of the network using traditional network vocabulary. A node or point is an actor or event. An arc or relationship connects two nodes. Unlike traditional networks, an actor-network is multi-dimensional so actors bend space and time around themselves. Arcs may thus travel from one node to another at any place in the network.

Appropriateness of Methodology

Because actor-network theory calls for elucidating relationships, interviewing and otherwise engaging actors that influenced the trail's existence was an appropriate research method for this project. Using what I already knew about the Trail (see Researcher Positionality, below), I made a list of actors to contact or observe and relationships to explore. Actors directly involved in those relationships offer the most comprehensive information on exchange of ideas and relative power between said actors. Engaging actors also self-selects the network of relevant actors. Based on narratives and historical evidence from initial engagement with actors, I began to construction a framework for the Trail's actor-network. For the section of research limited to the node of Patagonia, I started network analysis and construction with actors within that spatial parameter and built the network out from there.

Before using the data to create a model of the Trail's actor-network, I needed to provide historical context. One of the tricky aspects of ANT is that it describes a network that exists in the present. However, to understand how those relationships exist in the present, one must understand where actors come from, that is, what other networks they act in. Chapter 4 thus begins with a meta-narrative on the Arizona Trail. It transitions to a more thorough historical narrative that includes more actors, more context, and less heroics. There follows a description of the Trail's actor-network from an OPP, Patagonia. Chapter 4 concludes with major findings regarding the actor-network.

Researcher Positionality

My very participation in this research study influenced the actor-network of the Trail. When I accepted the problematization of the Trail as a state-long footpath

showcasing wonderful, in the literal sense, landscapes, I enrolled in its actor-network. I then re-mobilized the network as I proliferated the Trail's problematization and interpellation by researching and asking questions about the Trail. My experiences with the Trail's artifact, its physical manifestation, influenced my decision to approach the network via Patagonia. I worked on a trail construction and maintenance crew that built part of the Arizona Trail in 2007 and in 2011 (Fig 3.2, Fig 3.3). I spent some four weeks of my trail crew tenure working directly on Passage 3, Canelo Hills West.



Fig 3.3 The author's first encounter with the Arizona Trail's viewshed near Mica Mountain. Photo by the author, 2007.



Fig 3.4 The author's trail crew working on the Arizona Trail in the Sonoran Desert. Photo by Jordan Guthrie, 2010.

Because of my familiarity with the trail, its ecosystem, processes informing its physical presence, and processes informing its political presence, I had some idea of actors and relationships in the trail's actor-network before beginning this research. My construction of the Trail's actor-network was thus colored by ideas of relationships and starting points that I imposed on my research. As a striving subjective observer and researcher, I was careful when engaging actors to not suggest or lead on to relationships that the actor may not recognize or privilege in the interest of elucidating the most accurate and comprehensive actor-network.

Chapter 4: Results & Analysis

Introduction

Historical accounts function as meta-narratives that explain and interpret their immediate subjects, a trail in this case, with reference to human individuals and groups operating in chronological time. Consequently, they assume their topics of explanation to be “real” objects that human actors have constructed over some period of history. This perspective, however, often masks more than it reveals, namely the way in which action, agency, and nature-society relationships are continually enacted as sets of relationships that blur the distinction between the material and the semiotic, the human and non-human, action and thought (Haraway 2011). These actor-networks reveal that social objects are never static, determined, or fixed, but rather are part of much broader and more complex material-semiotic networks that are always in the making, regardless of their “location” in chronological time. Historical narratives construct their objects of explanation as “Black Boxes,” artifacts which are taken *a fortiori*, without consideration of the complex networks that sustain them. The danger of Black Boxes lies in their power to reify, which effectively discourages “a peek inside” and obscures the many relationships that constantly recreate them as the “objects” we take to be real. The Arizona Trail can be thought of as a Black Box: in popular thought, it is a singular footpath carved in the earth by a select few individuals and agencies. Actor Network Theory (ANT), however, explores the dynamic networks behind the physical reality and social meanings of the Trail (Latour 1991). In other words, the analytical approach of

ANT evinces the complex relationships between actors and events that establish and sustain the Trail as both an idea and a physical artifact. Actor-networks integrate nature, society, technology, meaning, humans, and non-humans as actors whose capacity to act is always *relational*, that is, dependent on networked connections that span the material and semiotic realms (Murdoch 2006).

First, I describe the results of my research. I present the analysis from my research in three sections. The first section is a meta-narrative from the Arizona Trail Association, which is a history that constructs the Trail as a Black-Box. The second section uses a similar historical approach but includes deeper and more thorough historical account that paves the way for ANT analysis. The third section fully opens the Black Box of the Trail and describes it as an actor-network.

Results

Since actor-network theory is descriptive rather than prescriptive, much of my results are presented in the analysis section. As discussed in my methodology, the results of my research were transcripts, notes, recordings, photographs, and video. Using snowball sampling, I began by interrogating relationships involving trail crews, the Arizona Trail Association, Dale Shewalter, and the physical trail in Patagonia. Teasing out those relationships led to the web diagram visible in the methodology.

Interpellations are sometimes general, in the case of the Arizona Trail Association putting out their Master Narrative or in the case of interest groups holding informational booths. For those interpellations, it took more research and some circumstantial evidence to make an educated guess on enrollment. Other interpellations are designed for a specific

actor. An example of that phenomenon is the US Forest Service explaining its views on the effects of the open pit mine to Rosemont Copper.

A Meta-Narrative of the Arizona Trail

The Arizona Trail Association (ATA) offers the following paragraphs as a “meta-narrative” (Lyotard 1984) for the foundation of the Arizona Trail. As a meta-narrative, this history of the Arizona Trail not only obscures competing narratives and the role of non-human factors (e.g., technology, environmental processes, wildlife) but also legitimates its own claim that the Trail is the product of the imagination and activity of a select few human individuals and organizations. This story permeates the Trail’s culture and perpetuates itself through Trail users and enthusiasts. Here is, in full, the ATA’s official “History of the Arizona Trail and the Arizona Trail Association”:

The Arizona Trail was the dream of Dale Shewalter who envisioned a cross-state trail in the 1970s, and in 1985, while he was working as a Flagstaff schoolteacher, walked from Nogales to the Utah state line to explore the feasibility of a trail traversing Arizona. Immediately thereafter, Dale began traveling around the state giving presentations on his vision of a trail connecting communities, mountains, canyons, deserts, forests, public lands, historic sites, various trail systems, wilderness areas, and other points of interest. The idea was embraced by all types of trails users throughout Arizona, and by Arizona State Parks and the Kaibab, Coronado, Coconino, and Tonto National Forests, the Bureau of Land Management, and National Park Service.

Inventory work was needed on determining the existing trails that could be interconnected to be designated as part of the Arizona Trail, and at the same time, where new trails would be needed to traverse Arizona’s diverse landscapes. In the late 1980's, Dale was hired by the Kaibab National Forest to be the first paid coordinator for the Arizona Trail, and all agencies began establishing segments of the Arizona Trail.

By 1990, two needs became apparent - a formal partnership among all governmental agencies was necessary to better coordinate efforts and communication, and a non-profit organization for the trail was needed. Using monies from all four National Forests, Bureau of Land Management, National Park Service, and funding of its own, Arizona State Parks assumed the lead role and employed paid coordinators for the Arizona Trail throughout the 1990s.

In 1994, the Arizona Trail Association incorporated as a 501(c)(3) non-profit organization and became an organized voice for the trail, and brought together passionate day hikers, backpackers, equestrians, mountain bicyclists, runners, trail builders, nature enthusiasts, cross-country skiers, and llama packers from throughout the state. These committed individuals (then and even more so today) provided the necessary route identification to “close the gaps” of the trail, provided the necessary volunteers for building and maintaining the trail, created maps and provided GPS coordinates, identified water sources and resupply points, and raised money and awareness for the trail.

Also in the 1990s and continuing today, various trail crews that spend extended periods of time working on the trail have contributed greatly. These include various youth corps crews, Sierra Club service trips, American Hiking Society Volunteer Vacations, scouting and college groups, Volunteers for Outdoor Arizona, REI service trips, Backcountry Horsemen of America, International Mountain Bicycling Association - Subaru Trail Care Crews, and many more. These trail crews can spend extended periods of time in the backcountry, where logistics can be challenging for the typical weekend volunteer work project.

Many large donors including outdoor stores and clubs, small businesses, and large corporations have provided valuable funding to the ATA for the AZT. Without their generous donations, the trail would not be where it is today. Additionally, many land managers have aggressively pursued Arizona Heritage Fund grants for the trail, and Arizona State Parks has facilitated this process.

Since 2000, some very significant milestones have been reached that originally seemed very difficult to achieve. These include: seeking and successfully achieving National Scenic Trail status; establishing easements and successfully building the trail on State Trust Lands (i.e., that is managed much like private land) in Pima and Pinal Counties; working to reestablish the trail in areas severely affected by major wildfires; traversing the challenging topography north of the Gila River; working through landowner opposition west of the San Francisco Peaks; the Arizona Trail Association absorbing much of the day-to-day coordination of the trail that was originally completed by the land managers (i.e., in better budgetary times); developing outstanding maps and GPS information to better assist trail users through the remote areas along the trail; and building the Arizona Trail Association to its current levels of membership, plus fun events,

trail work weekends, and Arizona Trail merchandise. It is the above milestones that brought the Arizona Trail to its current completed state.

The Arizona Trail has become one of the premier long distance trails in the country. The diversity of people that have made this happen are as diverse as the trail itself. The Arizona Trail demonstrates what trail users and land managers can accomplish when they share a common vision.

See you on the Arizona Trail.”¹

Unpacking History: What the Meta-Narrative Leaves Out

The ATA’s meta-narrative encapsulates the Arizona Trail and ATA’s founding in a few tidy paragraphs. This section begins to interrogate and deconstruct the “Black Box” of the Trail as a first step toward evincing the Trail’s actor-network. To conduct an ANT analysis, however, we must first unpack the narrative history of the Trail in a deeper and more thorough account. A distinction is necessary here: historical events described in conventional English occur in linear time; actor-networks operate within a relational temporality. Although the Trail’s actor-network exists independent of a chronological time frame and disregards physical distances and spaces in favor of a purely relational ontology (which, simply put, asks the question: Are two entities associated or not?), it is also the case that a series of real and tangible historical events created the Trail as a recreational space on the landscape. Therefore, this section uses the conventional past-tense prose of historical narrative to describe this set of chronological events before switching to the present-tense language that is appropriate to the relational temporality of the actor-network.

¹ http://www.aztrail.org/at_history.html

One of the most substantial differences between the meta-narrative and the deconstructed narrative is the role of Dale Shewalter. The meta-narrative poses Shewalter as a Carlylian Hero² (Carlyle 1858), one of the men whose mere thoughts drive the course of human history. Although both histories begin with Shewalter's idea, this second history takes a broader look at the agency and actors involved in creating the Trail over the past three decades. Here we meet the many individuals, collectives, and other entities that established and maintain the Trail.

As in the Arizona Trail Association's narrative, this more extensive history begins with Dale Shewalter's conceptualization of the Trail. Shewalter stated the initial direction for the efforts of those interested in the Trail. His goal was a state-wide trail that would provide opportunities for outdoor recreation, access to scenic viewsheds, and public access to this landscape experience. In order to tackle such an extensive project, Shewalter needed others to support the effort and so he traveled the country convincing people he had a promising idea. Initial contacts included those entities stewarding most of the land he wanted to use. Shewalter met with representatives from the National Park Service, Bureau of Land Management, US Forest Service, and Arizona State Parks. To drum up further support he appealed to community interest groups like the Audubon Society, Sierra Club, and local hiking groups.

² "They were the leaders of men, these great ones; the modellers [sic], patterns, and in a wide sense creators, of whatsoever the general mass of men contrived to do or to attain; all things that we see standing accomplished in the world are properly the outer material result, the practical reali[z]ation and embodiment, of thoughts that dwelt in the Great Men sent into the world: the soul of the whole world's history, it may justly be considered, were the history of these." (Carlyle 1869, p1)

In a state with residents already proud of the landscape and enthusiastic about outdoor recreation, Shewalter faced the challenge of marketing his effort in a competitive field. To that end, Shewalter tailored his message to interest whichever party he was addressing. Hiking groups heard about plans for an 800-mile trail; birding groups heard about additional access to public land near the famed San Pedro Riparian Area; land managers heard about the volunteer support Shewalter imagined for his project; local governments heard about tourism prospects; ecologists heard about generating interest through generating access. One attempt was a 1988 speech to the Huachuca Audubon Society, a branch of the birding enthusiast organization that meets in Sierra Vista, AZ. Present at that meeting was Kelly Tinghe, who became an early advocate and would go on to co-write the Arizona Trail's first guidebook in 1999.

Shewalter's marketing fed back into itself as those he addressed passed on interest in the Arizona Trail to others. A network of parties supporting the idea and effort to make the Trail a physical reality grew. The physical locations of those interested in the Arizona Trail spanned many countries, debunking the "tyranny of geography" that would conceptualize the Trail as a purely regional, in-situ creation (Coe 1999). Likewise, some entities in close proximity to the Trail remained oblivious or chose not to support the Trail. Instead, enthusiasm for the Trail spread via relationships of interested parties, despite their physical separation.

As the colloquial "man with the plan," Shewalter positioned himself as the go-to person for troubleshooting and coordination regarding his dream trail. Those who were willing to volunteer, donate, or plan for the Trail's future looked to Shewalter to orchestrate their efforts. Land agencies, governments, corporations, private citizens,

anyone with interest in the Trail converged around him and his efforts. Shewalter maintained his primary role throughout the 1980s and 1990s but his project soon grew too big, and the network of parties interested in it too extensive, for him to manage alone. Although he remained involved with the Trail until his death in 2010, the stewards, volunteers, and other enthusiasts turned elsewhere for additional leadership and support.

Efforts at a clearinghouse committee produced the Arizona Trail Partners. Governing members included the governmental organizations that stewarded land used by the Trail. It was soon apparent that on-the-ground maintenance, management, and promotion required more volunteers than the already-burdened bureaucrats could take on. Community leaders and trail enthusiasts took up the effort of coordinating volunteers and managing the Trail. They called their new body the Arizona Trail Association (ATA).

The ATA functioned as Trail clearinghouse and coordinator for over four years before codifying its vision for the Trail with a five-year Strategic Plan in 1994. That document included the goal of Trail completion by 2000. Still optimistic in 1999, “it [was] expected that there will only be a few sections that will not meet the original goal (due to federal planning requirements out of ATA’s control” (ATA 1999). Although the Arizona Trail would not be complete for over a decade and would entail two more Strategic Plans, the Forest Service opened and dedicated the two passages of the Trail around Patagonia in 1995, the very next year.

When the Arizona Trail came through Patagonia in 1995, the municipality became a special kind of gateway community, a “trail town.” “Trail town,” as the name suggests, refers to a population center that provides amenities for trail users. However, not all the residents or visitors were enthusiastic about the new amenity. Residents

characterized an April, 2011 “Patagonia Trail Days” event as “sparsely attended” and noted that a guided “3-mile hike offered [as part of the event] had no takers.” Garnering support for the Arizona Trail became a mission for those already on board.

Socioeconomic qualities characteristic of gateway communities, and especially trail towns, are oriented to job creation based heavily in tourism and support for public land stewardship. However, those qualities often bring conflicting values. For example, jobs supported by tourism may be prevalent in the high tourism season but quiet down in the off-season. Politics in support of responsible public land stewardship often come into conflict with development that may bring more consistent jobs to the area. Patagonia residents are experiencing that conflict currently with the proposed construction of the Rosemont copper mine.

Trail enthusiasts continued to spread word of the project. The ATA’s Executive Director started lobbying the US Congress for recognition of the Trail in March of 2000. Many of Arizona’s congressmen already had personal connections to the Trail (ATA 2000). Criteria for National Scenic Trail designation are that the trail be “100 miles or longer, continuous, primarily non-motorized routes of outstanding recreation opportunity,” and an act of Congress affirming that those qualities apply (NPS) Effective lobbying, adequate trail condition, and personal connections of congressmen all helped the Arizona Trail become, formally, the Arizona National Scenic Trail in 2009.

Once created, the trail surface requires maintenance due to damage by rainstorms and fire. The Arizona Trail Association orchestrates a Passage Steward program to mitigate and repair such damage. Each of 43 sections of the trail is assigned to a volunteer steward who coordinates maintenance. Sometimes Stewards do the repairs

themselves and sometimes they use volunteer crews or work with land agencies to hire crews. Those maintenance events, in turn, promote interest in the Trail. During his tenure as Passage Steward for Canelo Hills West, Richard Corbett held at least a dozen documented and public maintenance events. Participation in one of Corbett's events encouraged one Trail enthusiast to become a Passage Steward himself. Zay Hartigan, assumed stewardship for Canelo Hills East (Passage Two) soon thereafter.

Patagonia

Patagonia was not always a "trail town," of course. Records of land use in Patagonia begin with habitation by indigenous Americans and Mexicans. Spanish explorers and missionaries arrived in the 1500s and 1600s. The United States acquired the Patagonia area as part of the 1853 Gadsden Purchase from Mexico. Patagonia and the surrounding areas have a history of mining activity dating back to the mid-1800s. The town of Patagonia was formally settled as a mining community in 1898, 24 years before Arizona reached statehood. Mining operations in Patagonia's immediate vicinity ceased in the 1950s without intent to return; the tracks of the New Mexico & Arizona Railroad, originally constructed in 1882, were removed in 1962 and the Rotary acquired the depot in 1965.

Without extractive industry but with plenty of renowned scenery, Patagonia attracted writers and artists looking for a small, quiet, rural town. Similar to trends across the rest of the western United States, appreciation for public land and outdoor recreation grew in the area. That trend was facilitated in part by Patagonia's location nestled among

large swaths of public land. The “Mountain Empire” towns of Patagonia, Sonoita, and Elgin celebrate their surrounding landscapes and artistic culture to this day.

The influx of Arizona Trail users drove changes in Patagonia. Some parties in town without much or any interest in the Trail found reason to take an interest once visitors came along. A kiosk in the town square that once described only Patagonia’s historic railroad made room for information on the Arizona Trail. Hikers who had not seen warm food, cold beer, or a soft bed in days patronized corresponding establishments in town. In 2010, Ann Caston refitted her long-standing Patagonia Bookseller’s outfit as a camping gear store. She rented space to the new Patagonia Cyclery, a mountain bike rental shop, and the Patagonia Visitors Center. Books of local poetry and history that once filled the room were relegated to a single shelving unit.

A bicycle shop was a smart call for Caston because of how popular mountain biking the Trail became. Patagonia Cyclery provides logistics and support for several area races. The Arizona Trail 300/750³ routes participants through town on the Arizona Trail and provides spectator opportunities. The 300/750 offers “no entry fee, no prizes, absolutely no support” and only a suggested start date and time. Both races start near the southern terminus of the Arizona Trail and follow it north as best they can given wilderness area restrictions for the respective distances.⁴ Besides riding the miles and reporting their times, all that race coordinators ask of participants is that they join the

³ Bicycle race nomenclature conventions use the distance of the race in the title. A 300/750 race is one for which participants have a choice of riding 300 or 750 miles. Kurt Refsnider set the 750-mile course record of 7 days, 6 hours, 35 minutes in 2010.

⁴ In 2011, the winning time for the 750 was 3 days, 4 hours, and 5 minutes (http://singletrack.competitor.com/2012/03/training/the-ultimate-ultra-the-arizona-trail-race_30254)

Arizona Trail Association. The Kentucky Camp race, discussed in detail in the next section, functions much the same way.

Rosemont Copper

Eight miles north of Patagonia proper, Rosemont Copper has sited an open pit copper mine and plans to bring back an industry not viable in the area since the early 1900s. Exploration in the area during the 1970s showed subsurface value. The Santa Rita Mountains contain significant deposits of copper (used for wiring), molybdenum (a steel alloy), silver, and gold. Rosemont's parent company, Augusta Resources, moved to acquire the land in 2005 with an eye to start digging the mine. Environmentalists and social justice activists started campaigning against the mine immediately. The area in question for the Rosemont Mine is called Rosemont Ranch. Under the current proposed plan, Rosemont would dig the mine on the privately-deeded Ranch and dump tailings and waste on 3,000 acres of adjacent public Forest Service land. The open pit mine Rosemont proposed would be a mile in diameter at the surface.

The dual and sometimes conflicting uses of Patagonia, mining and myriad recreational and non-industrial pursuits re-emerged with a vengeance when the Arizona Trail and Rosemont Copper wanted to occupy the same physical space. Rosemont Copper's threat, as many Patagonians see it, is manifold, including destruction of scenery (viewshed), increased truck traffic on scenic and rural roads, surficial tailings, dumping of waste rock, animal habitat loss and damages, water pollution, air quality, and significant lowering of the water table.

Patagonia sits in a rural and uniquely scenic part of Arizona, the “Sky Island” mountains region. The town prides itself on being “spectacularly rich in natural...assets” due to its location “between the Santa Rita Mountains and the Patagonia Mountains, in the riparian corridor of Sonoita Creek” (Patagonia 2013). The Arizona Trail, celebrated for its scenic path and access to the Mount Wrightson Wilderness, Coronado National Forest, and Santa Rita Mountain Backcountry Touring Area, is one of those “natural assets.” Rosemont Copper’s Mine is antithetical to those interests for many Patagonians.

Rosemont Copper acknowledges all those deleterious effects and others as well. The Arizona Trail currently skirts part of the proposed open pit site and construction of the mine would require a reroute of the trail by at least four miles (USDA 2011). National Scenic Trails, including the Arizona Trail, are “so located as to provide for maximum outdoor recreation potential and for the conservation and enjoyment of the nationally significant scenic, historic, natural, or cultural qualities of the areas through which such trails may pass” (NPS 2009). Digging an open pit mine offends the letter and spirit of the Trail’s federal legislation. It likewise offends many Patagonians’ sensibilities about how nature should look and be made accessible. The ongoing controversy about the Rosemont Mine is drawing in several interested parties who had little to no interest in the area when it was just a trail but considerable interest now that larger ecological concerns are arising.

The Trail as Actor-Network

The previous two sections described the meta-narrative history of the Arizona Trail and then unpacked that history with more depth. This section describes the Trail as

an actor-network. In the interest of making this section as readable as possible, each actor network-specific term is defined in-text and/or in a footnote at its first use. For definitions throughout the chapter, reference Appendix A.

Actor-network theory posits that social objects (such as a trail running the length of Arizona) consist of multi-dimensional relationships between actors that include humans, non-humans, technology, and environment. Elucidating these relationships in English is difficult because the language separates the past from present and future, and operates primarily through the linguistic form of subject-verb-object (SVO). The former makes it difficult to conceptualize time in non-chronological fashion, whereas the latter makes it difficult to express agency in a relational way (e.g., multiple subjects co-constituting the action implied in the verb). And regardless of the language used, drawing a network implies a certainty and linearity that does not exist in relational space. In ANT, then, the concept of the network can initially be thought of as a metaphor that guides deeper, more critical relational analysis grounded in an ontology that discloses how social products and agency are enacted via networked associations. Therefore, the discernable and definable *relationships* are the focus of analysis here.

Topology: Relational Space

This research analyzes a physical artifact and its colloquial *space* and *place* as an actor network. However, the space of the actor-network is different from a conventional physical or temporal presence. Actor-networks do not occupy space or time the same way a human, house, or galaxy does. Instead, the network's *topology*--that is, the structure of its relationships--expresses a distinctively *relational* space (Murdoch 2006). To

understand the concept of topology, picture a single point representing one actor. First, think of this point in terms of conventional space (e.g., that of Euclidean geometry or a Cartesian grid). From this perspective, the geometric plane or grid is the preexisting space upon which points can be located and identified. So, a single point on the coordinate grid will have zero dimensions and occupy a single location in space. When that point is connected to another, the relationship can be represented as a line between the two; this line has one dimension, length, which is measurable as distance. Now, think of this point as an actor in relational space. From this perspective, there is no preexisting space or grid onto which points and their relationships are “mapped.” Instead, the relationship itself constitutes the space. So while in Euclidean and Cartesian systems, space establishes the possibility for points and lines, in the space of actor-networks, *relationships* establish the possibility for space (i.e., relationships are the foundation for ontology). What matters in ANT is that that space occurs only as it is created by a relationship. As Latour once put it, the basic question in ANT is, “Are two actors connected or not?” If two actors have nothing to do with one another, it does not matter if they are close together or far apart in conventional physical space because there is no relationship connecting them. That applies to actors separated by both physical (Euclidean) space and conventional time. An actor physically in Tucson, AZ might have a direct relationship with an actor in Washington, D.C. Although a great physical distance separates the actors, the topological distance between them (their relational line) is short (or “intense,” as ANT theorists tend to put it). Two actors may exist contemporaneously and have nothing to do with one another and two actors separated by geologic time may

have a direct relationship. The relationships in the network determine the network's space.

Agency is usually thought of as the capacity of a subject (agent) to influence an object. In the relational space of ANT, by contrast, agency is a function of the *relationship*, not an individual subject. In other words, a subject has agency only in its relationship with other actors. This understanding of agency is related to the Spinozan concept of "affect." For Spinoza (and the extension of his work by Deleuze and Guattari (1987)), affect refers to the modification produced in the body (or mind, in the case of a human) of an actor *through its encounter with another actor*. Affect, then, is agency enacted through relationship. Deleuze and Guattari (1987: xvii) described affect as:

...an ability to affect and be affected. It is a prepersonal intensity corresponding to the passage from one experiential state of the body to another and implying an augmentation or diminution in that body's capacity to act. *L'affection* (Spinoza's *affectio*) is each such state considered as an encounter between the affected body and a second, affecting, body (with body taken in its broadest possible sense to include "mental" or ideal bodies).

With this in mind, it is more accurate to say that relational space is created through *affect*.

Importantly, this definition avoids the tautology of saying that relationships create relational space (as above). Affect is therefore the "prepersonal intensity" that expresses itself in relationships among actors and so creates relational space.

To help grasp construction of the Trail as an actor-network, one can picture this entity as a web with dimensions that stretch far beyond the conventional conceptualizations of time, physical space, and human agency. This web also extends beyond the ordinary delineation of the "Trail" as a physical feature on the landscape. As an actor-network, the Trail is embedded within a relational space that engages and depends on other networks. The relationships that constitute the Trail can be described as

threads in the web, crisscrossing and connecting actors. Much like the fibers of a basket, each strand is not necessarily that strong by itself, but when woven together, they collectively form a coherent and structurally integral “object.”

The sheer abundance and diversity of relationships mean that theoretically, it would be possible to trace associations to near-infinity. Consequently, the delineation of the “network” most relevant to the Trail is necessarily arbitrary: any analysis must reach a “stopping point” that could, in theory, be crossed. ANT methodology therefore requires the identification of a “stopping point,” or a tentative delineation of the relevant network, for the purposes of conducting and communicating the results of the analysis. One way ANT makes this delimitation is by identifying and working from an Obligatory Passage Point (OPP), which is a site in the network that both defines and enacts the network’s interests.⁵ This process is called “problematization,” and it is usually the first focus of analysis in ANT. In the web metaphor, an OPP does not necessarily sit at the “center” of the network but rather is a point of convergence for many relational threads that, taken together, *affect* the network’s interests. The Trail’s OPP chosen for this analysis is Patagonia, Arizona because this is one of the key sites where network problematization occurs.

The “focal actor” is a special kind of OPP where network problematization is most intense. It is the “location” that enacts the network, in this case as a publically-accessible, state-wide trail. The focal actor organizes problematization and defines the network’s action plan. Problematization, by extension, both “interpellates” and “enrolls”

⁵ Obligatory Passage Point (OPP): A network location through which actors pass, work, or interpellate that defines/drives the goal or representation/manifestation of the network.

actors. Interpellation refers to a “call-response” effect in the network: problematization issues forth an action plan that elicits a response from actors. Metaphorically, actors “hear their name being called,” and are compelled to engage. (The French term used by Latour in ANT is “*interressement*.”) During interpellation, actors frame their interests in terms commensurate with other actors’ interests, making the latter actors consider themselves subjects or intended recipients of that calling (Althusser 1972). Enrollment refers to the phenomenon of actors engaging networks and importantly, taking them to be “real.”

As actors interpellate and enroll, the problematization is “translated” into relationships that sustain the network. Translation intensifies the network to the point where it is “punctuated” as a social object, a reification, the so-called “Black Box.” Enrollment, therefore, is about engaging the network as something “real.” It is also possible, however, for translation to break down, which de-intensifies the network. In this regard, resistance, that is, the refusal to enroll, is a complicated force that can actually serve to translate network interests. At the OPP of Patagonia, for example, the trail encounters resistance in Rosemont Copper, but that resistance only serves to problematize the network, interpellate and enroll actors, and intensify the relational space of the network. In other words, the resistance the Trail encounters at Patagonia is, in part, a productive force.

Interpretations

ANT analysis of the Arizona Trail’s actor-network evinced four main interpretations. I explain each of them here, including examples and their influence on the actor-network.

First, I explore Dale Shewalter's role in a network that has no place for heroes. Next, I explain material-semiotic hybrids and how those ideas tied to physical objects affect the network. The third section examines the seemingly contradictory nature of resistance to the network: its simultaneous ability to strengthen and weaken the network. The fourth and final section looks at non-human participation in the network, including the role of abiotica and non-human animals. By evincing these actor-network features, this research demonstrates that what is at stake is not just the biography of individuals or things, but rather the material practices and relations through which those individuals and things come to matter.

1. Deconstructing Shewalter's Agency

The issue of deconstructing Dale Shewalter's agency acknowledges an important aspect of actor-network theory. In ANT, there is no conventional "power," but rather just more or less successful interpellations. In conventional parlance, one's goal advances because one has more power. In ANT, one's goal advances because the interpellation enrolls actors. The more appealing interpellations advance goals. This is evident with the competing interpellations of the Arizona Trail presented by either the Arizona Trail Association or Shewalter. The simple, heroic interpellation narrative of the ATA resonates with more actors than the deconstructed one of Shewalter that follows. Evincing the relationships of the network requires teasing out the sources of alternative interpellations.

Dale Shewalter's passion for non-motorized transportation (e.g., hiking, biking, horse riding) was a longstanding one: "For me, it [the idea of the Trail] goes way back. It

goes back to childhood, dreaming of getting from here to there in a non-motorized way, such as hiking or horseback. It's a chance to enjoy that sense of freedom and independence” (AZ Daily Sun 2010). The meta-narrative of the Arizona Trail presented earlier in this chapter posits Dale Shewalter as a Carlylian hero who all but single-handedly created the Trail for those who shared his interest in non-motorized forms of outdoor recreation. As demonstrated in the preceding sections of this chapter, actor-network theory does not permit heroes or stand-alone agents. Like all actors, Shewalter is an assemblage of his relationships. He is an actor through which agency is enacted. In the historical narrative, “Dale Shewalter” is an individual who created a trail, but in ANT, he is a point in relational space from which network problematization originates and through which network interests are translated. For this reason, Shewalter remains the “focal actor” even though he is deceased.

Part of the romance of the meta-narrative is that Shewalter came up with the idea of the Arizona Trail in an epiphany during his own bushwhacking adventure across the state in 1985. While this story is attractive in its simplicity, Shewalter did not spontaneously set off on a hiking trip. Instead, his interest in non-motorized transport is networked: Shewalter’s interests and motivations are enrolled and enacted in networks other than the Arizona Trail. Based on archival research of Shewalter’s biography, these networks include American Trails, the American Hiking Society, the Flagstaff Biking Organization, the Arizona Horse Council, professional geology (Shewalter received an MS in Geology from Northern Arizona University), and K-12 education (Shewalter taught for 30 years in Flagstaff public schools). It is likely that Shewalter’s interests are enrolled in many other networks related to non-motorized transport and outdoor

recreation, most obviously the Appalachian Trail, which is often used as a point of comparison in news media about the Arizona Trail.

As a focal actor in the Arizona Trail network, Shewalter's action plan problematizes non-motorized interests to new actors (MTBR 2010). Actors interpellate and enroll, and interests are translated within the network and across networks (for instance, those listed above). In this way, Shewalter's agency is a *relational* achievement (Whatmore 1999), a unique problematization (a statewide trail in Arizona) that interpellates actors and translates interests across networks. As the focal actor, Shewalter's agency consists in the problematization that interpellates and enrolls actors, and the translations that sustain the network. As the focal actor, Shewalter's agency perseveres in the problematization and translation of network interests.

Another way agency is achieved is via the relationship between Shewalter and local outdoor recreators. At sites in the network involving those relationships, the Trail's problematization interpellates and enrolls community interest groups. These sites include the Audubon Society, Sierra Club, hiking clubs, and naturalist organizations. The same interpellation does not enroll every group; different groups respond to different interpellations. For example, agency is achieved when the interpellation of habitat preservation enrolls the Audubon Society. Agency may not occur when the interpellation of habitat preservation reaches a hiking club because the hiking club is not interested in ornithology and would not enroll in a network supporting ornithology. However, agency would occur in the latter example when the interpellation of a state-long footpath enrolls the hiking club. Likewise, agency would not be achieved when interpellation of the

footpath reaches the Audubon Society because the birding organization would not enroll in a network supporting hiking.

Shewalter's agency is achieved in still other relationships. Network problematization interpellates and enrolls government institutions of Pima County with its support for maintaining viewshed and public access. Like any public-agency actor, Pima County's agencies (the political bodies, not necessarily associated with *agency*) join relationships with constituents. Demand among Pima County's constituents for outdoor recreation and conservation interpellates to those agencies. As an event site in the network, Pima County manages tracts of land creating a public land buffer along many miles of the Arizona Trail. Home to Tucson, the largest economic, infrastructural, and population center in southern Arizona, Pima County is integral to many relationships.

Network problematization also interpellates and enrolls the Kaibab National Forest (KNF). The KNF interpellates by providing recreation opportunities on public land. Another interpellation of the problematization enrolls a different actor interested in the same parcel of land. The interpellation that enrolls the Kaibab Forest Products Company (KFPC), a timber outfit that harvests on Forest Service land speaks to KFPC's stake in keeping forests responsibly thinned to avoid destructive wildfires, sharing in the problematization of maintaining public access to the trail by keeping its surrounding landscape intact.

2. Material-Semiotic Hybrids

Another finding that emerged from my study is the role and construction of material-semiotic hybrids. In this study, material-semiotic hybrid combines the terms material,

referring to a real physical object or role an actor could hold, and semiotic, referring to the significance an object or actor could take. Thus, the term includes both the “natural,” observable entity and its “cultural” meaning and implications (Harraway 1991).⁶ Furthermore, and true to actor-network theory, it acknowledges both “natural” and “cultural” agency because both contribute to a single material-semiotic hybrid. These hybrids are eponymously named: their material and semiotic qualities cannot be considered independently; the entity must be considered as an assembly of its material and semiotic qualities. As the network persists, material-semiotic hybrids are reified or punctuated. Each production of such a hybrid, in turn, reifies the Trail. Material-semiotic hybrids I discovered include mountain bikers, through-hikers, passage stewards, ranchers, signage, titling, trail promotion events, and even the Trail itself. The section explores how the network reifies each of the identified hybrids.

Mountain bikers

As a material-semiotic hybrid, mountain biking comprises the physical bike, associated gear, the trail biked on, ideas about what constitutes mountain biking and mountain biking culture, and the actors who find significance in those. Those qualities are reified as a singular “mountain biking” punctualization in the network.

Mountain biking is an increasingly popular use of the Arizona Trail around Patagonia. Interpellation of network interests occurs as athletes and spectators form relationships with visitors, locals, and local establishments, all while reifying the Trail.

⁶ Not to be confused with artifacts, which are physical objects associated with production of the network. The physical trail itself is an example of an artifact. Unlike material-semiotic hybrids, no cultural or symbolic meaning is applied.

By acting as a Mountain Biker or a Spectator and using the Trail accordingly, those actors reify the Trail. Relating to the actors in Patagonia spreads interpellation. Cyclists in the Santa Rita Mountains rely on Patagonia for lodging, food, and bicycle repairs. Ann Caston, a Patagonia resident, converted her bookstore to a visitor's center and the Patagonia Cyclery. In turn, Patagonia Cyclery co-sponsored a National Trails Day event to raise awareness of and garner support for the Arizona Trail.

Recent biking events include the Arizona Trail 300/750 and Kentucky Camp mountain bike race. The Kentucky Camp mountain bike race interpellates USA Cycling, which sanctions the race, and the International Mountain Bicycling Association, which designates the route as an "Epic."⁷ As part of the Arizona Endurance Series, Kentucky Camp also interpellates cyclists from around the American southwest. Along with athletes, Kentucky Camp interpellates USFS officials who enforce policies including permitting and a 74-participant limit. Kentucky Camp's coordinator is a Passage Steward with the Arizona Trail Association (Shouse 2012). Shouse brings to bear his network of relationships from cycling and from involvement with the Trail to his work with Kentucky Camp.

Through-Hikers

Through-hikers, those hikers traversing the entire physical route of the Trail are a unique type of actor. Interpellation reaches them in terms of problematization of a state-long footpath. Through their relationships with other actors, they reify the Trail as the same. For those who enroll in the Arizona Trail's network as through-hikers an example

⁷ An IMBA "Epic" is considered a "bucket list" ride, one a mountain biking enthusiast "must do" in his/her life

of reification occurs when connecting with local persons after days alone. Relationships between hikers and locals interpellate the Trail by sustaining the Trail experience for both those hikers and Patagonians.

As a material-semiotic hybrid, “through-hiker” includes the hiker him or herself and hiking accouterments like maps, boots, backpackers, and water bottles. Much like the mountain bikers, through-hikers reify a certain Trail experience or translation of the Trail. The translation they reify might be of the Trail as a conduit for adventure, solitude, loneliness, meditation, or danger. For through-hikers, Patagonia reifies a certain trail experience characterized perhaps by companionship, cold beer, warm food, or a soft bed.

Interpellations and reifications take many forms as relationships between actors vary. While passing through Patagonia on his through-hike, Dave Hicks struggled to find Internet access. Local bookstore owner Ann Caston helped him connect through her phone line. At another event site concerning inclement weather, Patagonians enrolled by opening their homes to through-hikers stranded in town. Patagonians remember through-hikers with stories from their shared homes (many Patagonians are US in-migrants), and reflections on the Trail. Their relationships present the Trail as a material-semiotic landscape they both cherish.

Passage Stewards Bucking the Ranching Stereotype

Trail maintenance event sites reify the material-semiosis of the Trail, the environment containing the physical trail, and those performing maintenance. The very idea of a *maintenance* event implies material-semiosis because the integrity of the material trail is at stake and there would be no call to maintain it if it did not have symbolic meaning.

There is a desired material quality of the Trail and Passage Stewards are formally tasked with maintaining it.

Closely related to maintenance material-semiotic hybrids are the Passage Stewards. They are physical people and ascribed meaning by the work they perform and the perceptions of other actors who participate in those events. Individual Passage Stewards contribute to many relationships in the actor-network. They are interpellated by the Arizona Trail Association, which runs the steward program while bringing their relationships in other actor-networks to the Trail. Via Passage Stewards, interpellation reaches residents in many towns, organizations, outdoor recreation groups, sports clubs, political efforts, and conservation efforts.

Rancher enrollment in public land stewardship and recreation networks is obscured by popular narrative but evinced by actor-network theory. Zay Hartigan, a local rancher, accepted interpellation at a Canelo Hills West maintenance event organized by Steward Richard Corbett. “Steward” titling challenges the idea of ranchers and conservationists being at odds about land uses. Hartigan and other stewards accept interpellations highlighting land use ethics, history of interactions with the land, and enthusiasm for spending time outdoors. Goals of the Trail’s actor-network are commensurate with the actor networks of Hartigan’s personal preference to recreate outdoors and with Hartigan’s ranching land use ethics.

Interpellating Locals & Tourists

Visitors to Patagonia that arrive by road receive interpellation from the “Gateway Community” signs outside the town. “Gateway Community” is another material-semiotic

hybrid combining the materiality of the town of Patagonia with the symbolic idea of a entrance point to public land. As a material-semiotic hybrid, it includes Gateway Community nomenclature and associated signage and advertising. Patagonia's role as a gateway community began long before the Arizona Trail passed through due to its association with access to other areas but the Arizona Trail provided impetus for "Gateway Community" signage.

Patagonia's formal titling as a Gateway Community is one node in the Trail's actor-network. By 2000, Patagonia called itself a "Gateway to Arizona Trail," and was the first Arizona Trail town to assign itself Gateway Community status. The Arizona Trail Association interpellates other actors through the formal Gateway Community program. REI (a popular national outdoor gear retailer) accepts that interpellation and at an event site, provided a grant to the ATA to publicize and promote Gateway Communities along the Arizona Trail. Artifacts, the "Gateway Community" signs became material-semiotic hybrids. Interpellation occurs when actors read or otherwise glean meaning from those signs.

My interactions with Patagonia residents and visitors further interpellate the Trail. As a trail user, I add to the meaning ascribed to the Trail. I spread its interpellation as a hiking trail. My presence as a researcher added an interpellation of the Trail. I interpellate the Trail as an entity worth researching and approaching academically. I also spread that interpellation of the trail. My interpellation may have been a problematization as it was not expressed in the focal actor's goal and, based on persons' reactions to my presence, an interpellation not previously considered. Residents and visitors acted surprised and

sometimes proud that an entity they interpellate as being part of their town would garner attention from a serious academic study.

Interpellation spreads through Patagonia's residents and visitors via several mechanisms besides direct encounters of trail users and signage. The local news publication spreads the Trail's problematization through its stories on Trail users. News about the Arizona Trail has included profiles of hikers, notices for public hiking events, and accounts of events associated with the Trail. News stories about actors and event sites are also examples of material-semiotic hybrids in their reification of Trail experiences. Since the local paper is available inside every business in town, residents and visitors can readily receive interpellation from the stories.

Events in Patagonia that support the Trail also provide opportunities for interpellation. The 2000 National Trails Day event, sponsored by the Patagonia Visitors Center and Patagonia Cyclery is one example. Actors attending the event maintained parts of the Trail and learned about the ecology of the area. The town's centennial celebration included an "Arizona Trail Tour" where regular enthusiasts and those new to the Trail explored the Passage south of town. The Arizona Trail Association ran a booth at the 2006 Patagonia Fall Festival, a celebration of Patagonia's cultural and natural heritage.

3. The Paradox of Resistance

Refusal to enroll in the network both strengthens and weakens the network. Colloquially, resistance to the network may be considered to deter its development but because actor-network theory is based on relationships, it can also strengthen the network. From the

perspective of the OPP of Patagonia, this phenomenon is evident in two areas: public trail access, and Rosemont Copper's intention to reopen mining operations in the vicinity.

Private Landowners vs. Public Land Access

Problematization involves public access to the Arizona Trail, a quality threatened by private ownership of proximal land. Much of the private property around the Trail is cattle ranches, a major land use in southeastern Arizona. Increased vehicle traffic to trailheads on rural roads and increased foot traffic from hikers, sometimes rowdy or excited, disturbs the cattle. The same rancher previously discussed, who allows Trail access over her property, prefers to keep her cattle from running around the property in order to fatten them up. The rancher's enrollment in the actor-network of the cattle industry supersedes enrollment in the Arizona Trail's actor-network.

That private landowner's refusal to enroll in the network led to different problematization by necessitating event sites to remedy said refusal. After eleven years of allowing Trail access across her property, the rancher reneged permission (effectively refusing enrollment) and that passage's steward rerouted approximately three miles of trail to sidestep the rancher's barriers. Here we see the dualistic destructive and productive role of resistance. It weakened the Trail's representation through material-semiotic hybrids because it compromised the integrity of maps, signage, and previous accounts of the Trail. Although that landowner made an effort to discourage the Trail, attendance and publicity for trail work event sites also strengthened it. More maintenance events provided more opportunities for interpellation and enrollment.

Rosemont Copper's Resistance

Like all resistance, Rosemont Copper has its own actor-network with an action plan incommensurate with the Arizona Trail's. Rosemont's primary interest is digging the mine and the Trail's is perpetuating its namesake. The relationship between Rosemont and the Trail reads as a series of unsuccessful interpellation attempts. Rosemont's attempts at interpellating the Arizona Trail include donating tens of thousands of dollars to the Arizona Trail Association. At a network event site in 2008, Rosemont first funded the ATA at the Premier Legacy Partner level.⁸ Here we see that Rosemont's resistance to the network is constructive as it provides much-needed financial support for maintenance to the physical artifact and interpellation to other actors.

That same year, Rosemont Copper submitted a Draft Environmental Impact Statement to the USFS for approval. Since the Forest Service enrolls in the Trail's actor-network and also manages Rosemont's land easement, the mining company's best shot at interpellating its interests to the USFS is not by alienating the Trail's actor-network. Hence, Rosemont's donations continue through the present (2012).

Rosemont's proposed mine involves using some 3,000 acres of Forest Service land to dump waste rock and tailings. As an attempt at interpellation, Rosemont's EIS includes reroute plans for sections of the Trail affected by the waste rock and tailings proposed to be dumped on USFS land. Rosemont is trying to interpellate to the Trail's actors with a compromise. After describing several trail re-routing options, the plan concludes

⁸ a donation of between \$2,000 and \$20,000 per annum

Under all of the action alternatives, and from the perspective of the trail user, the proposed trail realignments would have long-term, permanent adverse impacts to scenic quality. All of the routes would closely parallel the project area perimeter fenceline, allowing foreground views and long viewing times of waste rock and tailings piles, slope terraces, the pit face, drainage features, access and perimeter roads, and ore processing infrastructure during the long-term construction and operation of the mine. (USDA)

The EIS elaborates on Rosemont's competing network interests, that is, to have the mine and to placate constituents by keeping the trail.

As a public entity managing public land, the USFS opened the Draft EIS to public comment in 2011 before taking a position on the issue. The ongoing forum provides a written record of public enrollment and resistance. Rosemont's interpellation is so far unconvincing. Of the 48 unique individuals who offered formal comments on the EIS mentioning the Arizona Trail, only one comment was in support of the mine. Support for the Arizona Trail has become nearly synonymous with anti-mine sentiment, thereby creating another material-semiotic hybrid associated with the Trail. Actors with no other expressed interest in the Trail accept problematization of the Trail as a landscape feature juxtaposed to the copper mine. Unfortunately for Rosemont Copper, at the event site where it wrote the EIS, it provided that problematization and jump-started an enrollment campaign for the Trail.

Evident in the Trail's network's enrollment strengthening is just how much actors perceive Rosemont's problematization antithetical to the Trail's. For most of those enrollees, the ill-planned re-route of the Arizona Trail (i.e.: destructive modification of the network's physical artifact) should the mine persist is not even a primary reason for opposition. Popular reasons instead include ensuing water pollution, increased road traffic, and degradation of viewshed. Networks those actors already belong to whose action plan includes clean water, remoteness, scenic views, biodiversity etc., are

commensurate with goals of the Arizona Trail; hence, those actors enroll. When asked about the Arizona Trail, opposing the copper mine was the first comment from some Patagonians who, admittedly, had no other interest in the Trail. The Trail's interpellation as a rhetorical tool against mine development enrolls those actors.

4. Non-Human Actors

One of actor-network theory's strengths is its perspective on non-human agency. Like humans, other animals and abiota participate in relationships. This section explores the relationships that include non-human actors. Non-humans provide another interesting experience in that they sometimes exemplify the dualistic role of resistance to the network. Abiota demonstrate this phenomenon when their degradation of the physical trail leads to more maintenance events where material-semiotics are reified and strengthened. Resistance from private landowners on whose property the trail passed led to more maintenance events, too, and also more discussion of the Trail in the Patagonia community. Rosemont Copper supports the Trail on paper but in practice works actively to resist the Trail. As elaborated on in Rosemont's section, that resistance causes myriad efforts to strengthen the network.

Cattle

Cattle often occupy the same physical space as the Arizona Trail or live proximal enough to it to be frightened by noise and intrusion. According to one rancher who allows vehicle access to an Arizona Trail trailhead via her ranch's driveway, vehicles and

pedestrians frighten or startle cattle who then run off. Some hikers also reported cattle walking or grazing on the path of the Trail in town.

Domesticated animals also use the physical trail to travel. The trail's design as a footpath makes it a convenient and obstruction-less corridor. The ease of travel on the trail seems to interpellate to horses and other pack animals living near the trail. Observation of hoof prints along the trail compared with linear hoof print patterns on other areas of pastures or fields the trail crosses indicates that network relationships exist between domesticated animals and the physical footpath of the trail.

Fire, Flooding, and other Abiots

Problematization of the Trail includes passage through uniquely scenic landscapes throughout Arizona. Making the physical and ecological landscape so remarkable are the region's harsh climactic effects. The alternately hot and dry, and monsoonal seasons of southeastern Arizona present resistance to the Trail's actor-network by threatening its physical artifact. Fire and flooding necessitate problematization of the Trail by refusing to enroll.

At several event sites in the network, fires and floods refused to enroll and kept on their own action plans from other networks. At a series of event sites where abiots demonstrated refusal, wildfires and floods damaged the Trail near Patagonia. Fires acted during the summers of 2002, 2003, and 2011 and floods during the fall of 2000, spring of 2001, and spring of 2005. Actors that converge at those and similar event sites problematize the Trail to mitigate damage from actors that refuse to enroll. Having the Trail pass in the path of fires and floods was an unsuccessful problematization.

Successful problematizations include laying the Trail where fire and/or floods do not reach it or constructing the Trail in a manner strong enough to withstand resistance.

Actors' mitigation efforts against abiota's refusal provide more event sites where interpellation can spread to others. More opportunities for interpellation and enrollment make the network more robust. For example, Passage Stewards responsible for keeping their sections of trail safe and open held maintenance events involving local volunteers or paid trail crews. Sometimes a Steward interpellates a land agency (e.g. USFS) at an event and sometimes a land agency interpellates private labor or interests. A common type of output from an event site regarding the physical artifact of the Trail is seen in 2004 when volunteers and USFS agents moved 1.5 miles of the Trail off "crummy 4WD road" and onto single-track tread (ATA 2004). Relocating the Trail strengthened both the physical artifact and the actor-network. By making the Trail occupy space unique to its transportation goals and not sharing with another conduit, laborers reify the Trail as a footpath. The artifact is also more durable as its own footpath. The tread is cut to pass water over and away from the Trail so it does not pool on or erode the Trail. The Trail's actor-network is also strengthened by interpellation from Stewards to laborers and by presenting the Trail to users as a unique physical space.

Chapter 5: Conclusion

This study's place in Actor-Network Theory

What do we gain by understanding trail as actor-networks?

Understanding trails as actor-networks allows us to account for myriad determinants in their establishment, function, and proliferation. More limited approaches, including political and landscape ecologies as discussed in the literature review, do not acknowledge the influence of those factors. Actor-network theory is a tool for accounting for any and all influential factors and even making sense of their interrelationships.

ANT is esoteric as an approach and its language too erudite to be useful in its purist form. However, the way ANT describes trails is valuable to the trails' stakeholders. Those parties could include land stewards, resource extractors, amenity landscape users, businesses with an economic stake in the area, people with an interest in the ecology of the area, and many others. Unfortunately, while actor-network theory can include any entity as an actor, only actors who read and understand conventional language could find this particular kind of analysis valuable.

This study's utility beyond expansion of ANT lies in its application to orchestration of trail spaces. Depending on one's goal for a trail, an actor can use ANT framework to promote its interpellation. Framing influence as sharing interpellation and building relationships with other actors could bring about more success for problematizations. Although ANT is a useful framework for conceptualizing goals,

drawbacks of applying strict ANT to troubleshoot is troublesome. Those drawbacks are discussed later in this chapter.

This research as compared to other types of trail projects

Unpacked histories like in section two of Chapter 4 exist for many major trails. Published books abound on popular histories of the Appalachian Trail, Pacific Crest Trail, and Continental Divide Trail. They usually mix trail history with a narrative of the author's own hike. Peer-reviewed literature on the Appalachian Trail includes articles on ecosystems and biodiversity, reasons for hiking the trail, nature-based benefits of making the hike, socio-politics of setting the trail's corridor, and aggregations of through-hiker profiles. The papers address singular questions and contribute to studies in a narrow field. Although less peer-reviewed literature exists for the other two mentioned trails, the smaller sample shows the same trends.

This paper is a relatively novel approach to a trail work. Instead of limiting the scope to one or two variables, it takes the angle that a trail has a near-infinite number of variables and influences. The successful approach to a trail problem might not be the variable most familiar to the one desiring change. The parties to approach concerning the problem might not be the closest physically or the ones expected. While delineating very far out into the actor-network of a trail is not always viable or necessary, thinking about problem-solving or developing trails in the actor-network framework would be a boon to resource users.

Benefits of Actor-Network Theory

ANT proved useful as an analytical tool for this project. It provided framework to consider numerous influential parties and entities throughout the analysis. ANT also allowed me to recognize agency beyond Great Men, which is so prevalent in the meta-narrative and even in the unpacked history. Agency was not limited to human actors either. ANT recognizes non-human actors including abiotic actors like fire, flooding, and livestock which engage in relationships affecting the Trail.

ANT also accounts for resistance as a productive force, as discussed in Chapter Four. Conventional analyses pit resistance as negative or harmful to a project's goal. ANT shows that when networks encounter resistance, it can make them stronger. Resistance or refusal to enroll in a network means actors must change interpellations. As those new ways in which the Trail is important emerge, the network grows stronger. Rosemont Copper's proposed mine and seasonal fires and floods are examples of resistant actors causing enrolled actors to bolster their relationships. Unlike conventional analyses, resistance is not synonymous with degradation in ANT.

Drawbacks of Actor-Network Theory

For all its strengths, ANT presented a few inadequacies in this project. Chapter Four highlights ANT's inability to fit conventional English narrative structure. Its post-structural, present-tense nature cannot stand on its own without some historical context. We can describe a network and its composite relationships fully in the present tense but it will lack rigor and substance without explanation and justification. I provided some

context for the actors and relationships described in this study which necessitated an awkward shift between past and present tenses.

Another struggle ANT imposes is passage of time in terms of network development. It would be a boon to practical applications of ANT if it were describable in terms of network evolution. This project relies on phrases where one party interpellates another. Although some historical order is implicit in those statements, that is, that Party A enrolled before Party B and could spread the interpolation, it is not explicit. In this structural world, especially in Western cultures where temporal order is privileged, those applying ANT would use it in a temporal framework. Practical questions like “How can we posit this idea [today] to enroll others [tomorrow]?” and “When should this event occur to maximize interpolation/ enrollment?” explicitly rely on temporal order. ANT’s refusal to grapple with temporal considerations remains one of its most prominent weaknesses in practical application.

Although actor-network theory tries to get away from privileging humans, it may make that issue more acute. The language of ANT and its atemporal descriptions make it painstaking for the small population that it interests. To expect a general population to apply this theory is unreasonable. The essence of the theory, that the things we take for granted result from a network of relationships, is a valuable way to look at things as it begets appreciation and perhaps more deliberate use of resources. Unfortunately, the language of ANT research, this paper included, is too off-putting for this theory to catch on.

Limitations of the Study

Conducting this research and developing it as a paper presented several limitations. One way the study is limited is in its scope of research. I focused the study on Patagonia and the actors the actors around there while trying to describe the actor-network of the Trail. However, the Trail's actor-network is more expansive than that and includes actors more closely related with other network nodes that this study does not include. Due to that limitation, there are relationships I did not uncover and could not describe.

Another limitation to this study is that research began in 2011, over a full year after Dale Shewalter's death. Inability to interview Shewalter necessitated making some assumptions about relationships involving him and specific interpellations. I also had to piece together an historical timeline for the trail using information from sources connected to Shewalter instead of having Shewalter elucidate those relationships. Two interviewees had personally worked with Shewalter but did not know him in a personal enough context to fill out the network in his deep-seeded motivations.

Lack of documentation also limited this study. Many relationships that influenced the Trail's actor-network were not recorded. For example, there is no written record of changes in flora or fauna behavior at a small enough scale to consider in this study. Event sites from formal speeches made to community groups, conversations between individuals, experiences on the trail, to other actors' interactions and relationships left no evidence except in their impact on the network. Tracking down individuals who remember or have notes from those events led to filling in some gaps but much of the exact agency at those sites is lost.

Actors for whose relationships I relied on others' accounts for were another limitation. Due to the time constraints of completing this project, I was only able to participant-observe the physical trail during a brief window in the summer. The relationships I was not able to evince or observe may have influenced my depiction of the network. Monsoons and wildfires are well-documented and observing those was not necessary. Fine-scale choices trail users make may have provided some different relationship connections that they could not articulate (either by being subconscious actions or using a means of expression I cannot understand in the case of fauna or flora). Another time constrain I faced was of daylight hours. In the interest of safety, I did not observe the trail at night because I was alone during this research foray.

Future Research

Future research objectives could include broader applications of ANT across many disciplines. Any application outside information sciences expands possibility for ANT use. This project provides an approach and techniques useful for studying a trail or another type of amenity landscape like a park or ski resort. I recommend applying the same approach and methodology to other artifacts as well to expand the cannon of actor-network methodology. Expanding techniques to evince relationships between actors would be a boon to future ANT development.

Future applications of ANT could also expand on this study by observing and describing further out in the network. Researchers could develop techniques for more robust analyses of the role of non-humans, including abiota. Hard sciences or even less positivist approaches to ANT might have greater success with observation of those actors

and their role in the network. The constraints of this study also did not permit as much analysis of the role of broader social definitions and meta-cultural representations of ideas like trails, nature and amenity landscapes.

What does it mean for actor-network theory in the future?

This study provides a new application of actor-network theory and thereby expands the pool of application fields for future research. Its niche in ANT literature is described in Chapter Three and its most valuable contribution to the field is that it demonstrates ANT's applicability to a topic previously only explored in other disciplines. Actor-network theory opens new avenues for studying trail development and trail spaces. Previous studies of trails studied one or few variables and addressed topics such as visitor behavior, erosion, and representations in literature. Those studies explore only one relationship. ANT expands on those analyses in three ways. First, it promotes examination of any entity or idea connected to a trail. For example, this paper included economic considerations, influence of non-human beings, influence of abiotic factors, and more. Second, ANT explores how those entities affect physical and cultural representations of the Trail. And third, ANT calls for a network analysis of how all those factors affect one another.

To once again use the web metaphor, pulling one thread, that is, examining one actor, flexes all the threads attached to it. It is not possible to extract a singular actor without seeing the relationships keeping it in the network. Future trail development studies should address the multifactorial nature of trails. A study on lobbying US Congress for trail designation should include the ties of the congressmen to their home

landscapes, hobbies, and ecological and economic goals as well as the ties of the lobbyists to the same. The way those actors communicate with each other, how they interpellate to each other, and how the actors use their other affiliations in the new relationship are all valuable to analyze.

The methodology in this paper is a novel application of ANT outside of information technology. I answer the question “What does the Trail’s actor-network look like?” or more colloquially, “What is the Arizona Trail?” by questioning actors involved, observing abiota and non-human actors, and tracing relationships historically and presently. The actors in this study were only limited by what is observable to humans and what data were available. “What is []?” is a simple enough question to fit any vein of research. Any noun or verb, anything there is a name for, will fit in the brackets. And when we title something, we ascribe it meaning associated with the word. Language is used so cavalierly that traditional research approaches take objects’ and ideas’ assigned names for granted. Future applications of actor-network theory would unpack our reductive language to evince what the world we relate to is truly made of.

Works Cited

- Althusser, L. 1972. Ideology and Ideological State Apparatuses in *Lenin and Philosophy and Other Essays*. Monthly Review Press.
- Arizona Daily Sun. 2010. Dale Shewalter, father of the Arizona Trail, dead at 59. *Arizona Daily Sun* 12 January 2010.
- Arizona Trail Association. 1999. Planning Underway for ATA's Strategic Plan. *Arizona Trail Association News* 5 (4): 4.
- Snead, L. 2000. Executive Director's Report. *Arizona Trail Association News* 6 (1): 3.
- Braun, B., & Castree, N. (Eds.). 1998. *Remaking Reality: Nature at the millennium*. New York: Routledge.
- Carlyle, T. 1858. *The Collected Works of Thomas Carlyle*. London: Chapman and Hall.
- Cassirer, E. F., Freddy, D. J., & E. D. Ables. 1992. Elk responses to disturbance by cross-country skiers in Yellowstone National Park. *Wildlife Society Bulletin* 20(4), 375-381.
- Che, D. 2003. The New Economy and the Forest: Rural Development in the Post-Industrial Spaces of the Alleghenies. *Social Science Quarterly*, 84(4), 1-16.
- Corbett, R. 2004. New Canelo West Single Track Trail. *Arizona Trail Association News* 10 (2): 6.
- Deleuze, G. 1988 *Spinoza, Practical Philosophy*. San Francisco: City Lights.
- Deleuze, G. and F. Guattari. 1987. *A Thousand Plateaus*. New York: Continuum.
- Dilsaver, L. M. 1990. Conservation Conflict and the Founding of Kings Canyon National Park. *California History*, 69(2), 196-205.
- Fretwell, H. L. 2009. *Who is Minding the Federal Estate?* Lanham, MD: Lexington Books.
- Glasser, H. 2011. Naess's Deep Ecology: Implications for the Human Prospect and Challenges for the Future. *Inquiry*, 54(1), 52-77.
- Goedeke, T.L. and S. Rikoon. 2008. Otters as Actors: Scientific Controversy, Dynamism of Networks, and the Implications of Power in Ecological Restoration. *Social Studies of Science*: 38, 1: 111-132.

- Greenberg, J. B. and T. K. Park. 1995. Political Ecology. *Journal of Political Ecology* 1, 1-12.
- Hackenberg, R. A. and N. Benequista. 2001. The Future of an Imagined Community: Trailer Parks, Tree Huggers, and Trilateral Forces Collide in the Southern Arizona Borderlands. *Human Organization* 60 (2).
- Haraway, D. 1991. A Cyborg Manifesto: Science, Technology, and Socialist-Feminism in the Late Twentieth Century. In *Simians, Cyborgs and Women: The Reinvention of Nature*, ed. D. Haraway. New York: Routledge.
- 1996 *Modest Witness@Second_Millennium.FemaleMan©_Meets_Oncomouse™*. New York: Routledge.
- 2011 *Key Thinkers on Space and Place*. Ed. Phil Hubbard and Rob Kitchin. Los Angeles: Sage.
- Knight, R. L. 2000. Forest Fragmentation and Outdoor Recreation in the Southern Rocky Mountains. In *Forest Fragmentation in the Southern Rocky Mountains*, ed R. Night, 135-153. Boulder: University Press of Colorado.
- Latour, B. 1996. On actor-network theory: A few clarifications. *Soziale Welt* 47(4): 369-381.
- 1997. Trains of thought: Piaget, formalism and the fifth dimension. *Common Knowledge* 6: 170-191.
- Law, J. 1988. *Science in Action*. Cambridge: Harvard University Press.
- 1999. Complexity, Naming and Technology. in *Actor Network and After*, eds J. Law and J. Hassard, 1-14. Oxford: Sociological Review and Blackwell.
- Law, J. and K. Hetherington. 2000. Materialities, Spacialities, Globalities. In *Knowledge, Space, Economy*, ed J. R. Bryson. London: Routledge.
- Lyotard, J. 1984 *Post-modern Condition: A Report on Knowledge*. Minneapolis: University Of Minnesota Press.
- Mace, R. D., & J. S. Waller. 1996. Grizzly bear distribution and human conflicts in Jewel Basin Hiking Area, Swan Mountains, Montana. *Wildlife Society Bulletin* 24 (3): 461-467.
- McCarthy, J. 2006. Rural geography: alternative rural economies -the search for alterity in forests, fisheries, food, and fair trade. *Progress in Human Geography* 30(6): 803-811.

- MTBR. 2010. Thread: Dale Shewalter died on Sunday. <http://forums.mtbr.com/arizona/dale-shewalter-died-sunday-585037.html> (last accessed 11 November 2012).
- Murdoch, J. 1997. Inhuman/nonhuman/human: actor-network theory and the prospects for a non-dualistic and symmetrical perspective on nature and society. *Environment and Planning D: Society and Space* 15: 731-756.
- National Park Service. 2009. National Trails System Act. P.L. 90-543, as amended through P.L. 111-11. <http://www.nps.gov/nts/legislation.html> (last accessed 20 February 2013)
- National Park Service. 2013. National Trails System General Information http://www.nps.gov/nts/nts_faq.html (last accessed 03 March 2013).
- Neumann, R. P. 2005. Making Political Ecology. *Human Geography in the Making*. New York: Hodder Arnold.
- Patagonia, Town of. 2013. Come and Visit Us. <http://townofpatagonia.com/come-and-visit-us/> (last accessed 03 March 2013).
- Peet, R., & Watts, M. Eds. 2004. *Liberation Ecologies. Environment, development, social movements*. New York: Routledge.
- Perkins, H. A. 2007. Ecologies of actor-networks and (non)social labor within the urban political economies of nature. *Geoforum*, 38 (6): 1152–1162.
- Phillips, M. 2002. Distant bodies? Rural studies, political–economy and poststructuralism. *Sociologia Ruralis* 42 (2): 1–25.
- Povilanskas, R. and A. Armaitiene. 2008. Application of the Actor-Network-Theory for the Sustainable Tourism Facilitation in the Rambynas Regional Park. *Tiltai [Bridges]* 3: 103-117.
- Robbins, P. 2004. *Political Ecology. Critical Introductions to Geography*. Malden, MA: Blackwell Publishing.
- Schroeder, R. A., St. Martin, K., and K.E. Albert. 2006. Political ecology in north america: Discovering the third world within? *Geoforum* 37 (2): 163-168.
- Serres, M and B. Latour. 1995. *Conversations on science, culture, and time*. Ann Arbor, MI: University of Michigan Press.
- Sheridan, Thomas E. 1995. Arizona: The Political Ecology of a Desert State. *Journal of Political Ecology*: 2.

- Shouse, J. Arizona Trail Association. 8 September 2012, e-mail correspondence.
- Springsteen, B. 1978. Badlands on *Darkness on the Edge of Town*.
- USDA. Draft Environmental Impact Statement for the Rosemont Copper Project. <http://www.rosemonteis.us/draft-eis> (last accessed 3 March 2013).
- United States Forest Service. 1997. *USFS Multiple Use-Sustained Yield Act of 1960*: 1–4.
- Walker, P. A. 2005. Political ecology: where is the ecology? *Progress in Human Geography*, 29(1), 73–82.
- Whatmore, S. 1999. Hybrid geographies: Rethinking the 'human' in human geography in *Human Geography Today*, eds D. Massey, J. Allen, and P. Sarre, 22-40. Cambridge: Polity Press.
- Woods, M. 2005. *Rural Geography*. London: SAGE Publications.
- Zimmerer, K. S. 1994. Human Geography and the “New Ecology”: The Prospect and Promise of Integration. *Annals of the Association of American Geographers* 84 (1): 108–125.
- Zimmerer, K. S., and T.J. Bassett (Eds.). 2003. *Political Ecology. An Integrative Approach to Geography and Environment-Development Studies*. New York: Guilford Press.

Appendix A: ANT Vocabulary

Actor: Actors, all of which have interests, try to interpolate other actors so as to create an alignment of the other actors' interests with their own. Building those relationships creates the network. Common examples of actors include humans, collectivities of humans, texts, graphical representations, and technical artifacts.

Actor Network: A heterogeneous network of aligned interests and entities influential to those interests. Actors and event sites are nodes. Relationships (including problematization and interpolation) are arcs connecting nodes. The actor-network is animate and dynamic. Although the actor-network lacks restrictions on size, for the purposes of this paper, the network is bounded by what is necessary to sustain the physical artifact vis-à-vis its problematization.

Black Box: An everyday object or term whose provenance and meaning we take for granted (Latour 1997). The black box obscures the actor-network within anything.

Enrollment: The moment that another actor accepts the interests defined by the focal actor. Also the moment when that actor joins the network.

Event Site: A temporal occurrence when something happens that engages actors. This is a way of describing occurrences in colloquial temporal terms while maintaining the integrity of actor-network parlance.

Focal Actor: An actor that expresses a problematization, establishing itself with a primary role in network creation.

Interest: An idea or value an actor holds that can be problematized. The same interest may need to be presented many ways in order to translate to the greatest number of actors.

Interpellation: The second moment of translation which involves a process of convincing other actors to accept definition of the focal actor and its problematization (Callon, 1986).

OPP: The obligatory passage point, broadly referring to a situation that has to occur in order for all the actors to satisfy the interests that have been attributed to them by the focal actor. The focal actor defines the OPP through which the other actors must pass through and by which the focal actor becomes indispensable- *because the focal actor's participation in the OPP is what makes it an OPP*. A node in the network through which actors' interests converge. A point of problematization. An OPP defines the network's action problem or goal.

Problematization: The first moment of translation during which a focal actor expresses desired outcomes and identifies interests of other actors that are consistent with its own.

Refusal: When an actor commits an action contrary to the goal or problematization of the actor-network. Refusal can strengthen or degrade the network or both.

Translation: The entirety of the **problematization, interpellation, enrollment** process.

