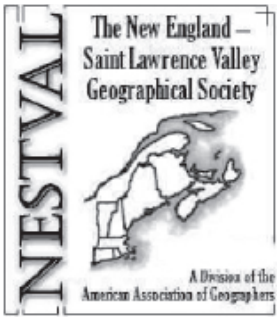

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FANDOM ON THE AIR:
Assessing Regional Identity Through College Football Radio Networks

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ABSTRACT

Sports fandom represents a significant aspect of place identity, as demonstrated by the colorful landscapes associated with team loyalty. However, there has been little research on the geography of sports fandom. While several geographers have studied the link between Southern regional identity and the sport of stock car racing, American football is the most popular spectator sport in the United States, and it seems to have a particular strength in the United States South. Therefore, examining the geography of football fandom can add depth to the study of place identity. A 1988 article by Roseman and Shelley on the geography of collegiate radio football broadcasting serves as a milestone and our inspiration here. Using data on college football radio coverage as our proxy, we mapped college football fandom for the "Power 5" conferences. Our results show that state borders continue to have an important influence on the geography of college football fandom, but we also identified a strong region of identity in the South. Our results support the theory that place identity can be fruitfully examined using quantitative data, although many questions remain about how sports fans contribute to the making of place.

Key words: place identity, fandom, American football

Introduction

Sports fans do more than participate in the celebrations and disappointments of victory and defeat on the field; they also contribute to the making of place and place meaning. Teams are almost always closely identified with places such as cities or states, and a team's very name directly connects it to place; indeed, "naming is the foundation of identity formation" (Alderman 2015, 36). A Yankees fan who lives in New York might feel personally vindicated by every Yankees victory through this kind of identification between a fan, a place, and a team (Guschwan 2011). The cultural landscape reflects sports fans' identities in a variety of ways. Stadium construction is supported by public subsidies (Nielson 1986). Teams and their fans

literally color the landscape through their logos and names on billboards, businesses, T-shirts, yard banners, and car flags. Through fans' purchases of these items and their pilgrimages to the stadium or "spectate" (Bale 2003) that necessitate the buying of tickets and concessions, sports teams are also major economic actors in local and regional economies. These many interactions between sport and place help sports contribute to the alignment of broad regional geographies which are at once economic, social, and cultural.

College football is a major component of American culture, particularly in the South, and this is made evident in many ways. For one, colleges and universities have in recent decades begun spending many millions of dollars on the sport. Even while most football programs lose money (Poliakoff and Zhang 2016), the ultimate financial goal for institutions is to join the ranks of the top college football programs which earn as much as large private corporations. For example, in 2011-2012, the University of Alabama spent $37 million on its football program and earned $82 million (Jessop 2013). Financial success and status in college football is often made evident by a college or university's membership in an athletic conference. For example, the Southeastern Conference (SEC) outspends and out-earns all other conferences, and six of the top revenue-generating programs in the United States are members of the SEC (Berkowitz et al. 2016). Additionally, football is also the largest participant sport in high schools in the United States, particularly in the South, structuring the autumn lives of millions of children and their parents (NFSHSA 2016). Football has replaced baseball as "America's pastime," perhaps because football has better suited the cultural and political needs of the United States since the sport became popular at the turn of the twentieth century. This has been especially true in the South. In the game's intercollegiate infancy, Southern teams approached the sport with a decisive vocabulary of antagonism against the North that was reminiscent of the "Lost Cause." Teams would travel to be beaten by Northern opponents but would use the warlike rhetoric of "northern invasions" to describe the trips and return "home to congratulations for having defended the honor and traditions of the South" (Doyle 1997, 29). The interest in winning, aggressive mindset, and competitive spirit encouraged by football still strike a chord in the South today where these values are internalized and intensified amidst an ever-present backdrop of the surrender by the Confederacy at Appomattox. Wes Borucki (2003, 480) rightly states that "analogies between football and the Civil War cannot be overdrawn."

The connection between a warlike attitude and college football is not unique to the South. According to sociologist Montez de Oca (2013), business leaders and politicians all over the United States saw in football the imagery necessary for fostering an appropriate mindset for an impending threat during the Cold War: soldiers lined up on the battlefield, violence was brought to bear against an enemy using defensive strategies of containment, and there was even the thrill of an offense throwing the "bomb." The sport of football seemed to serve multiple cultural, economic, and political purposes. In the era of globalization when the social construction of regional identities through nonlocal relationships has intensified (Anderson 2016; Paasi 2003), people often turn to football fandom. This sports culture is highly commodified, and United States college football has participated in this by attracting large commercial enterprises, exploiting every avenue of mass media and intensive marketing. Even at the very local scale, in hundreds of high schools, football seems to saturate the Southern lifestyle. According to Pierce and Jackson, "football is the most important sport in the United States

South because football holds communities and towns and neighborhoods together. It bonds southerners of different classes, circumstances, races, and religions in ways no other activity has ever done" (2012, 40). This paper seeks to further explore and document this connection between regional identity and college football using the geography of radio broadcasting as our data source.

Literature

Since the 1970s, there has been a tremendous increase in scholarship on the social aspects of sport (Frey and Eitzen 1991; Oriard 2001; Washington and Karen 2001). Several studies (e.g., Wann and Branscombe 1993; Ben-Porat 2009; Ratna 2014) have demonstrated the potentially powerful role of sports fandom in the construction of individual and group identity. However, little of this research is geographically based, and almost none attends to how sports relate to regional identity. The major geographic analyses of sports focus on such topics as competitive strength of conferences (Morgan and Klimasewski 2015), the diffusion of a sport (Rooney 1969), the geographic patterns of recruiting (May 2012), and the making of particular places through sports (Gumprecht 2003). Outside of geography, scholars have noted that place is central to the power of the spectator experience. Analyzing the sports fan experience, sociologist T. R. Young (1986, 8) wrote, "There can be no greater solidarity than dozens, thousands, millions thinking, doing, and feeling the same things in the same place at the same moment." Therefore, the geographical aspects of such solidarity deserve quantitative scholarly analysis.

Geographers have demonstrated the power of vernacular regions (e.g. Ambinakudige 2009; James 2010), and while the leading texts on sports geography (Rooney 1974; Bale 2003) give little attention to regional identity, sports fandom might legitimately be considered a force in the establishment of those regions. One seminal paper by Rooney (1969, 471) does argue the important point that "fan loyalties are probably among the strongest of human attachments, and their regional boundaries are...functionally organized via major sports radio networks," but Rooney's claim for radio's role has been investigated only once, by Roseman and Shelley (1988). We seek to build upon that study from thirty years ago.

Place Identity and Sports Fandom

Fandom has the power to create, maintain, and facilitate strong place attachments and identities. This is true in the examples of naming (see Gunderman and Harty 2017 for the case of music fandom), alterations to the cultural landscape (Alderman 2008), and sports game attendance (Harris 2008). However, it importantly remains true too for sports fans removed from the physical space where their teams compete. Often, a fan removed from the gameday spectate will engage in other expressions of fandom that equally constitute placemaking practices. These practices reflect emotional attachments to a place. It is important to acknowledge that "multiple places...influence fan identity" (Baker 2018). Unlike the placemaking and collective identity construction that occurs at a localized scale through the gameday tourism experience (Harris 2008), remotely "attending" a sporting competition can

foster a fan's attachment to just about any place. Following a game "on the air" may induce emotions of nostalgia for alumni or devoted fans for past experiences in the sporting arena (Zhang et al. 2018), but it may also serve to meaningfully and imaginatively connect the fan's physical location to a larger fan community spanning a greater geographic space. It is when this occurs that we can begin to speak about collective fan regions or footprints.

Kraszewski (2008) and Baker (2018) use the concept of home to view this connection between fandom and place attachment, specifically in the cases in which fans are removed from the gameday spectate. Home is a nuanced concept increasingly studied by geographers that couples tangible sites, structures, and spaces with intangible emotions and senses of belonging. Like identities, home is not a static concept; rather, it is fluid and is defined and redefined by those who construct and inhabit this "spatial imaginary" (Blunt & Dowling 2006, 2). The very ideas of "sport and home are intimately connected" (Baker 2018, 15). Indeed, "a primary function of sports fandom in contemporary America [is that] it allows displaced populations to negotiate home and home identities" (Kraszewski 2008, 140). This is a geographic process by which people imagine themselves and their sense of belonging in relationship to the places where sport and fandom are meaningfully conducted. Radio allows fans listening *in* to feel a strong link between their own location and that of their chosen team through a vicarious performance of fandom. Like the concept of home itself, this can operate at every scale, from the local town rivalries to national and international identities (Blunt and Dowling 2006). For example, in Nebraska, a state known for its strong college football fandom (Aden & Titsworth 2012), a survey found that most respondents held a rather negative attitude toward soccer with many agreeing with the statement that the sport is "un-American" (Lindner and Hawkins 2012). Foer's (2004) book, *How Soccer Explains the World*, argues that this negativity toward soccer is a defensive attitude in the face of globalization; this is a clear example of place identity operating at the national scale.

Media consumption is one way fans express their fandom, negotiate their ideas of home, and imagine themselves within larger communities (Anderson 2016). Baker (2018, 13-14) discusses these as "virtual" spaces of fandom. The use of media that can reach a wide geographic audience lends itself to a larger debate about the effects of globalization and the extent to which modern sport has become placeless (Bale 1998). However, media information "always has a geography [and] helps define how we understand and create places" (Poorthuis et al. 2016, 248). Kraszewski's (2008, 143) research on television and professional football fandom illustrates this: "NFL regional telecasts [invite] viewers and fans to attach other regional aspects of sporting culture to the football club. The interweaving of television markets and local cultures render regions which are always made up of competing and conflicting notions of home." While the game itself is national, its media broadcast is regional. A regional structure of broadcasting sports is not random; it is economically motivated because networks acknowledge the consumers' notions of home and market to them. This holds true for both radio and television regional markets; radio has an "inclusionary potential" (Wilkinson 2015, 132), especially because it is accessible to a wider range of audiences in less accessible geographies (Pompeii 2015, 796). Both create and contribute to home and facilitate place attachment to the consumer.

Of the many geographic scales of home ranging from the body to the nation and even the globe (Blunt & Dowling 2006), the region is an important collectively constructed place wherein its inhabitants infuse it with social and cultural meaning and, in this placemaking process, develop an attachment to the region that informs their identity. For people both within and outside of it, the region can be a "placed" representation of home. Paasi (2003, 475) argues for a renewed critical understanding of regional identity as a socio-political phenomenon within geographic experience: "(P)eople's awareness of being part of the global space of flows seems to have generated a search for new points of orientation, efforts to strengthen old boundaries and to create new ones, often based on identities of resistance." This critical approach to regions in studies of geography, home, and sports is important. We do not use the term lightly or assume the physical existence of regions but rather understand them as constructed, fluid, dynamic, and relational entities (Wilson 2017, Nagel 2018). Yet, scholarship dedicated to studying regions actually facilitates their social existence (Powell 2007, 7), and their popular recognition makes them a materially, economically, politically, and socially important geographic scale that deserves continued study and analysis. Published studies of regional identity within grounded social phenomena such as politics (Cooper & Knotts 2010), foodways (Davis & Morgan 2015, Kelting 2016), and both economic and symbolic capital (Alderman 2015) demonstrate the resilience of the importance of regional identity in modern scholarship within and outside of geography.

For Paasi (2003, 477), "narratives of regional identity lean on miscellaneous elements: ideas on nature, landscape, the built environment, culture/ethnicity , dialects, economic success/recession, periphery/centre relations, marginalization, stereotypic images of a people/ community , both of ' us' and ' them' , actual/invented histories, utopias and diverging arguments on the identification of people. These elements are used contextually in practices, rituals and discourses to construct narratives of more or less closed, imagined identities." Sport is one such ritual that "carr[ies] a regional language of identity" (Kraszewski 2008, 141). Sports fandom is always a tangle of many meanings which can have deep historical, cultural, and social significance. A wide array of research shows that sports fans often invest considerable emotion and meaning in their mediated experience of sports events, including negotiation of their social identities (Kim et al. 2017). While the modern world has created a culture of individualistic selves that are isolated, even cast adrift, sports fandom and place identity may function as "horizons of significance" by which people seek to authentically define themselves (Taylor 1991, 39). Fandom functioning as both a miscellaneous element (Paasi 2003) and a horizon of significance binds people together and buttresses the construction of collective identity. Through sport and fans' geographic negotiations of belonging and home, cultural narratives are written, identity is imagined, and places are created. Drawing upon existing literature and current data, we argue that college football fandom contributes to the formation and maintenance of regional identities in the United States.

In 1988, the fledgling journal *Sport Place* published a study by Curt Roseman and Fred Shelley examining the radio coverage of United States college football. The authors sought to assess the "experience of college football in places away from the stadium" (Roseman and Shelley 1988, 43). Radio has a long history as an instrument for the diffusion for sports information, the recruiting of team fans, the promotion of ticket sales (Howard and Crompton 2007), and

fundraising from donors. Roseman and Shelley were among the first to recognize something larger in scale: sports fans' place identity.

Stock car racing was demonstrated by Pillsbury (1974) and later Alderman et al. (2003) to be important to identity in the United States South, but these authors recognized that this sports identity is no simple matter. Southern regional identity has always been complicated by relations with other regions. Southerners, particularly working-class white males, might want to claim stock car racing as their own. But the nationalization and corporatization of the sport has constrained such simple identification. None of these geographic studies empirically assessed the patterns of fandom itself, and geographers have not mapped where sports fans are identifying both with their team and region. We may then ask, what are the dimensions of fandom's role in place identity?

Data on mass media can provide some answers to such a question. The power of the media in identity formation has already been established (e.g., Anderson 2016; Horton and Wohl 1956; Zagacki and Grano 2005). Questions of identity are mentioned in recent geographic studies of sports such as Andris (2018, 479) and Zeitler (2013, 35-36). However, Roseman and Shelley's paper represents a path initiated - but then mostly neglected - of using mass media data to spatially assess and analyze sports fandom and cultural place identities. Their paper importantly demonstrated the usefulness of the geographic analysis of media, and this work continues today (see Andris 2018 and Zeitler 2013). However, the application of such analysis to regional identity or fandom has been largely neglected; we seek to build on their initiative by integrating new data, modern GIS technologies, and sound cultural geographic frameworks.

Mass media networks are much larger today than in the 1980s, as sports fans can follow the action through a wide array of cable and satellite television and even streaming websites. But one format remains the staple for many fans because they can access it while traveling: radio. Television is perceived to be the leading format for mediated sports experience, but radio has a higher "penetration" of United States households than television (Nielsen data cited in Dunn 2017). This may be partly because even loyal fans who can afford access to television and internet follow their teams while either working or driving; they cannot stop to watch a screen, so radio coverage of a team's performance has a critical role. We therefore agree with Roseman and Shelley (1988, 50) who argue that "the radio audience may be generally more reflective of true fan support for a particular team than the television audience."

In their geographic analysis of college football radio stations, Roseman and Shelley included a wide variety of schools, not just those in the prominent conferences. They examined different spatial distributions of radio affiliates, specifically for the year 1987, across the United States for many different teams and constructed different types of fan bases using these distributions. Their main conclusion was that state borders play an important role in the delineation of fan regions (Roseman and Shelley 1988, 43). In Paasi's (2003) terms, college football fandom seems to reinforce identification with the state where a fan resides. One of our goals is to assess this conclusion in the light of new data, changes in technology and organization, and recent literature on sports and identity.

Data and Methods

For their study, Roseman and Shelley (1988, 43) mailed surveys to the sports information director at each university whose football team competed in the NCAA Division 1-A (the modern-day Football Bowl Subdivision or FBS) and Division 1-AA (today's Football Championship Subdivision or FCS) along with "a few others located in regions lacking major universities in the first two categories." Their response rate was about 77 percent. Because radio broadcasting information is now available online, the current study can rely on more comprehensive data. The present study limits its scope to the "Power 5" conferences: the Atlantic Coast (ACC), Big Ten (B1G), Big 12, Pacific 12 (Pac-12), and Southeastern (SEC) conferences. The Power 5 represents only 64 of the approximately 350 Division I football schools, but because of their schools' large budgets and the advertising power they hold in the media, these conferences dominate the spectator experience of college football (Burnsed 2014; Smith 2015; Wolohan 2015). A focus on these five premier conferences is frequent in the current study of college football, although the membership in these and other conferences is far from stable. At the time of Roseman and Shelley's publication, quite a few colleges and universities competed in major sports without belonging to a conference; this has since become rare. Abbott's (1990) study of college athletic conferences' connections to American regions used 1987-1988 data and is thus outdated; several conferences he examined no longer exist. Even Morgan and Klimasewski's recent (2015, 216) research on the preeminence of Southern collegiate football was based on the Bowl Championship Series, a now defunct system that preceded today's College Football Playoff system. Morgan and Klimasewski also focused solely on the "dominant conference[s]" of that time - the year 2013 - then the "Power 6." The Big East Conference has since dropped from this prestigious standing, so we focus on the remaining conferences, the "Power 5." Notre Dame and Brigham Young University, currently independents belonging to no conference, and the United States Air Force Academy, a Mountain West Conference member institution, were also included for comparative purposes.

Each university examined here maintains a webpage on its institution's official athletic website that lists all of the radio station affiliates that broadcast football games. Some webpages provided locations from which the stations broadcast while others did not. In certain cases, further research was necessary to determine the locations of the studios (and not the radio towers) that broadcast the games. While there is a great deal of difference between FM and AM radio stations in the quality, wattage, and range of the signal, no distinction between the two were made in this study because, as with the 1988 study, the data is expressed using points rather than polygons to display the radio network's geographic reach. The area an AM station can serve might differ greatly based on the station's wattage and even the time of day. This makes mapping AM stations' ranges difficult. Point data (station location) is our only readily available data on radio's spatial reach, so it serves as a surrogate for polygon data, leaving for now some limitations on our analysis of radio patterns. Each institution's radio locations were batch geocoded to obtain these points spatially and then examined team by team.

Roseman and Shelley identified five categories radio networks could fit into: single-station local coverage, single-station extended area coverage, within-state regional coverage, state saturation, and multi-state coverage. We also include five categories. However, the first category of single-station local coverage did not apply to any of the Power 5 teams' networks studied here, so it is excluded. The fifth category then comes from our split of the "state saturation" category into "state saturation" and "statewide coverage" categories for the sufficient differences between the two.

No previous quantitative geographical analysis of fandom has examined football conferences. The prior literature on athletic conferences and their current prominent role within intercollegiate athletics mentioned above not only dictated the teams on which to focus our study but also which conferences as a whole to examine. Abbott (1990) has already shown that there is some correlation between the geographies of athletic conferences and the major US cultural regions. We therefore believe that studying footprints of fandom at the larger conference scale can lend further insight into the connection between sports fandom and cultural place identity.

One of our assumptions is that the geography of radio sports broadcasting reflects demand from the fans. In other words, where there are sufficient fans, radio sports coverage will follow. We recognize that other factors influence the geography of radio sports coverage, such as the pattern of available radio stations, which in turn depends on several factors. In the case of collegiate sports radio, there are other qualifications. For example, the radio coverage could depend less on the ability to sell advertising and more on the size and budget of a given college's athletic program. In any case, the presence of a sports show on a radio station is assumed to indicate significant fan demand for that show among the listeners in that area.

Results

Teams

State Saturation

Most Power 5 teams exhibit a pattern of coverage which Roseman and Shelley called "state saturation" (1988, 45-46). This means that a university's radio coverage matched rather closely to the borders of the state where that school was located. This broadcasting method may reflect a rational strategy of many "comprehensive public universities" (44). Roseman and Shelley also found that most such universities exhibit this pattern. Our results show that 38 out of 67 (57 percent) studied teams' radio networks exhibit a state saturation pattern. Stations carrying these teams' football programming thus commonly blanket that school's home state, making football games available to listeners anywhere within the state's borders. An excellent example of this pattern is demonstrated by The Ohio State University, located in Columbus, OH. Figure 1 A shows how Buckeye fans can listen to games all across Ohio as radio stations blanket the state and line the Ohio River at numerous cities. A couple of radio stations are even located just across the border in Kentucky and West Virginia.

Roseman and Shelley (1988, 46) noted several variations of the state-saturation pattern. Sometimes the coverage is statewide but not as thorough as Ohio State's. Indiana University was cited as an example of this: Hoosier stations skirted West Lafayette, "the home of Purdue University, Indiana's other comprehensive university and prime sports rival" (46). This phenomenon is still true with the Hoosiers' modern day network shown in Figure 1 B (though the pattern exhibited truly fits the "statewide coverage" category discussed later). The absence of an Indiana station around West Lafayette raises a question: could a state that hosts two Power 5 universities see its state saturated by either team's radio stations? Is the lack of an in-state rival for Ohio State the reason for their saturation? Upon examination, however, it is true that in most instances, rival schools within a state do not have mutually exclusive areas around their campuses; instead, there is often an overlap in coverage. Consider Texas, a state known for its "high-quality play...over a long period of time" (Rooney 1969, 491). The University of Texas at Austin and Texas A&M, rival programs that now find themselves in different conferences, both offer coverage to the entire Lone Star State. With nearly twice the stations, Texas A&M (Figure 1 C) more truly saturates the state than does Texas, but both Aggie and Longhorn fans from El Paso to Amarillo to Houston can listen to their team's football games. Neither is there a noticeable region of absence from either school's network near the other's campus; Texas A&M even has an affiliate in Austin. While Indiana's radio coverage avoids its rival's immediate territory, this is not always the case.

The classification of "state saturation" is itself problematic because of the vast difference in size of the fifty states. Texas is the largest state by area in the continental United States, so Texas A&M's ability to support 62 affiliates to truly saturate the Lone Star State is impressive. However, state saturation status must also be given to Rutgers, New Jersey's flagship public university. Figure 1 D shows that the Scarlet Knights only support four radio affiliates, but because of New Jersey's smaller size, one can hear Rutgers football games in nearly every corner of the state as well as Philadelphia and New York City. This problem of a variation in state size will reappear in the multi-state coverage where Boston College (Figure 2 E) fails to truly saturate Massachusetts but has stations in four surrounding New England states. These variations all go to show that the idea of "state saturation" has been loosely defined, but as it will be argued later, this classification matters because of the power that state borders have in bounding collegiate football fandom.

Statewide Coverage

Roseman and Shelley (1988, 46) also observed some networks that provide "statewide coverage but [where] true saturation occurs only in part of the state" (46). Schools that exhibit this pattern were still included in the larger "state saturation" category in the original article, but even there, the distinction was made within that category. Syracuse is an institution the authors used to illustrate this qualified statewide coverage pattern because it "saturate[s] nearby areas and also extend[s] coverage to more distant large markets" such as, in this case, New York City. Figure 2 F showing Orange coverage in New York state looks very similar today with the area around Syracuse more densely saturated and the more distant cities of Albany, Massena, and

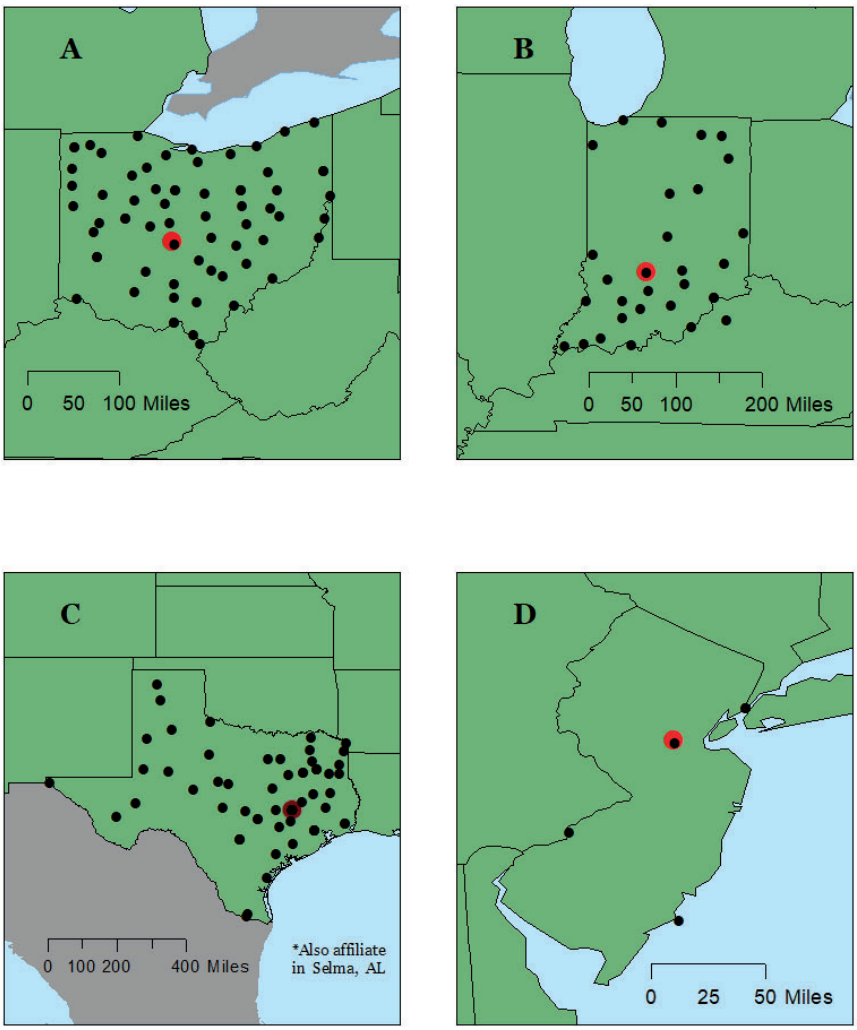


Figure 1. Radio affiliates of (A) Ohio State, (B) Indiana, (C) Texas A&M, and (D) Rutgers.

New York also offering a signal. Other teams such as Indiana (mentioned earlier), Texas Tech, Miami (FL), and Duke exhibit similar patterns. 9 out of 67 teams (13 percent) exhibit statewide coverage. While this pattern necessitates that a state has full coverage, the density of the stations is significantly different enough from the "state saturation" category that it has been presented here as its own category.

Within-State Regional Coverage

A prominent distribution pattern outside of state saturation is "within-state regional coverage." This has been defined as a grouping "of networks, usually three to seven stations, located within a certain region of a state" (Roseman and Shelley 1988, 45). 9 out of 67 teams (13 percent) exhibit within-state regional coverage. A perfect example of this type of coverage is Vanderbilt's radio network. Vanderbilt is situated in Nashville in the Middle Tennessee region. Of its nine stations shown in Figure 2 G, seven are within Middle Tennessee; only the urban centers of Memphis and Chattanooga partially extend coverage of the Commodores to the other regions of Tennessee. All of Vanderbilt's Middle Tennessee affiliates lie in or between Nashville and Huntsville, AL. Surprisingly, no station exists in Clarksville, a Middle Tennessee city to the north of Nashville. One quality Roseman and Shelley (1988, 45) observed in schools that exhibited this pattern in 1987 was that they were often located "in places distant from the comprehensive state universities." Vanderbilt is a private school and competes for territory with the University of Tennessee, Knoxville, the Volunteer State's flagship and most well-known university. The University of Tennessee radio coverage saturates the entire state, which perhaps renders it more difficult for the smaller Vanderbilt to establish the same fanbase through all of Tennessee. Additionally, Vanderbilt sees competition in West Tennessee from both Memphis and Ole Miss, is bound to the north by the University of Kentucky, and even shares space within its own south-of-Nashville region with the University of Alabama. Rather than attempting to establish a broad network, the Commodores instead cater particularly to the Middle Tennessee fans.

This study identified a pattern quite similar to the one seen in the Roseman and Shelley (1988, 45) study where "a few of the regional networks are rather extensive." These networks exceed the single-digit station count of typical networks with regional coverage but do not offer statewide coverage because they are still concentrated within a state's region. The University of Pittsburgh was designated by Roseman and Shelley to have statewide coverage because of stations in Scranton and Philadelphia offering East Pennsylvania coverage. The newest data in Figure 2 H shows a shift from this statewide coverage to a Pittsburgh-based network that has concentrated within Southwest Pennsylvania. The network no longer offers coverage from Philadelphia and Scranton; the easternmost stations are now at Harrisburg and York. Every other station in the network lies within a 100-mile radius of Pittsburgh within the Pennsylvania state line. Residents of bordering parts of Ohio and West Virginia are more able to hear Panthers games than those of Philadelphia. Today, the network has only one station fewer than it had in 1987, but their cumulative spatial dispersion is more concentrated now than in the past. Perhaps the presence of the highly successful program of Penn State located in the center

of Pennsylvania limits the urban school of Pittsburgh's reach into the rest of its home state. Therefore, the Panthers' network is an excellent example to show that within-state regional coverage does not have to inherently exist as a category for networks with few stations.

Multi-State Coverage

The most geographically wide-reaching coverage category found to exist in 1987 was "multi-state coverage" in which the radio stations of a team's network vastly go beyond the boundaries of the state where the institution is located. These few cases reflect instances in which state borders that are normally so instrumental in bounding collegiate fan bases are transcended for one reason or another. Roseman and Shelley found only eight schools to support multi-state coverage: Illinois, Nebraska, Oklahoma, Southern California, Washington, Notre Dame, Air Force, and BYU. Of these institutions, only Nebraska, Notre Dame, and BYU have retained a network with multi-state coverage; Alabama, Auburn, Penn State, Florida State, and Boston College have risen to join this group. 8 out of 67 teams (12 percent) exhibited multi-state coverage. It is worth examining some of these networks in detail. Roseman and Shelley (1988, 43, 45, 50) saw the multi-state coverage pattern as a rarity that often could be connected to external geographical trends not directly related to football such as out-migration from states to locations "where career opportunities are greater," tourism, and religious affiliation.

Boston College (Figure 2 E) is an odd member in this multi-state category because, as mentioned above, the Eagles' network fails to truly saturate the relatively small state of Massachusetts, but its stations can be found in four other New England states. Just as Rutgers achieves state saturation by the nature of New Jersey being small in size, so Boston College benefits from being the only Power 5 team in the multi-state region of New England. New Englanders identifying with Boston sports teams is no new phenomenon; the Greater-Boston-based Patriots professional football team even use the region as its place-name, reflecting this trend.

Florida State, Auburn, Alabama, Penn State, and Nebraska are good examples of the paradigm of multi-state coverage. These networks all saturate the state of the team in question and spill across state lines into bordering states. While Nebraska (Figure 3 I) no longer fosters the vast radio network from Texas to California (which Roseman and Shelley attributed to the history of migration out of Nebraska), but the university still maintains many stations in medium-sized cities of neighboring states along with one in Las Vegas as a result of those old migration patterns. The Cornhuskers benefit from the lack of a Power 5 rival in the Dakotas to the north, and their exceptionally passionate fanbase has helped them maintain this extensive pattern of fandom (Aden & Titsworth 2012).

A tradition of excellence on the gridiron and exceptional fandom seem to reinforce one another for all four of these institutions, and that perhaps explains their multi-state coverage. Indeed, football fan identities can reach an almost religious intensity, the state of Alabama being the leading example. Teams in the Heart of Dixie have been some of the most successful programs coming out of the South, a region where college football is "woven into its civil religion" and interacts constantly with its culture (Bain-Selbo 2009). As of 2019, nine out of

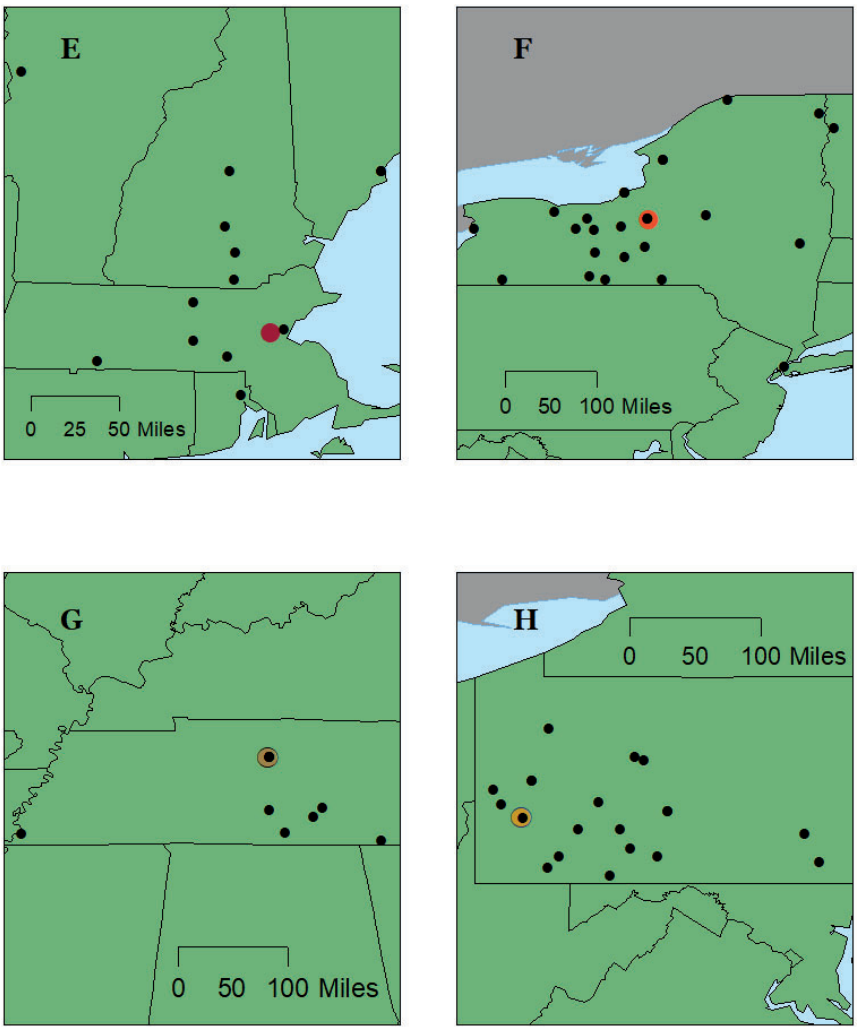


Figure 2. Radio affiliates of (E) Boston College, (F) Syracuse, (G) Vanderbilt, and (H) Pittsburgh.

the previous ten college football national championship games have featured either Auburn or Alabama, and six of those have been victories. This is important because for Southern teams, "athletic superiority...is a flattering story that offers a basis of keen regional pride and serves as a source of relentless bragging rights" that is "likely one of the strongest forces defining regional identity in the South" (May 2012, 50; Morgan & Klimasewski 2015, 216). This quasi-religious fandom may have a stabilizing social function in the United States South where society suffers from strong divisions in race and class. "The structures of privilege, inequality, and oppression are left intact" by such fandoms (Young 1986, 9), and so challenges to the order can be dismissed. The passion and religious-like fervor of the Alabama and Auburn fanbases can be seen geographically by their multi-state coverage radio patterns; each have stations in Tennessee, Mississippi, Florida, Georgia, and South Carolina as well as a comprehensive saturation of Alabama itself (Figure 3 J).

Brigham Young University is another university where religiosity seems to play a role in the geography of fandom. Roseman and Shelley (1988) noted that its radio network's spatial pattern is a fairly close match to the Mormon Culture Region described by Meinig (1965). This pattern is concentrated in the region of the Interior West and is centered on Utah, but the region, like the Cougars' radio network, extends up and down the Rocky Mountains. While the number of stations for BYU has been halved since 1987, the spatial distribution of the stations remains largely the same and continues to reflect the connection between the "religious heritage of the university" and the "unique sport-place relationship...expressed by the [radio] network" (Roseman and Shelley 1988, 50).

Just as it was in 1987, the most extensive network in all of college football today and certainly the only truly national network is supported by the University of Notre Dame. Another private institution with religious affiliations, the Fighting Irish radio network displayed in Figure 3 K "extends truly from coast to coast" (Roseman and Shelley 1988, 50). They attribute this national coverage to the university's well-known connection to the Catholic Church and subsequent appeal to fans all over the United States. Like BYU, Notre Dame has had their number of radio affiliates halved since the original study was conducted, but the essential outlook of the Irish's fan region is the same; 110 stations span from San Diego to Miami and from Seattle to Boston.

Single Station Coverage

The last category identified by Roseman and Shelley (1988, 45) was that of single-station coverage. This type of coverage was more common in their study due to their more comprehensive look at a variety of institutions rather than just the ones from the most prominent conferences, and therefore they divided it up into stations with local or extended-area coverage. The latter fits best for the 3 institutions (out of 67, 4 percent) that fall into the category today: Utah, Stanford, and Northwestern. These schools "are located in major cities" and "have access to powerful stations" (45) from which to broadcast their games. These stations can often be registered for a great distance around the city from which it is broadcast and sometimes into neighboring states. Utah and Northwestern have maintained their single-station status since 1987, and while Stanford was not included in the original study, its similarity in urban location may indicate stasis as well.

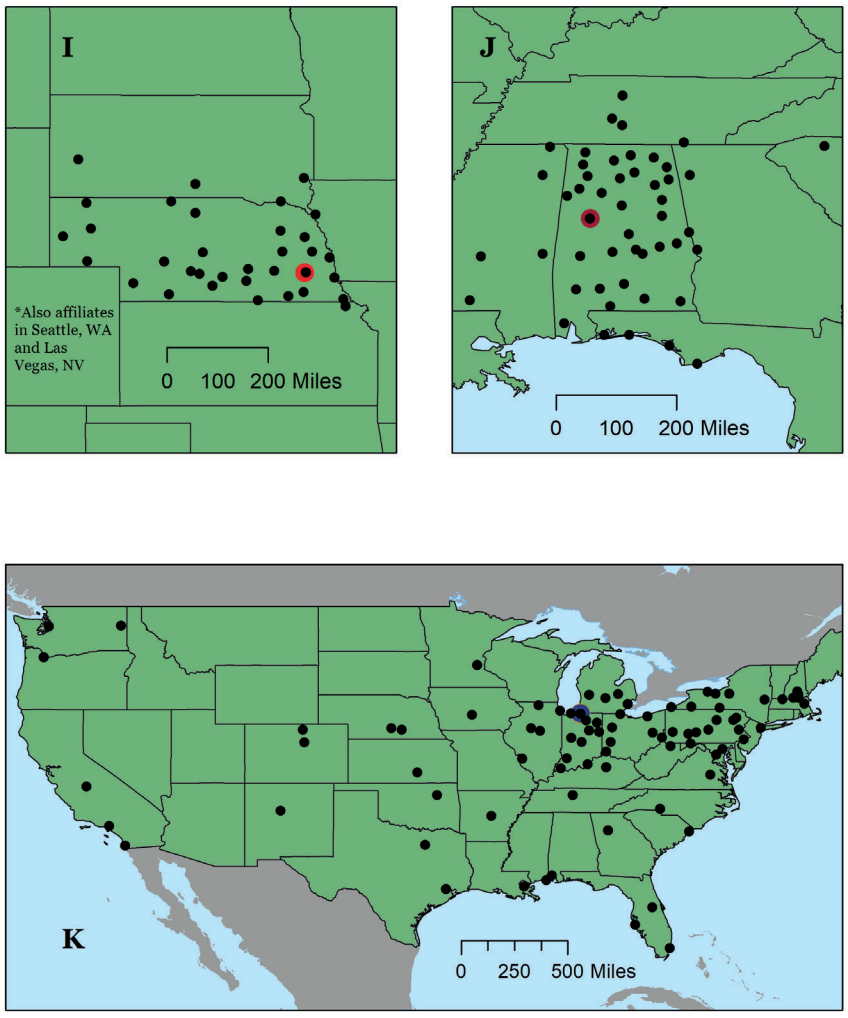


Figure 3. Radio affiliates of (I) Nebraska, (J) Alabama, and (K) Notre Dame.

Conferences

In order to study regional identity, we must examine regions at multiple geographic scales. Roseman and Shelley (1988) demonstrated the power of state borders to organize fandom and proposed that many college football fans were identifying with their state of residence. Considering the limited literature on the correlation between fandom and regional identity, we use our same data to analyze broader regions in the context of fandom and identity.

Radio stations broadcasting for members of the Power 5 football conferences were mapped using the same data as in the analysis above. Figures 4, 5, and 6 show the aggregates of the team-level data for each of the Power 5 conferences. While our sample size (n=5) is too small to construct meaningful categories for these data, certain spatial discrepancies at the conference level are immediately apparent. For instance, the radio affiliates of the Pacific 12 saturate the West much less than its counterparts do their respective regions. The use of points to represent the data here lends itself to "the problem of overplotting," (Poorthuis and Zook 2015, 153) and this is especially true with the aggregated Pac-12 map. As shown in Table 1, the number of teams from the Pac-12 saturating their states (4/12, 33 percent) is lower on average than those from the Big Ten (12/14, 86 percent) or SEC (13/14, 93 percent) for example. Multiple teams support radio affiliate stations in urban areas like San Francisco, Los Angeles, and Las Vegas, but many states included in the conference's footprint are not densely covered. Our dependence on point data here leads the current analysis to accent the widespread nature of radio stations at the expense of urban densities.

Our next step is to examine these conference geographic radio footprints through the lens of regional identity by comparing them to established US cultural regions. Carl Abbott (1990) holds that the very "formation of college conferences" was fostered and enabled by "a sense of regional cultural identity." Perhaps the geography of fandom within athletic conferences still points toward a modern expression of regional identity.

Returning to Figures 4, 5, and 6, we can see the widespread nature of each conference's footprint. When 10 to 14 team networks are combined, can the resulting geographies resemble any recognizable cultural region? Most conferences do not. The Pacific 12 network (Figure 6 O) does not resemble the Pacific region delineated by Zelinsky (1980). The addition of Utah and Colorado into the conference within the past decade stretches the network hundreds of miles eastward from the Pacific; the very large Western region now intersected by the conference includes large areas with which the coastal areas of California and Washington do not closely identify. The geography of the Big 12's network (Figure 5) does partly match the Great Plains, but West Virginia sits as an exclave far to the east of that region. The ACC's network footprint (Figure 6 P) could perhaps be likened to the South, Atlantic, or East, but there are major discrepancies with each of these comparisons: Boston College and Syracuse are not Southern, Pittsburgh is not Atlantic, and Louisville is not Eastern. The Big Ten's footprint (Figure 4 M) almost matches the Middle West, but its expansion teams of Penn State, Rutgers, and Maryland have pushed the conference's footprint all the way to the Atlantic; no recognizable vernacular region encompasses Nebraska, Washington DC and New York City.

The SEC coverage (Figure 4 L), however, does resemble the South. There is the obvious omission of radio coverage in Virginia and North Carolina, but each member of the SEC broadcasts its football games from within the South. The SEC is notably the only conference

to offer radio coverage from each of its members from within a single region, indeed one of the main culture regions defined by geographers, the classic example being Zelinsky (1980; see also Ambinakudige 2009).

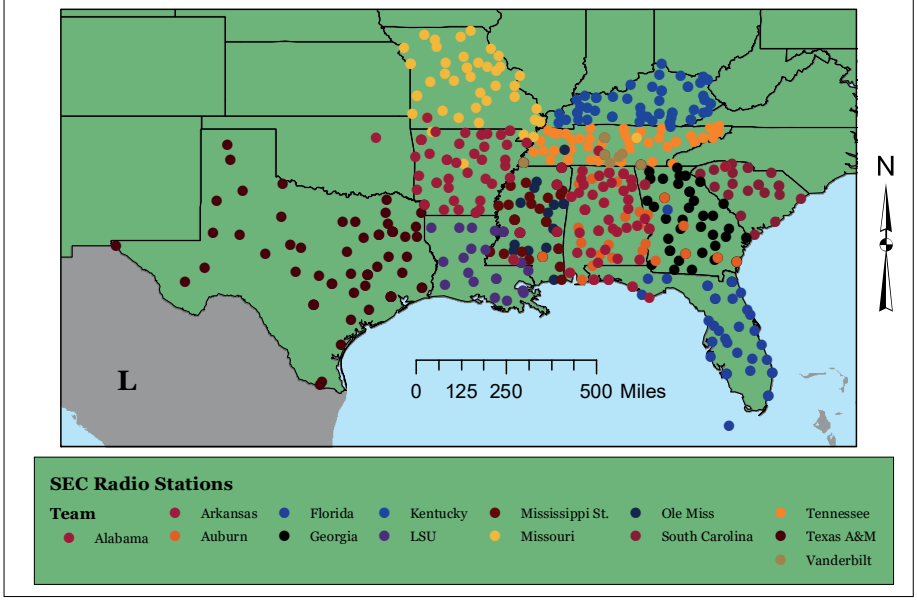
Table 1. Radio Affiliate Information by School

School	1987 (Roseman & Shelley)	(Cooper & Davis)	2015 Classification
Atlantic Coast Conference			
Boston College	-	13	Multi-State Coverage
Clemson	57	19	State Saturation
Duke	38	15	Statewide Coverage
Florida St.	59	29	Multi-State Coverage
Georgia Tech	63	29	State Saturation
Louisville	8	12	State Saturation
Miami	50	18	Statewide Coverage
NC St.	53	20	State Saturation
North Carolina	70	39	State Saturation
Pittsburgh	21	20	Within-State Regional Coverage
Syracuse	12	26	Statewide Coverage
Virginia	-	15	Within-State Regional Coverage
Virginia Tech	-	28	State Saturation
Wake Forest	15	9	Within-State Regional Coverage
Big Ten			
Illinois	43	38	State Saturation
Indiana	51	30	Statewide Coverage
Iowa	9	36	State Saturation
Maryland	-	12	State Saturation
Michigan	-	32	State Saturation
Michigan St.	-	31	State Saturation
Minnesota	1	41	State Saturation
Nebraska	44	49	Multi-State Coverage
Northwestern	1	1	Single Station
Ohio St.	44	43	State Saturation
Penn St.	47	53	Multi-State Coverage
Purdue	40	24	State Saturation
Rutgers	-	5	State Saturation
Wisconsin	30	45	State Saturation
Big XII			
Baylor	-	18	Statewide Coverage
Iowa St.	35	32	State Saturation
Kansas	30	26	State Saturation
Kansas St.	-	31	State Saturation
Oklahoma	73	35	State Saturation
Oklahoma St.	28	26	State Saturation
TCU	1	5	Within-State Regional Coverage
Texas	-	32	State Saturation
Texas Tech	3	32	Statewide Coverage
West Virginia	-	28	State Saturation

Table 1 cont.

School	1987 (Roseman & Shelley)	2015 (Cooper & Davis)	2015 Classification
Independent			
Notre Dame	201	110	Multi-State Coverage
BYU	14	7	Multi-State Coverage
Mountain West			
Air Force	22	2	Within-State Regional Coverage
Pacific 12			
Arizona	Statewide	9	Within-State Regional Coverage
Arizona St.	-	15	Statewide Coverage
California	6	7	Statewide Coverage
Colorado	22	11	Statewide Coverage
Oregon	-	24	State Saturation
Oregon St.	15	30	State Saturation
Stanford	-	1	Single Station
UCLA	14	3	Within-State Regional Coverage
USC	10	7	Within-State Regional Coverage
Utah	1	1	Single Station
Washington	35	16	State Saturation
Washington St.	22	21	State Saturation
Southeastern Conference			
Alabama	26	53	Multi-State Coverage
Arkansas	-	42	State Saturation
Auburn	68	48	Multi-State Coverage
LSU	-	23	State Saturation
Mississippi St.	-	29	State Saturation
Ole Miss	-	28	State Saturation
Texas A&M	-	61	State Saturation
Florida	60	37	State Saturation
Georgia	92	44	State Saturation
Kentucky	-	55	State Saturation
Missouri	-	44	State Saturation
South Carolina	45	21	State Saturation
Tennessee	80	56	State Saturation
Vanderbilt	20	9	Within-State Regional Coverage

Figure 4. Radio affiliates of the (L) Southeastern and (M) Big Ten Conferences.



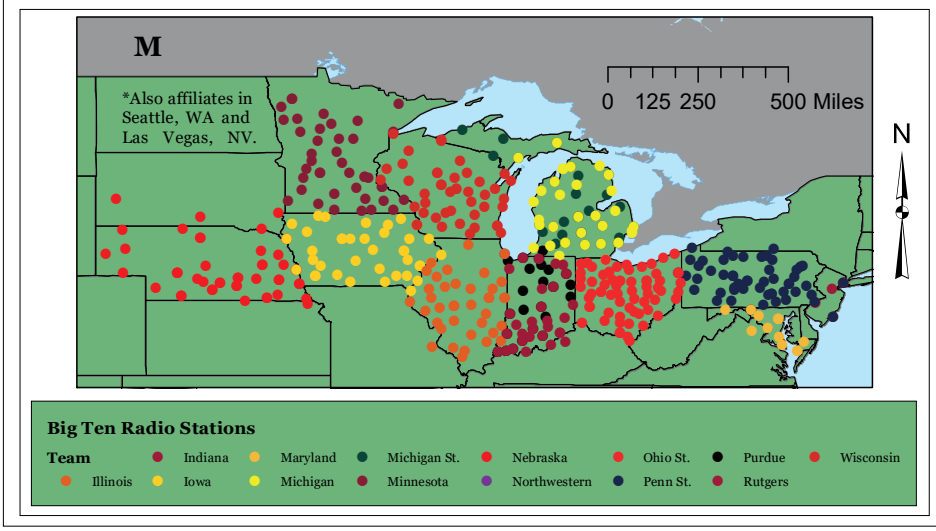


Figure 5. Radio affiliates of the (N) Big XII Conference.

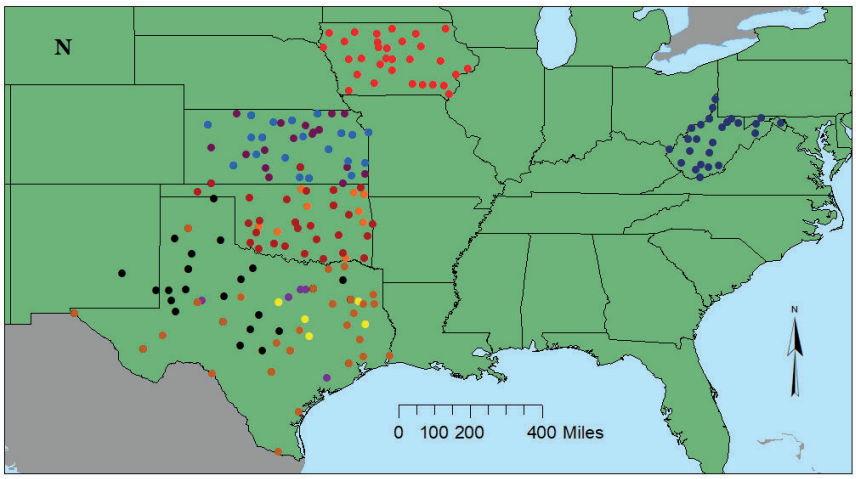
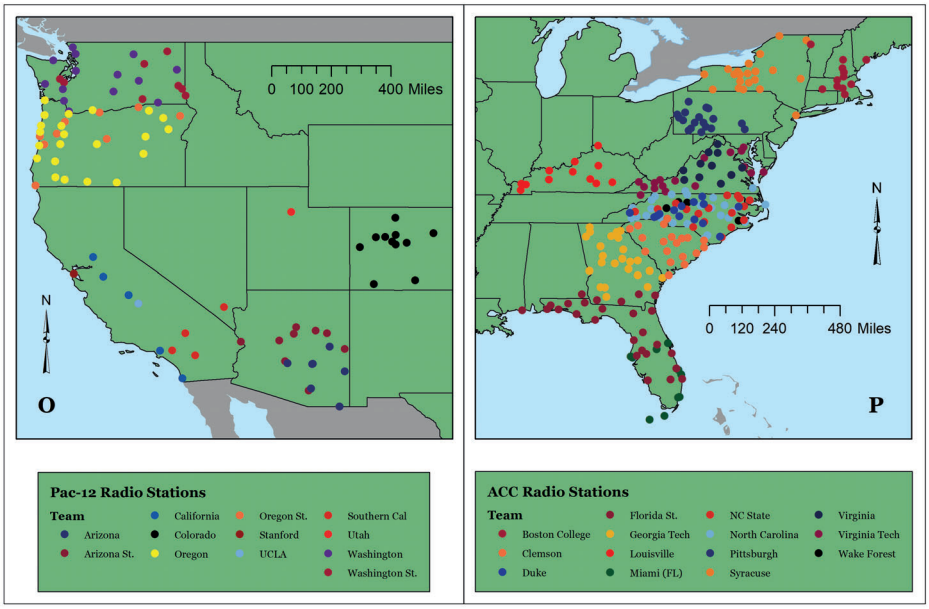


Figure 6. Radio affiliates of the (O) Pacific 12 and (P) Atlantic Coast Conferences.



Discussion

Three main features of our results stand out: the standardization of Power 5 radio networks, the importance of state borders in bounding team fandom, and the varying strengths of conferences as avenues to large-scale regional identity. The standardization, which might be called a "move to the middle," reflects a real change from the network variation identified in 1988 by Roseman and Shelley. A change in the number of radio station affiliates for a school can be confusing as some schools such as Oregon State doubled their affiliate count while Colorado saw its number halved. Many of the extensive networks from 1987 no longer support the same density and volume of affiliates (Georgia went from 92 to 48; Notre Dame went from over 200 to 110), but other teams that have risen to a more prominent role in premier college football have increased their affiliate counts significantly. Texas Tech for example now supports 32 affiliate stations as opposed to 3 in 1987. So while a substantial decrease in affiliate stations is the trend, the more accurate assessment of the change over the past three decades is a move towards a standardized model of a radio network for a premier college football team. There is less disparity between the top and bottom of these conferences than in 1987. Perhaps most teams look to establish themselves in a respectable light compared to other institutions.

A large part of this process of standardization has been the power of state borders to bound the radio networks of these teams. The move towards the middle is not all about radio affiliate count but also the pattern of the team's network on a map. Over 80 percent (55/67) of the teams surveyed here exhibit statewide coverage, state saturation, or multi-state coverage that also saturates the home state of the institution. Roseman and Shelley (1988, 43) detected a similar pattern and attributed it in part to "in-state tuition benefits, extension programs, and other linkages between citizens and universities that change abruptly at state lines." One of those unspecified linkages may be more important than any other in their list: place identity. College football is for many people a tangible way of expressing and preserving identity in connection with place, and the patterns delineated here indicate that states, through college football fandom, are important agents in constructing and bounding those identities.

However, at a larger scale, conference-based college football fandom does not seem to act as an agent of regional construction, identification and expression nearly as much as its team-based counterpart does for state identity. Athletic conferences used to be a vehicle for this regional cultural identity, but the realignments of 2010 and 2012 fundamentally changed the notion of what an athletic conference is and how member institutions are organized. The size of conferences ballooned to numbers unimaginable in 1990, and the cultural region began to fade as a framing idea for the structure and geography of conference membership. Instead, as Rooney and Pillsbury (1992, 63) accurately predicted, the shift to "align schools with television programming demands" became "the rule rather than the exception."

Through these recent realignments, the Southeastern Conference was the only one of the current Power 5 conferences to retain its traditional regional bounds. While the SEC was also motivated by capital and media gain just like the other conferences, it was unique in that its

leaders prioritized regional-cultural cohesiveness as a factor in expansion decisions. Primary sources from the 2012 SEC expansion to absorb Texas A&M and Missouri state this explicitly (Loftin & Burson 2014, 73). R. Bowen Loftin, president of Texas A&M at the time of the 2012 realignment, writes that he "considered factors such as...cultural similarities" in deciding whether to pull A&M from the Big 12 to the SEC. He eventually decided to advocate for the move, citing among "twenty-six million good reasons" the fact that "the cultural fit [of Texas A&M in the SEC] was very appropriate" (Loftin & Burson 2014, 120). When the move was complete, "SEC fans began to embrace the Aggies as a perfect addition in their league," and "the A&M community went absolutely crazy with 'SEC fever'" (Loftin & Burson 2014, 157). Another university spokesperson claimed that "Texas A&M has always been an SEC school in terms of [its] tradition,...spirit,...and passion" (Loftin & Burson 2014, 120). And while some at the time did not perceive "Missouri to be the perfect geographical fit in the SEC" (Loftin & Burson 2014, 159), the fact that the state "borders three SEC states (Tennessee, Kentucky, and Arkansas)" (Loftin & Burson 2014, 162) was considered by officials. Again, geography and location were factors in determining conference affiliation for the SEC.

The radio coverage's geographic data here support this fandom-region connection. The SEC radio network does not perfectly resemble the South; the states of North Carolina and Virginia each host only one SEC broadcasting station (both University of Tennessee affiliates), and the Texas A&M and Missouri networks push further west and north respectively than even the broadest delineations of the vernacular South (see Reed 1976). However, each team in the SEC offers coverage to some part of the traditional culture region of the South. No other Power 5 conference's teams all offer radio coverage for a single United States cultural region. The fan footprints of the Pac-12, Big Ten, Big 12, and ACC no longer resemble a cultural region. This is striking; while individual team fandom seems to conform broadly to fit within state borders, conference fandom has become much less tied geographically to cultural regions than in the past, with the SEC as the exception.

Southern regional identity is a complex and multifaceted phenomenon that cannot be understood simply with the data here (Wilson 2017, Nagel 2018). However, we can gain insight into cultures through the study and examination of "expressions of regional consciousness and identity" (Alderman 2015). If, as discussed earlier, a key element of football's attractiveness has been its war-like spirit, then we may not be surprised at the determination of many fans to imagine SEC football victories as vengeance against northerners, or at least as restoration of lost pride. Morgan and Klimasewski (2015) present data that indicate the SEC's recent success acts as a vehicle for Southern regional pride. Cooper and Knotts (2017) demonstrate the resilience of the *idea* of the South as a driving force in our current cultural discourse. The data in our study support this conclusion and goes further: it demonstrates that, as it is constructed and reconstructed through the political economy of radio for millions of college football fans, the United States South is, as Zelinsky (1980) suspected, the "sturdiest of [North America's] vernacular regions." We suggest that it is not only college football but the particular variety of the sport being played, watched, and listened to in the Southeastern Conference that helps maintain Southern regional consciousness.

Conclusion

Roseman and Shelley established that radio coverage of college football can inform us about the geography of fandom. Since sport and place identity are both important elements of culture, their intersection tells us something of the cultural geography of particular places. This study finds that college football radio coverage overlaps with - and may help maintain and even solidify - identities within state borders and less so within larger cultural regions. State "boundaries help in defining the spatial distribution of fans" and foster "linkages between citizens and universities that change abruptly at state line[s]" (Roseman and Shelley 1988, 43). The state-saturation pattern that has become even more clear since the 1987 study reinforces this connection between people and the functional region of the state.

However, in some cases, such processes do not seem to maintain. Sometimes, state borders are less relevant to the pattern of radio coverage for certain teams. Football fans can identify with their state but also with other institutions, such as a religious denomination (as with Notre Dame, Brigham Young). Additionally, we have shown that fans may also identify with an athletic conference, as in the case of the SEC and the South.

Technologies that now exist were not factors at the time of Roseman and Shelley's research in 1987, yet they certainly now affect remote fandom. These new media, including satellite radio, satellite television, and the Internet have changed the face of the sports industry in ways that are not yet clear. Access to live game coverage is now potentially much wider since fans with access to these technologies are able to listen to, watch, and follow games almost anywhere (see Albarran et al. 2007). In this age of big data, "the proliferation of...user generated data makes a range of everyday social, economic, and political activities more visible than was previously possible" (Poorthuis et al. 2016, 249). Social media is a modern technology by which fans passively follow and actively engage with sports and fandom. The resulting volunteered geographic information (VGI) from social media platforms like Twitter can be used to study "how and where events are discussed online...and how places are represented and understood by different people" (Poorthuis et al. 2016, 249). Indeed, geography through the utilization of GIScience is making use of these new VGI data to robustly and quantitatively study and assess the geographical construction of identity at many scales including regional (Arthur & Williams 2019).

Additionally, satellite and internet radio now allow the college football fan to "spectate" while seated far away from the bleachers and beyond any ordinary sense of a place or region; she or he can practice their fandom while thousands of miles from the game itself. This medium certainly competes with local commercial radio and has contributed to a drop in the latter's popularity in recent years (Shelley 2015). It is important that geographers analyze the impacts of these shifting technologies upon the sports landscape and associated regional identities. These new technologies can and should also be used to compliment research using more established media.

Our research, however, supports the conclusion that there is no significant decline in the broadcasting of college football on traditional radio frequencies. The Nielsen corporation's surveys continue to find radio as the number one entertainment medium in the US (Music 360 2014), and geographic research shows that people still access information by radio more than any other media (Pinkerton & Dodds 2009). Our data show a solidification and standardization of big-time college football radio networks to provide coverage to their entire states rather than an across-the-board decrease of station affiliates. This is evidence of the strength of fandom at the local and regional scales. Additionally, the total geographic reach of those networks' gameday broadcasts is today greater due to internet and satellite radio listeners. We are confident in our use of radio as a proxy for football fandom but encourage geographers to compare the results presented here with other studies delineating fandom footprints using a wide variety of audio, video, digital, and social media.

Our research on the geography of football fandom raises other questions about the role of college sports and fandom in the creation and maintenance of place identity. For example, how does race affect place identity at the state and regional scales, and can we find expressions of this among sports fans? Also, does a fan's understanding of her or his vernacular region, such as the South, have an identifiable impact on his or her college football spending behavior? A socio-economic geographic analysis of greater depth using both qualitative and quantitative methods is needed to further investigate the overlapping nature of multiple place identities in the context of sports fandom.

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All maps projected with the World Geodetic Survey 1984 coordinate system.

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ASSESSING CLIMATE CHANGE, Ecotourism and Small Communities

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ABSTRACT

Many areas around the world depend on small scale recreation and tourism activities to sustain local economies. However, even the most successful tourism regions are currently, and will continue to be, confronted with climate change. How future tourism is planned and managed while considering these changes in climate will ultimately determine the sustainability of the industry. Given that many tourism businesses are indeed small or medium size enterprises (SMEs), located in smaller communities, using large scale global climate models and national Gross Domestic Product (GDP) figures may have little resonance; particularly for regions that are economically dependent on natural resources for tourism and recreation, and are fractured in terms of any cohesive planning unit that accurately represents all stakeholders. It is important to explore how they will fare as the climate changes and threatens the resources upon which they rely socio-culturally or economically. This paper examines these issues with a mixed methods approach, using surveys and interviews to identify critical resources for tourists and residents, exploring the threats to these resources through climate change models and data, and assessing the potential economic impacts. Results from the analysis can assist policymakers understand the local issues and impacts on livelihoods, cultural practices and the tourism industry, when considering climate change adaptation and mitigation strategies.

Key words: Ecotourism, climate change, local economic development, small or medium size enterprises (SMEs), Great Lakes

Introduction

As more communities around the world embrace tourism as an economic development strategy the inevitable change in climate should be considered and how it may impact the future sustainability of those businesses. Of particular importance are regions where much of the recreational and tourist activities rely on natural resources, on specific climate conditions that support these natural resources, and where the bulk of economic activity is tourism related.

Given that most tourism businesses are indeed small or medium size enterprises (SMEs), using large scale global climate models and national GDP figures may have little resonance for a community trying to plan for sustainable tourism endeavors in the face of climate change.

Conversely, there are indeed many community action plans (CAPs) that outline steps that are effective in certain situations, but rely on substantial participation rates. There are also regions that are economically dependent on natural resources for tourism and recreation, but are fractured in terms of any cohesive planning unit that accurately represents all stakeholders. These scenarios will become more challenging as the climate changes and presents new or worsening obstacles for those resources. Thus, providing information to these stakeholders is paramount for the sustainability of both the resources and the people and businesses that depend on them.

This study expands upon recent work exploring climate change, tourism and economics by focusing on smaller regional tourist areas and local impacts. Several of the first published papers in this realm had focused on climate and utilized tourism mostly as a case study. This earlier research formed the basis of tourism climate indices such as Mieczkowski's (1985) 'tourism climate index' (TCI) which has since been used extensively since it was first offered. Values for these types of indices are calculated based on 'general circulation models' (GCMs) such as in the work by Scott and McBoyle (2004) and often explore different scenarios of *comfort* levels of tourists to future temperature and precipitation changes (Amelung et al. 2007). TCI and other such indices have been widely accepted throughout the tourism and climate change literature (Scott, de Freitas, and Matzarakis 2008), but have also expanded into other realms of discussion such as biometeorology (Roshan 2016), governance and policy (Johnston et al. 2012; Leon and Arana 2014), water consumption and demand (Roson and Sartori 2014), and econometrics (Stern 2007; Nordhaus 2010) with research linking climate variables to economic impacts and focusing on "climate damage functions as reduced-form formulations" (Ciscar et al. 2011). Many of the economic-focused studies are at a macro level, employing large scale input variables such as average global temperature to gross domestic product. However, on a local level these attempts to model economic impacts and climate change may have little resonance where the economic modelling and impacts are estimations of GDP loss and often this measure, or the data needed to calculate it, is unavailable at smaller scales.

More recently, Scott, Rutty, Amelung and Tang (2016) found TCI to have limitations which their 'holiday climate index' is said to overcome and offer a more accurate representation in urban settings. While tourism comfort indices can be projected into the future so as to assess possible conditions for tourism development (Dubois et al. 2016), the purpose of this study is not to compare various climate scenarios or these models, but rather to highlight their usefulness in framing the research. There are indeed sufficient papers that compare and contrast the research in tourism and climate change realms (Hamilton 2004; Rosselló-Nadal 2013) yet there seems to be general agreement that improved indices could be useful to enhance decision-making and anticipate climate change in the tourism sector (Dubois et al. 2016), particularly in the 'ecotourism' niche (McDougall 2016).

As mentioned previously, tourism in many areas of the world relies on natural resources and is often referred to as ecotourism due to its reliance on environmental resources. Proponents of ecotourism have debated definitions, principles, guidelines, and certification requirements, and much of the published literature begins by contemplating the issues surrounding the term itself, but for the purposes of this research, the following definition from Fennell (2015, 17) has been adopted:

> Travel with a primary interest in the natural history of a destination. It is a form of nature-based tourism that places about nature first-hand emphasis on learning, sustainability (conservation and local participation/benefits), and ethical planning, development and management.

Even the most argumentative proponent of ecotourism would agree that this type of tourist activity relies on *local* natural resources and their ecosystems. Thus, the need to consider and mitigate both risks and impacts of climate change will vary based on locational features (natural resources) of destinations.

One such feature (natural resource) that is crucial to many types of tourism is water. As the air temperature will increase over time, so will the water temperature which will inevitably create changes in the ecosystem. A plethora of studies have shown that this will change the physiological processes for fish, alter freshwater and marine food webs, and increase risk for invasive species and spreading of vector-borne diseases (Marcogliese 2008; Da Silva and Soto 2009; Tranvik et al. 2009; Trumickas et al. 2015). Along with the changes in temperature then, will follow changes in marine wildlife and fisheries habitat, and small businesses must consider how they will adjust, although it has also been suggested that flora and fauna may adapt to the new conditions "in part by microevolution, even in the short term" (Jeppesen et al. 2014, 91). But whatever the changes that may occur, understanding possible outcomes and then adapting usage accordingly will be necessary.

Cross et al. (2012) offered an adaptation of natural resource management to address climate change. The model identifies natural resources, assesses management goals for each resource and how it is used, considers various climate change threats and future scenarios, and then suggests strategic plan action items. The 'Adaptation for Conservation Targets' (ACT) framework offers a simple step-by-step process that: 1) identifies adaptation actions for particular conservation features ranging from a specific species to ecosystems and ecological functions, 2) integrates stakeholders into the process by encouraging participation from both public and private jurisdictions, and 3) uses scenario planning to address uncertainties for various climate change threats and outcomes (Cross et al. 2012). While this has been shown to be an effective process, it may have limits in tourism due to the nature of the industry. Most businesses are small and often owned and operated by the same people who may not be willing participants in such a process. They may feel it would be taking time away from their normal work duties or participation in a process would require extra time to commit to something that they may not necessarily see the benefit of (O'Laoire and Welford 1998).

Additional problems with participation arise with varying levels of resistance by SMEs to environmental management (McKeiver and Gadenne 2005; Boiral et al. 2014). Although there have been recent studies indicating SMEs may be more apt to become involved in climate change discussions if they have seen any impacts or envision any threats to their business (Revell, Stokes and Chen 2010). McDougall (2016) examined the extent to which ecotourism operators are addressing climate change risks in their business planning, which is positive in the sense that some smaller communities and tourism businesses are thinking about climate change.

Underlying such framework, and of particular importance, is to recognize that governance and policy will differ from place to place. Thus, a model that works in one location may be completely unsuitable for implementation in another. For example, indigenous peoples in Canada have a complex range of self-governance power that often overlap other political boundaries. Research has shown that when there are different types and levels of governments, there are different preferences and expectation of both the problems and the policy measures "potentially leading to frame conflict rather than an effective mode of multi-governance" (Scholten 2013, 219).

We can find examples of this type of scenario in many tourist regions globally, whereby there are many competing interests for the same natural resources in a particular location, but different levels and types of governance and policies. It is not unheard of in a tourist area to have multiple types of tourist activities, with a variety of ownership types, sizes and governance and all relying on the same resources in one location. An example might be small families running enterprises, large corporations with hotels, chains of retail, restaurants, local government, federal government, seasonal businesses, indigenous interests, permanent residents, transients, temporary workers and other various stakeholders all vying for use of the same natural resources, but with different objectives and governed by different political networks. Couple this scenario with a discussion surrounding climate change, and one can see there will be a wide range of ideas and opinions. Moreover, the levels of interest and understanding of future changes to those natural resources will vary considerably amongst the groups. Further, in many tourism areas around the world, asking all of the stakeholders to come together to formulate a common plan for multiple resources to prepare for impacts of climate change is unrealistic. There are examples throughout the literature where CAPs are successful and provide excellent frameworks for natural resource management (Cross et al. 2013), but more recently some are also calling into question their applicability and effectiveness (Stone et al. 2012; Kosky and Siulagi 2016). Others have productively built on the CAP ideas but acknowledge the need for climate change scenarios and scientific information "to be localized in order to be ''real'', understandable, and meaningful to laypeople" (Sheppard et al. 2011, 410). This is particularly important in tourism areas where there is diverse stakeholder interest that may not have any relationship with other stakeholders, other than a common need for the sustainability of a resource from the threats of climate change.

It is reasonable then to suggest that future economic development and growth must consider possible climate change scenarios to ensure the sustainability of viable businesses, particularly in ecotourism. Already we have seen policies created for other industries (albeit much larger and on a macro-scale), such as the U.S. based Securities and Exchange Commission which requires companies to disclose their risk and preparedness for climate change in annual reports. There is a need to go beyond theorizing tourism and climate change models, to applying their principles and offering a structure for situational analysis. To this end, we will investigate the sustainability of resource-based tourism (or ecotourism for the purposes of the paper) in complex areas where there is multiple, and often conflicting, types of governance and in light of climate change, resulting in management suggestions and recommendations for sustainable future economic growth.

Methods

The tourism system is quite complex with the industry itself comprised of many separate industries of varying types of ownership and sizes of businesses. The tourism destination is equally as complex and its use and value to tourists can based on any number of factors including their preferences for different natural or built environments, biophysical or cultural resources, or activities and climate, among others. When exploring this tourism system for sustainability, it stands to reason that a more complex methodology would be helpful in ensuring that all aspects of the system are considered. As such, a mixed-methods approached was utilized to integrate data from various sources which was essential in framing the results and discussion, and has been accepted as a valid methodology throughout the literature (Scott et al. 2004; Sandelowski 2006; Heyvaert 2013). The location chosen for this research, Muskoka – Parry Sound, in Ontario Canada, provides many of the same elements that can be found in different locations globally, from the large numbers of stakeholders having shared uses for resources, to multiple types of governance and varying types of land and home ownership. The complexity of the location thus expands the applicability and usability of this research beyond the Great Lakes region to many other areas that may have one or several similar characteristics.

Three different types of data sources and analysis were considered for the study: 1) Demographic data to provide a context for the region and SMEs; 2) Climate change scenarios and climate data to frame the sustainability discussion, based on the Government of Canada's Canadian Climate Data and Scenarios (CCDS) and TCI results for the Muskoka A area (Figure 1); and 3) The tourist voice from surveys that were conducted face-to-face at various tourism facilities along the main transportation route through the study area.

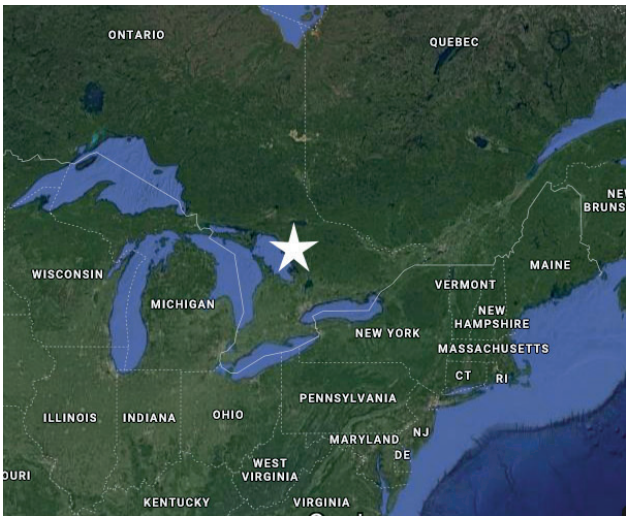

Figure 1. Muskoka – Parry Sound Map. (source: adapted from Google maps)

1) Demographic Data

Demographic data was obtained from the 2016 Census of Population, Statistics Canada; Indigenous and Northern Affairs Canada, Government of Canada; and where permission was not given for Canadian government enumeration of data, Association of Iroquois and Allied Indians and individual First Nations Bands provided data through online sources.

2) Climate Data and Climate Change Scenarios

The Canadian Centre for Climate Modelling and Analysis creates models to study climate change and variability, and make quantitative projections regarding future climate scenarios. For this study, the AGCM4/CanAM4 model output was used to generate long-term climate scenarios. In addition, TAR/AR4 climate scenario, using statistical downscaling input from the predictand - Muskoka A region - was used to generate data for the TCI indices. The results were then used to estimate changes in natural resources relevant to this paper.

The conceptual and methodological development of the TCI is explained in detail in the original paper by Mieczkowski (1985) and, as noted previously, has been validated by many other researchers. The results from the Tourism Climate Index used in this paper builds upon this model by incorporating survey data results into the discussion. The TCI results themselves were compared against the results from Scott and McBoyle's (2001) Toronto TCI score to ensure validity. The use of TCI along with the input variables remained constant with Scott and McBoyle (2001) and Mieczkowski (1985), employing the same combination of five sub-indices, three of which are independent and two in a bioclimatic combination (total of seven climate variables). For this paper, the input data was generated from TAR/AR4 as follows:

$$TCI = 4 \cdot CID + CIA + 2 \cdot P + 2 \cdot S + W$$

Where CID is a daytime comfort index, consisting of the mean maximum air temperature Ta, max (°C) and the mean minimum relative humidity RH (%) CIA is the daily comfort index, consisting of the mean air temperature (°C) and the mean relative humidity (%), over the full 24 hour period, P is the precipitation (mm), S is the daily sunshine duration (in hours), and W is the mean wind speed (m/s). The CID was weighted at 40 percent as it represents the thermal comfort levels of both temperature and humidity during the time when maximum tourist activities occur. Whereas the CIA, although important, is weighted at 10 percent due to its reflection of the whole 24-hour period, including sleeping hours. The levels of sunshine would be very important during the summer months to tourists as many activities are outside and although at risk for sunburn, more enjoyment from sunny days for outdoor activities are expected. Sunshine may become less important during the winter when precipitation in the form of snow is more important for activities such as skiing, snowmobiling and snow shoeing. As such, both are weighted at 20 percent. Other climate indices do not always consider how each variable contributes to activity enjoyment levels so may not weight them differently. However, in this model every contributing parameter is assessed and results in a final score with a maximum value for TCI of 100. Using this weighting factor scale, values from 90-100 are ideal, and 80-89 are excellent, while values between 60 and 79 are regarded as good to very good. The lower the value, the less acceptable tourists find the conditions.

3) Tourism Surveys

The surveys were administered in person over the course of one year (winter 2016 through fall 2017) at publicly accessible locations within the study area, asking for their participation, and whether or not they were staying overnight, or had stayed overnight within the Muskoka-Parry Sound area. The researcher had both paper copies (handed out) and digital (completed on an iPad in person), but was also asked by several people to read the 10-question multiple choice survey aloud and then type in the participants choices. Five locations along the Trans-Canada highway were chosen, including two gas stations with restaurants, a Trading Post (retail store), marina, and visitor center which also houses an education/interpretive center. A total of 435 surveys were validated (out of 700 – resulting a 62% response rate) which is considered good, particularly since the majority of those who did not participate were dismissed due to transient travel (i.e. not including an overnight in the area), rather than an unwillingness to respond. The questions in the survey explored demographics, activity choices and perceived impacts of climate change.

Site Analysis and Results

The District Municipalities of Muskoka and Parry Sound, are regional municipalities located in Central Ontario, Canada (Figure 1). The area falls under multiple overlapping government political jurisdictions, with thirty towns, both federal and provincial electoral districts, nine indigenous (Indigenous People) districts (nine referred to as First Nations, and 12 as Indian Reserves), two economic regions, and part of Ontario Tourism Region twelve. It is approximately a two-hour car drive north of Toronto, and spans 14,602 km^2 (5,638 sq. mi.) (Census Canada 2016). The region borders on the Great Lakes, specifically Georgian Bay, but also over 2,000 smaller lakes, making it a popular recreation and tourist destination. This area, often referred to as "cottage country", sees over 4.3 million visitors annually (Ontario Ministry of Tourism, Culture and Sport 2016). Muskoka-Parry Sound has 103,423 permanent residents (Census Canada 2016), but there are more than 200,000 additional seasonal property owners/renters (Royal LePage 2016). Tourism Ontario (2016) estimates that visitors spend over $598 million annually this region, supporting 1,666 tourism-based businesses. It is considered a desirable destination to visit for tourism and recreation, was ranked #1 for best trips of 2011 by National Geographic, and also among the best trips of 2012 by National Geographic calling it “a natural playground with 8,699 miles of shoreline…countless waterfalls and lakes to the east and the 30,000 islands of Georgian Bay Islands National Park to the west” (National Geographic 2012). But because of climate, and the desire to vacation in this area, much of the housing is only occupied during the summer with a mix of rentals and second homes occupied by the owners only seasonally. In fact, just over half of the private dwellings are occupied by the usual (same) residents year-round (Table 1). This leaves over 37,320 housing units available for weekend, vacation and seasonal tourists.

Population	103,423
Private Dwellings	81,433
Private Dwellings occupied by usual residents	44,110
Median Income total per household (CAN$)**	38,175

Table 1. Selected Muskoka-Parry Sound District Demographics
(sources: Census 2017; **Census Household Survey 2011)

Similar ratios were reflected among the survey respondents with 42 percent staying in their own cottages, cabins or properties with a further 33% renting cottages or cabins (Figure 2). Of the respondents, only 5 percent (21people) listed the Muskoka-Parry Sound District as their primary residence, with almost three-quarters (73 percent) hailing from elsewhere in Canada, 20 percent from the United States. and less than 2 percent other international visitors.

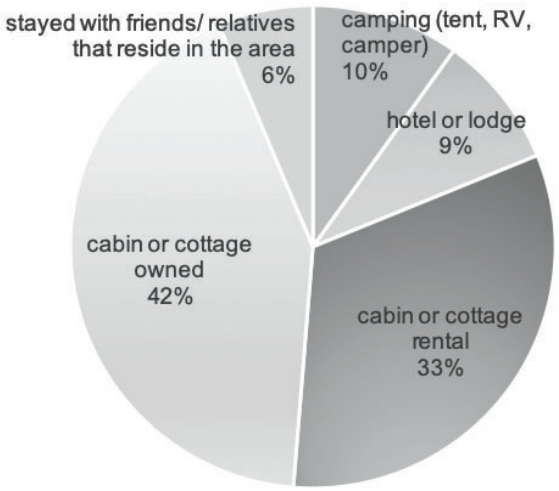

Figure 2. Accommodation choices

The population in Muskoka-Parry Sound districts is currently recorded as 103,423, but the Census population figures do not consider the First Nations communities as many do not give permission for the Canadian government enumeration of data. However, population numbers of residents in the indigenous communities located within this study area were approximated from a variety of online sources and checked against reported numbers for each First Nations on their own websites (Table 2). Each community listed in Table 2 has its own political jurisdiction with local as well as a regional governance structure.

		Population
Wahta Mohawk Territory in Muskoka		819
Wasauksing First Nations		1303
Shawanaga First Nations		660
Moose Deer Point		497
Henvey Inlet First Nations		835
Magnetewan		267
Chippewas of Rama First Nations		1912
Dokis		1224
Beausoleil (2017)		2488
	Total	10005

Table 2. Indigenous Population

Although the region has over 100,000 residents, the density is a mere 4.5 (persons/km^2) in the northern area of Parry Sound and 15.3 in the south-east Muskoka. The towns themselves are relatively small and even though this region has many different types of industry they are predominantly small tourism based businesses. Indeed, the residents of the area have a wide array of employment (Figure 3), but many relate to recreation or tourism, as support or spin-offs. In most communities there are gas stations, restaurants, boat rentals, fishing, and some type of lodging offered. Most communities have businesses competing with each other for tourists seeking local handicrafts, native-made products, retail, restaurants and gas stations. In fact, in every First Nations along the Trans-Canada highway that transects the study region, there is a gas station, and most offer some retail as well.

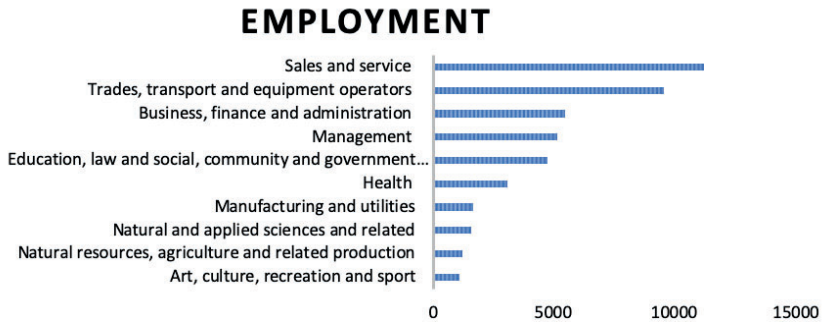

Figure 3: Occupations of residents in Muskoka-Parry Sound districts
(Source: Statistics Canada 2011 National Household Survey, Statistics Canada Catalogue no. 99-014-X2011017)

The types of occupations listed in Figure 3 are very broad and may not reflect the extent to which the economy is based on tourism and recreation although they can almost all certainly relate to recreation or tourism activities. For example, sales and service jobs surround retail, marine sales, gas stations (which also house retail, rental and fishing supplies), accommodation services etc. Restaurants and their employees fall under business, service, and management. While construction falls into several categories with a focus on cottages, decks, docks and general repairs. Also, important to note that these occupations do not include the First Nations communities, which separately publish their industry endeavors, summarized and listed below:

- Lodges/housekeeping cottages/camps
- Trail maintenance and supplies for hiking, cycling, ATV, snowshoeing, cross country skiing, snowmobiling
- Boat launches, rentals, sales and supplies
- Pharmacies, beer and liquor stores, grocery stores, other retail
- Special events, tournaments, fishing derbies, Pow-wows
- Trading Post retail store, visitor center, art galleries

All of these businesses rely on tourists, the majority of whom travel to the area for the natural resources and the activities they provide. It would be a stretch to suggest that residents don't also take part in the same activities and utilize the same amenities. The infrastructure that is in place certainly supports residents and tourists alike. Table 3 summarizes the activity choices for tourists from the surveys administered in spring, summer and fall.

Activities	**n=393**	**percent**
Dining out	390	99
Power boating	354	90
Swimming	300	76
Fishing	296	75
Shopping (excluding food)	280	71
Canoeing/kayaking	241	61
National/Provincial nature parks	180	46
Wildlife/bird watching	84	21
Waterskiing/tubing	62	16
Sports tournament	41	10
Pow Wow	26	7
Sailing	4	1
Hunting	3	1

Table 3. Survey responses for activity choices spring, summer and fall.

Climate Change Scenarios

From Figure 4, the current TCI rating for both June and August were above 80, which is deemed as having 'excellent' tourism climates. However, "under the CGCM2 climate change scenario, the number of days where the maximum temperature exceeds 32°C increases from four (1961-90) to 19 in the 2050s and 32 in the 2080s. Under the same scenario, the maximum daily temperature extreme in August increases from 35°C (1961-90) to approximately 46°C in the 2050s" (Scott and McBoyle 2001). These increases would see June as the only month with an above 80 rating in 2050s and May as the only month with an 'excellent' rating in 2080s. This is not to say that the other months would be unacceptable, rather, the summer season would expand from predominantly June to August seeing the bulk of tourists, to a May-September summer season, with May and June being optimal, July less so due to excess highs in temperature and humidity but September rebounding with near 'excellent' rating.

With the predicted TCI ratings, it is possible that more international visitors may be drawn to the area in May and September, rather than domestic tourists who currently take much of their holiday time in July and August to follow school break.

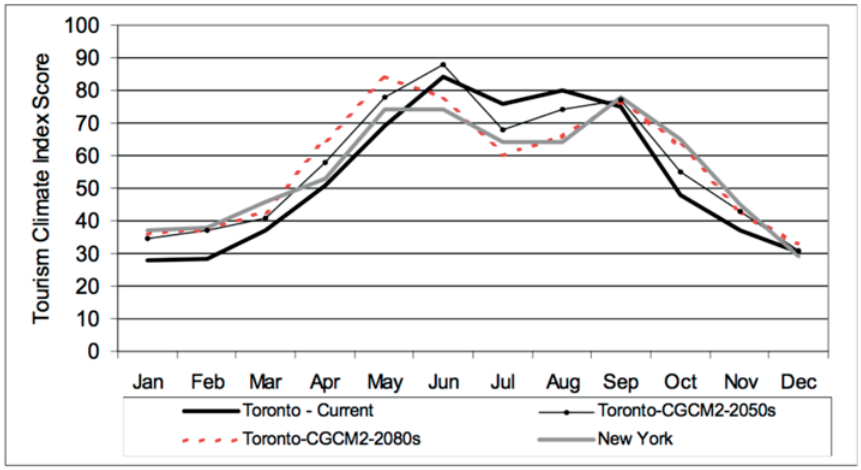

Figure 4. TCI current, 2050, and 2080
(source: Scott and McBoyle 2001)

What the TCI also offers is a look into how each separate index will change and we can extrapolate that data and explore how these changes will impact the resources upon which the tourists currently rely. For the purposes of this paper, we will focus on the increases in air temperature and the consequences to the natural resources in the study region. Using the AGCM4/CanAM4 model, data was generated to compare the temperature profile baseline (station years 1961-1990) in Figure 5 with a projection for 2041-2070 in Figure 6. The mean monthly temperatures, seasonal averages, extreme minimum temperatures and extreme maximum temperatures were graphed to illustrate the predicted differences.

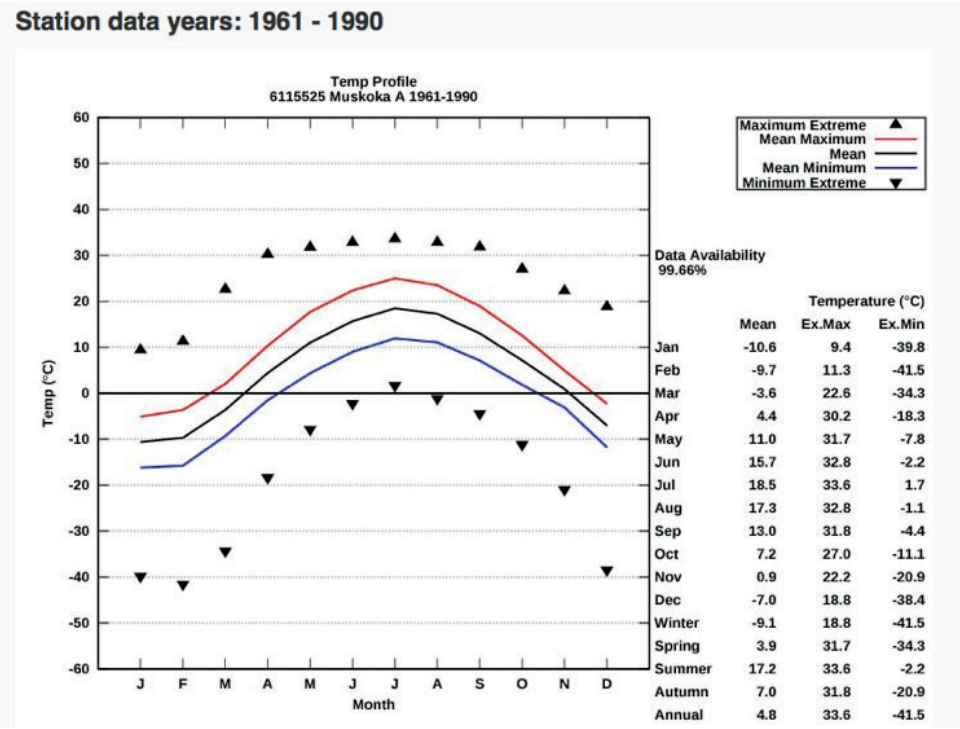

Figure 5: Temperature profile baseline 1961-1990

These models found that TCI rating declined in eastern Canada (Toronto and Montreal – the closest metropolitan areas) and although the TCI suggests that should result in fewer visitors, perhaps they would instead expand the time frame for visitation one or two more months of the year for summer recreation activities. More specifically for individual variables, the mean temperature will increase 3.1C by 2050s, 4.9C by 2080 and precipitation will increase 1.5 percent.

Discussion

From the TCI results it appears that the area's climate will dip from "excellent" but will continue to be very good for tourists' comfort and that the tourism-based businesses may continue to thrive in response to the desirability of the location. However, we need to explore how the changes in climate will impact the resources upon which tourism is based before sustainability can truly be ascertained.

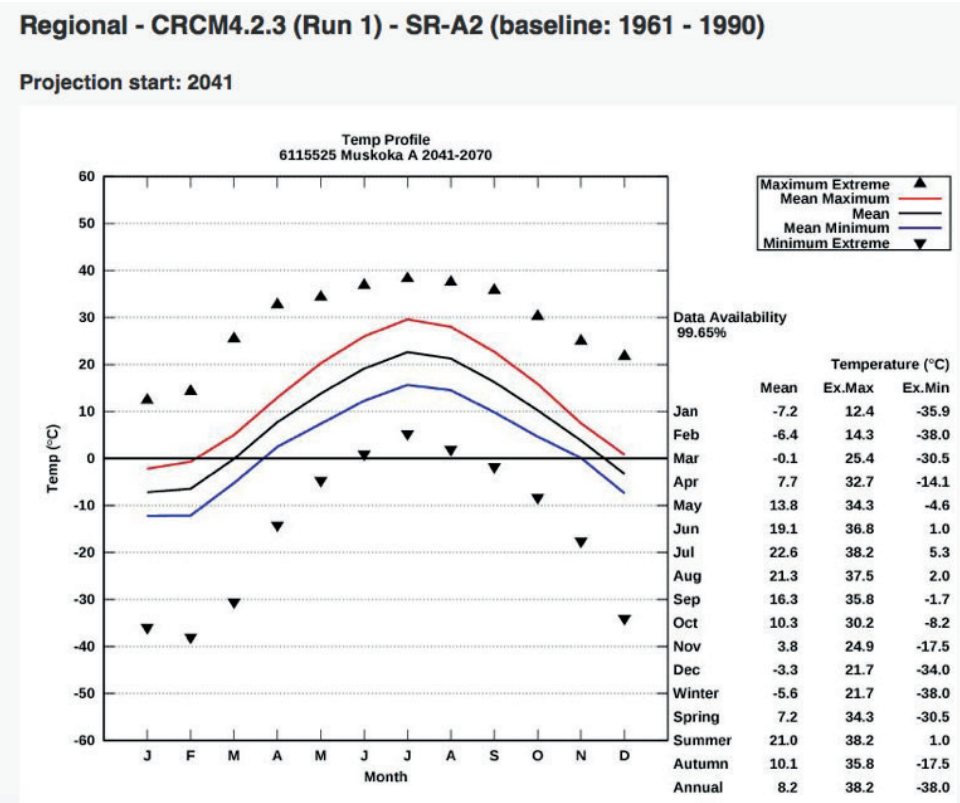

Figure 6: Temperature projection 2041- 2070

As was discussed previously, tourism in the Muskoka-Parry Sound regions can be considered ecotourism due to the reliance on natural resources for the pleasure and activity choices of the visitors. The visitor centers in the area are quite expansive with educational components, displays, artifacts and interpretive signage on trails. Most of the activities surround water, whether that is water-based activities such as swimming or boating, or wildlife viewing and/or harvesting (such as fishing or hunting) whose ecosystem depends on water, and any changes which will impact the temperature, quality, or quantity thereof, will threaten the sustainability of its use. The survey results illustrated a particular need to ensure long-term viability of water-based activities as they comprised the vast majority of all activities undertaken in the study region.

From the climate change scenario, we saw that the temperatures will continue to increase, and as the air temperature increases, the water temperatures will also rise. It is far beyond the scope of this paper to predict the exact impacts on freshwater ecosystems, but what is important

is to understand that there has and will continue to be changes, and businesses must be prepared to shift their practices accordingly if necessary. While some aquatic species may not be capable of withstanding water temperature increases, there is evidence to suggest that other's may be able to adapt. Understanding which species become more tolerant will be critical. Also important will be understanding the impacts on vegetation and other components of the ecosystem. This is not to say the changes will be predominantly negative. Warmer temperatures will extend the summer season on both ends (beginning earlier and stretching into the fall) allowing boating, swimming and some fishing activities to be enjoyed for longer periods of time. Although potentially shortening the winter season, an increase in precipitation may produce more snow (until a certain temperature rise) which would benefit other industries such as skiing and snowmobiling.

Tourism business operators should begin to consider expanding their options beyond reliance on one specific use of a resource. For example, a fishing camp may expand its offering to different species of fish, rather than relying on promoting one type or event (i.e. do not limit promotions and events to only bass fish). Hunting camps could expand the game licenses they seek to other specific of game that have and may continue moving into the area. Additionally, they may want to consider integrating types of activities that span several seasons rather than simply one.

Winter tourism operations should acknowledge that the amount of snow will decrease as a larger proportion of precipitation will fall as rain thereby decreasing the duration of snow cover and the depth of snow on the ground (Davidson-Arnott 2016), and also consider other possible activities to promote beyond renting huts for ice fishing and snowmobile rental to perhaps more all-season rentals such as "winter-friendly" cabins and recreational vehicle and boat rentals that are capable of bridging seasons.

Because many tourism areas are fractured in terms of governance, ownership and management practices, as we saw here, they cannot rely on complete collaboration with all stakeholders and thus a macro solution such as blanket policies may not be the most effective strategy. Each individual community needs to consider the resources that they rely on and examine where there may be overlaps with neighboring communities and where they could work together on a small scale. While this is not ideal and certainly not as effective as larger scale cooperation, best practices can still be applied and local solutions that are nimble and adaptable may prove more sustainable in the long run.

Conclusion

This study sought to explore climate change issues among ecotourism businesses and assess potential impacts on a local level. By utilizing a case study location with a high level of complexity, the difficulties that confront policymakers were illuminated. Trying to balance the needs of communities whose livelihoods rely on natural resources and the influx of tourists, but are not under the same governance structure is only one facet within this complex relationship. Factors such as differing cultural practices and competing uses for the same resources are compounded by the fact that the fragile economies are comprised mostly of small businesses,

often family-owned, and based on climate conditions that support seasonal tourism, recreation and the cottage industry.

Future research and conversations that surround climate change should consider a three-dimensional approach as was utilized here, to ensure all aspects are taken into consideration. It is imperative that we not only have reliable climate change scenario models for the physical environment, but that the economic and socio-cultural landscapes are intertwined within them. Additionally, the local voice from both the supply and demand perspectives can keep us abreast of changes and be the check points along the way. There are certainly many regions around the world with a similarly complex economic, sociocultural and environmental structure that could benefit from comparing situations. Thus, it may be up to future researchers to continue to share and compare case studies to ultimately achieve sustainability in the face of climate change.

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MULTIPLE SCLEROSIS DEATH RATES and County-level Contextual Characteristics: A New England Case Study

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ABSTRACT

There is growing interest in the role that environmental, demographic, and socio-economic factors play in the prevalence of the disease Multiple Sclerosis (MS) within the United States. Existing empirical evidence examining the spatial association between the environment and MS death rates, however, remains ambiguous. The objective of this research is to examine the relationship between MS death rates and contextual characteristics at a county level in the New England region. The analysis shows that predictors such as available sunlight, race, and access to healthcare are associated with MS death rates in the region. Most importantly, the association between MS death rates and all major explanatory variables in our analysis significantly varied over space, highlighting the need for local and context-specific MS prevention and intervention programs.

Key words: Multiple Sclerosis, New England, Geographically Weighted Regression

Introduction

Multiple Sclerosis (MS) is the most common inflammatory disorder of the central nervous system and a leading cause of disability in young adults (Milo and Kahana 2010). Most researchers suggest the disease to be autoimmune, but others categorize the disease as an infectious-viral disease or a neurodegenerative disease (Milo and Kahana 2010). Common symptoms of MS patients include paresthesias or numbness, motor weakness, monocular visual disturbances, incoordination, diplopia, dizziness and vertigo. To maintain functioning and alleviate symptoms, MS patients must undergo lifelong treatment. However, the disease can still lead to disability and in many cases, early death. Mortality in patients with MS is significantly increased compared with the general population. The most common cause of death for MS patients is multiple sclerosis itself, or complications related to the disease. For example, Koch-

Henriksen et al.'s (1998) research findings suggest that among the 8,142 MS Danish patients documented within the period 1951-1993, 2,803 (or 34.4 percent) died from multiple sclerosis and/or its complications.

Today, MS affects approximately 2.0 to 2.5 million people around the globe and with prevalence rates of less than five cases per 100,000 within Latin America and Asia and up to 200 cases per 100,000 people in Europe and Northern America (Milo and Kahana 2010). While a wide range of symptoms and types of MS are known to the medical realm, the exact causes of MS are still unknown. The disease is so vastly complex that the cause is not correlated directly to one instance or exposure, but seems to have intertwined relations to many different risk factors with varying intensities. There are many factors that may be the causes of the disease, but several demographic (i.e. age, race, and sex), socio-economic (i.e. access to healthcare) and environmental factors (i.e. available sunlight and latitude) have become essential aspects of what may cause or relate to the disease (Minden et al. 2007; Conradi et al. 2011; Kakalacheva and Lunemann 2011; Bove and Chitnis 2014).

Public health research has shown that MS is not spatially evenly distributed, but instead tends to be geographically patterned. For example, results from Mayer's (1981) study suggests that high latitude areas are particularly notable for clusters of high MS prevalence due to the lack of exposure to sunlight. Local demographic, socio-economic, and environmental correlates of MS prevalence also differ across geographic space. Given this evidence, empirical research is needed to investigate the spatial difference in MS death rates and identify contextual characteristics that underlie existing spatial differences. Therefore, the objective of this research is to examine the relationship between MS death rates and contextual characteristics at county level in the New England region.

This article is organized as follows. Section Two provides a review of risk factors associated with the MS disease. Following this, Section Three presents the methodology outlining a description of the study area, variables used in this study and the local analysis method – Geographically Weighted Regression (GWR). In Section Four, the results of a local analysis using GWR are discussed. The final section presents concluding remarks.

Risk Factors Associated with MS Disease

Available Sunlight

Sunlight is an important protective factor. Different research suggests that receiving a good amount of sunlight throughout life, which leads to preferable vitamin D levels, can prevent or defer MS (Freedman et al. 2000; Kakalacheva and Lunemann 2011; Bäärnhielm et al. 2012). Low exposure to sunlight can increase the risk of MS (Van der Mei et al. 2003; O'Gorman et al. 2012). A study conducted by Mayer (1981) takes into consideration the incidence rates (number of cases per 10,000 people) of Multiple Sclerosis by country while also taking into consideration the approximate latitude of each country. The countries typically with higher

MS rates are those that are higher latitudinally or ones located further away from the equator. It should be noted that available sunlight hours per day and latitude have an inverse linear correlation (Kakalacheva and Lunemann 2011). Therefore, the amount of available sunlight holds answers or hints towards the reasons why MS disease is more likely to occur in higher latitudes.

Age

MS typically presents itself in young adults between twenty and fifty years of age, with a peak occurrence at thirty years of age according to the National Multiple Sclerosis Society, although MS can also occur in children as well as in seniors (Compston et al. 2006). Some researchers find that young age may be a protective factor. For example, Conradi et al. (2011) discover that living in an urban area while of the age of zero to six may be a protective factor against MS. Age is also a factor that differentiates the development of the disease. Harding et al. (2013) noticed that children diagnosed with MS took longer to develop secondary-progressive disease (thirty-two years) than adults diagnosed with MS (eighteen years), and they also took longer to reach disability milestones.

Gender

Gender is a risk factor that has its roots in the development of the MS disease. The National MS Society reported in the 1940s that the female to male ratio was around 1:1 and was on the rise in females. Recent empirical studies show that the increased prevalence in females coincides with the conclusion from the National MS Society. Research done by Milo and Kahana (2010) indicates that the ratio of MS prevalence is 2:1 in females to males. Bove and Chitnis (2014) discovered that the ratio is approaching and even exceeding 3:1 in some regions, mostly located in western societies.

Race

Race is another important factor. Although MS is present in the three principal racial groups in the world (White, Asian-Mongol, and Black), it tends to be unequally distributed. Empirical research has pointed towards people of White European descent having the highest risk of Multiple Sclerosis (Kingwell et al. 2013), but there are still other races and ethnicities that suffer from MS as well. For example, recent research suggests that minority populations in the United States, such as African Americans and Hispanic Americans, have a higher incidence of MS compared with their ancestral countries of origin (Amezcua et al. 2015). Another study suggests that the prevalence of the disease, especially the classical, Western form, is on the rise in northeast Asia (Kira 2006).

Access to Healthcare

Access to healthcare is an essential contributing factor to MS risk. Limited access to quality health care can have far reaching effects on the physical, social, psychological, and economic well-being of people with chronic disabling conditions such as MS (Neri and Kroll 2003). As a key for access to healthcare, health insurance allows people to have access to routine and unforeseen medical care and protects them against the high cost of medical bills. People without health insurance are less likely to visit doctors, have usual sources of care, receive preventive services, and undergo recommended tests or fill prescriptions. They also have high out-of-pocket medical expenditures which may stop them from receiving future treatments. Therefore, the MS risk associated with people without health insurance is higher, since they are less likely to be diagnosed as MS patients in time and more likely to miss recommended tests or fill prescriptions and even undertake delayed treatment (Minden et al. 2007; Wang et al. 2016).

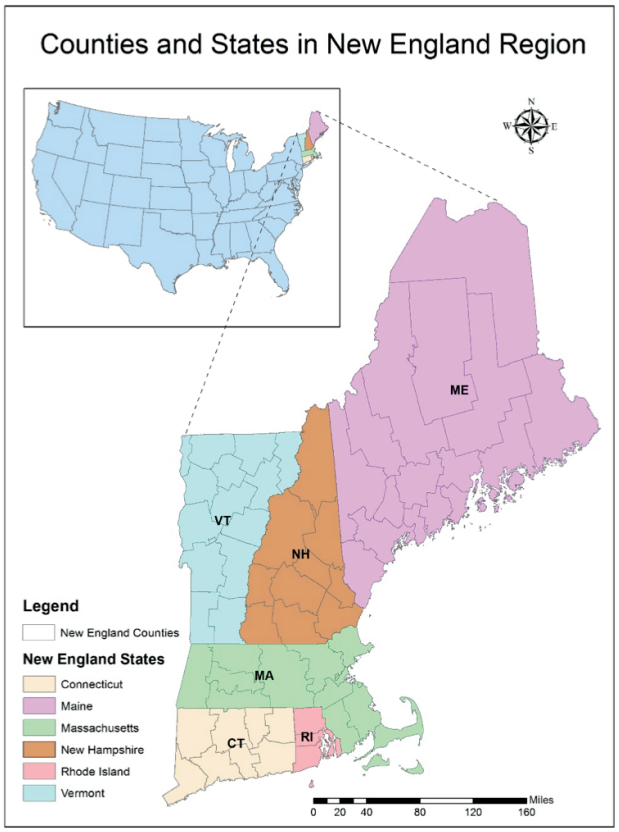

Figure 1. Study Area.

Methodology

Study Area

The study area (see Figure 1) consists of the region of New England within the United States of America. New England is comprised of six states that are Maine, Massachusetts, New Hampshire, Vermont, Rhode Island, and Connecticut which consist of a total of sixty-five counties. With a population of over fourteen million, the region has a fairly large concentration of people that have a wide and varied distribution within its boundaries. The New England region is an important study area for MS research, since its unique geographic location – a middle latitude region (between 40°59'N and 47°28'N), and an increased prevalence of MS has been documented in the region recently (Murray 2005).

Data

The MS death data used in this study was acquired through the Center for Disease Control and Prevention (CDC) WONDER database (https://wonder.cdc.gov/). However, we encountered the problem of suppressed data, because the CDC does not report all sub-national data if the MS death counts fall below a pre-determined cut-off value determined by CDC. In this study, ten counties or 14.9 percent of the total sixty-seven counties in New England have no reported MS death data because the CDC intentionally deleted the data before disseminating them. The MS death data consisted of 2,687 reported MS death incidents in New England Region during 1999 and 2014 and the MS death rate in a county was calculated by using the MS death number divided by total population in the county and then multiplying by 100,000. The descriptive statistics for the dependent variable – MS death rates is shown in Table 1 below.

	Min	Max	Average	Interquartile Range	Standard Deviation
MS death rates: MS death per 100,000 people	0.8	2.6	1.65	0.6	0.43

Table 1. Descriptive Statistics for the Dependent Variables – MS Death Rates.

In this study, the data used to model the death rates of MS are demographic and socio-economic variables together with an environmental factor – available sunlight. Specifically, the demographic variables such as overall population, age groups, gender, and race were taken from the 2010 Census provided by U.S. Census Bureau through the American FactFinder website (https://factfinder.census.gov/). The age variable was determined using the number of people aged between twenty and fifty divided by the total population in each county and then multiplying the result by 100, since this age group has a higher MS risk. The gender variable was measured using the total female population divided by the total population in each county from the census and then multiplying the result by 100, because the female population has a higher risk for MS. The race variable was quantified using the number of non-Hispanic White population divided by the total population in each county and then multiplying the result by 100, since non-Hispanic White people are at greater risk for the disease. The socio-economic variable – access to healthcare was determined by using the uninsured population data reported through the recent five-year estimates (2009-2013) from the US Census Bureau's American Community Survey (ACS). The uninsured population data was used because it is a data set collected over sixty months to ensure that it is the most reliable data and largest sample size for the region of New England. The access to healthcare variable was measured using the number of uninsured population divided by the total population in each county and then multiplying the result by 100. When it comes to the available sunlight variable, it was quantified by the yearly average sunlight based on records from January 1979 to December 2011. This data was acquired through the Center for Disease Control and Prevention (CDC) WONDER database, but was gathered by the North America Land Data Assimilation System (NLDAS) (Daily Sunlight

insolation for years 1979-2011 on CDC). All variables were collected and measured at the county level and ArcMap 10.3.1 (ESRI 2015) was used to join the data variable with the New England counties shapefile which was downloaded from US Census Bureau's website (https://www.census.gov/en.html). The descriptive statistics for each explanatory variable are shown in Table 2 as below.

Variables	Min	Max	Average	Interquartile Range	Standard Deviation
Age: % of people aged between 20 and 50	19.2	26.1	22.9	1.7	1.4
Gender: % of female population	45.2	55.2	49.5	3.1	2.2
Race: % of non-Hispanic White population	54.8	99.5	89.6	8.6	7.7
Access to healthcare: % of uninsured population	2.5	15.2	8.4	5.0	3.2
Available sunlight: daily sunlight insolation in KJ/m^2	13,133.0	15,731.8	14,306.0	916.3	679.4

Table 2. Descriptive Statistics for the Explanatory Variables.

GWR Model Building

Many early contextual studies on disease patterns are criticized by their use of a conventional global regression modeling technique, such as Ordinary Least Squares or OLS regression (Moore and Carpenter 1999), because the technique violates some important assumptions (e.g., independence of observations and spatial stationarity of the relationship between independent and dependent variables) when spatial data are used in the studies. GWR (Brunsdon et al. 1996; Fotheringham et al. 2002) relaxes these assumptions and enables the analysis of spatially clustered data. GWR is often considered as an extension of OLS regression, since it allows local instead of global parameters to be estimated, hence making it possible to model spatial variations within the data (Fotheringham et al. 2002). Unlike OLS regression, which produces a single global model across space, GWR simultaneously conducts multiple regressions for different data units so that there is one regression model per spatial data unit (e.g. a county) (Hipp and Chalise 2015). In a GWR model, observations near a particular data unit will have more influence in the estimation than observations distance away (Hipp and Chalise 2015). Given the weaknesses of OLS regression and strength of GWR, this research uses GWR for analyzing the spatial non-stationarity relationship between MS death rates and county contextual characteristics in the New England region.

The first step is to examine the dependent variable and explore its spatial heterogeneity. If the MS death rates are not spatially clustered, there is no need to build a spatially explicit model. The Moran's *I* Index (Anselin 1995) provided by ArcMap 10.3.1 (ESRI 2015) was used to identify the clustering of MS death rates across counties in the New England Region. Moran's *I* ranges from −1.0, perfectly dispersed (e.g., a checkerboard pattern), to a +1.0, perfectly clustered. In this study, a Moran's *I* score (0.202) and *p* value (0.0049) were generated, indicating

MS death rates are spatially clustered and the result is statistically significant. A Local Moran's *I* Cluster Analysis of MS death rates was conducted, and the results are shown in Figure 2 below. The map demonstrates five different types of spatial clustering: (1) high-high, for counties with high MS death rates that are in close proximity to counties with high MS death rates; (2) low-low, for counties with low MS death rates that are in close proximity to counties with low rates; (3) high-low (known as spatial outliers), counties with high MS death rates, but are proximate to counties with low rates; (4) low-high (also known as spatial outliers), for counties with low MS death rates, yet are in close in proximity to counties with high rates; (5) not significant, for counties where there is no significant spatial clustering. As illustrated in Figure 2, a low-low spatial cluster was found in most counties located in Connecticut and those within Greater Boston region; while a high-high spatial cluster is overlapped with counties located in the Southwestern Maine and Northern New Hampshire and Vermont.

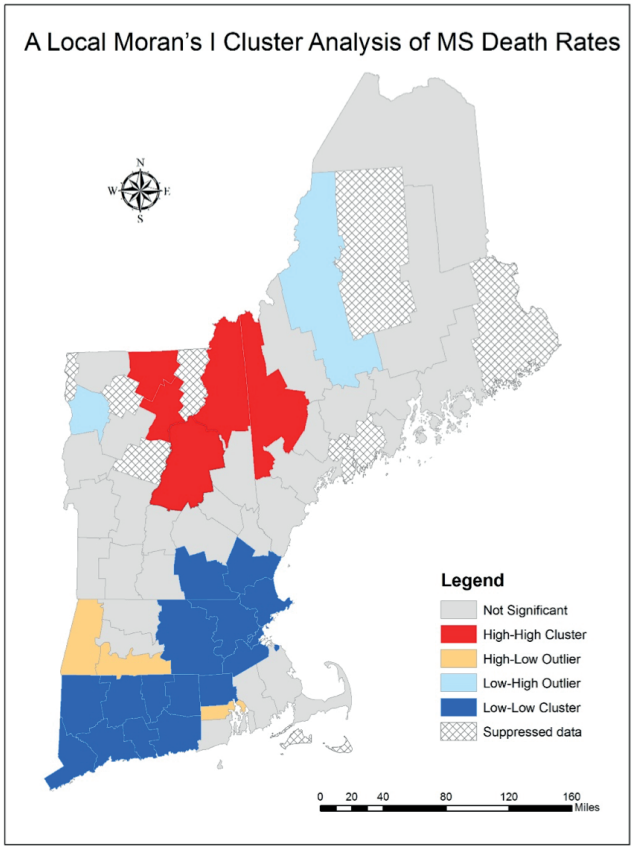

Figure 2. A Local Moran's *I* Cluster Analysis of MS Death Rates.

OLS multivariate model (Aiken and West 1991) in SPSS 22 was then used to conduct initial data exploration and model specification. Two factors motivated the decision to first specify the OLS model: 1) to identify independent variables significantly correlated with the dependent variable (MS death rates) before specifying the GWR model; and 2) the GWR software used for spatial analysis does not provide a variance inflation factor (VIF) to assess multicollinearity. If the standard regression equation in the investigation of MS death rates is given by:

$$Y_i = \beta_0 + \sum_k \beta_k x_{ki} + \varepsilon_i$$

where Y_i is the MS death rate at county i, β_0 is a constant term (i.e., the intercept), and β_k measures the relationship between the independent variable x_k and Y for the set of i counties, and ε_i is the error associated with county i. It should be noted that $i \in C = \{1,2,...,n\}$ which is the index set of locations of n observations (i.e. all counties in the New England Region).

It should be noted that the above equation "results in one parameter estimate for each variable included" (Cahill and Mulligan 2007). The summary of the OLS analysis result is presented in Table 3 as below. In the OLS regression, included were only variables significantly correlated with the dependent variable – MS death rates. The OLS model is significant ($F = 3.984$, $p < 0.05$). The adjusted R^2 value is 0.21 which means that the model explained 21.0 percent of the variance in county-level MS death rates. The VIF for all variables was less than 4.0, a commonly used cutoff point, suggesting no multicollinearity was detected among the independent variables (Table 3).

Variables	β	SE	p value	VIF
Intercept	2.555	1.886	> 0.05	-----
Available sunlight: yearly average sunlight	-1.7×10^{-4}	0	< 0.05	1.386
Race: % of White Population	1.642	0.813	< 0.05	1.234
Access to healthcare: % of Uninsured Population	0.618	2.086	< 0.05	1.161

Table 3. Results from Ordinary Least Square Model of County-Level MS Death Rates.

As shown in Table 3, there is a positive and significant relationship between MS death rates and the percentage of White population as well as between MS death rates and the percentage of uninsured population. In other words, the higher the percentage of White people or people without insurance coverage in a county, the higher MS death rate in that county. As negative and significant relationship is detected between MS death rates and available sunlight. In other words, the lower the available sunlight in a county, the higher the MS death rate in the county. Age and gender are insignificantly related to MS death rates in this study. The residuals of the OLS model were spatially auto-correlated (Moran's $I = 0.12$; $p < .05$). In other words, the OLS model overestimated MS death rates for some counties, while it underestimated the outcomes for some other counties.

Then, the same set of variables was then used to specify a GWR model using the GWR4 software http://geodacenter.asu.edu/gwr). GWR is a modeling technique used to explore spatial non-stationarity (Brunsdon et al. 1996). The "main characteristic of GWR is that it allows regression coefficients to vary across space, and so the values of the parameters can vary between locations" (Mateu 2010, 453). In other words, instead of estimating a single parameter

for each variable, GWR estimates local parameters. By estimating a parameter for each data location (i.e. county) in the New England Region, the GWR equation would only alter the OLS equation as follows:

$$Y_i = \beta_{0i} + \sum_k \beta_{ki} x_{ki} + \varepsilon_i$$

where Y_i is the MS death rate at county i, β_{0i} is the constant term at county i, x_{ki} is the explanatory variable (i.e. available sunlight, race, or access to healthcare) at county i, β_{ki} is the value of the parameter for the corresponding explanatory variable at county i, and ε_i is the error term at county i. It should be noted that $i \in C = \{1,2,...,n\}$ which is the index set of locations of n observations (i.e. all counties in the New England Region).

GWR becomes useful when "a single global model cannot explain the relationship between some sets of variables" (Brunsdon et al. 1996, 281). In the GWR model, a continuous surface of parameter values is estimated under the assumption that locations nearer to i will have more influence on the estimation of the parameter $\hat{\beta}_i$ for that location. Consequently, GWR allows researchers to explore "spatial non-stationarity by calibrating a multiple regression model which allows different relationships to exist at different geographical locations" (Leung et al. 2000, 9). The GWR model was used to explore the macro-level spatial non-stationarity of the statistical relationship among MS death rates and the predictors including available sunlight, race and access to healthcare.

While conducting GWR, the adaptive kernel was used, which was produced using the bi-square weighting function. The adaptive kernel uses varying spatial areas, but a fixed number of observations for each estimation. It is the most appropriate technique when the distribution of observations varies across space. In this case, observations (counties) are much smaller and closer together in the South and Southeast than they are in the North. Finally, a process that minimizes the Akaike Information Criteria (AIC) was used to determine the best kernel bandwidth. The parameter estimates and t values produced by the software were exported and mapped using ArcMap 10.3.1 (ESRI 2015).

Results and Discussion

A Local Moran's *I* cluster analysis (Anselin 1995) was conducted for the residuals of the GWR as a diagnostic for the collinearity in GWR residuals. There is no violations of residual independence. The GWR model generated β coefficients for each county (See Table 4 and Figure 3 as below). The direction of the relationships among the dependent variable and the predictors was consistent as expected in all counties included in the study and the MS death rates at the individual county-level were significantly clustered (Moran's *I* value: 0.202 and $p < 0.05$). This clustering and the relationships suggest that local socio-economic contexts and environment attributes are associated with MS death rates and that the amplitude of such contexts and environments varies across the New England region.

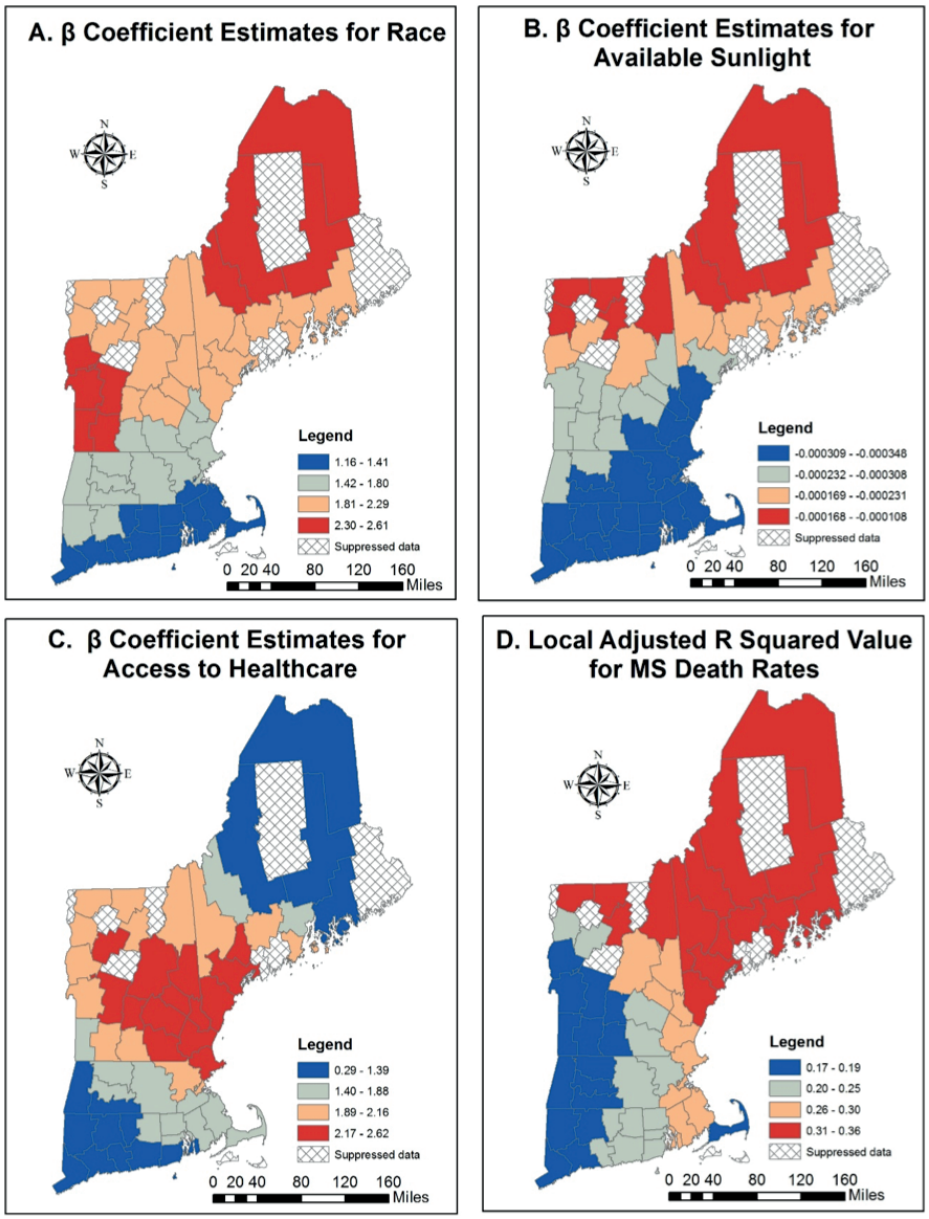

Figure 3. Spatial variations in β coefficient estimates in New England counties for explanatory variables: race (map A), available sunlight (map B), access to healthcare (map C), and local R squared value (maps D) from the GWR model .

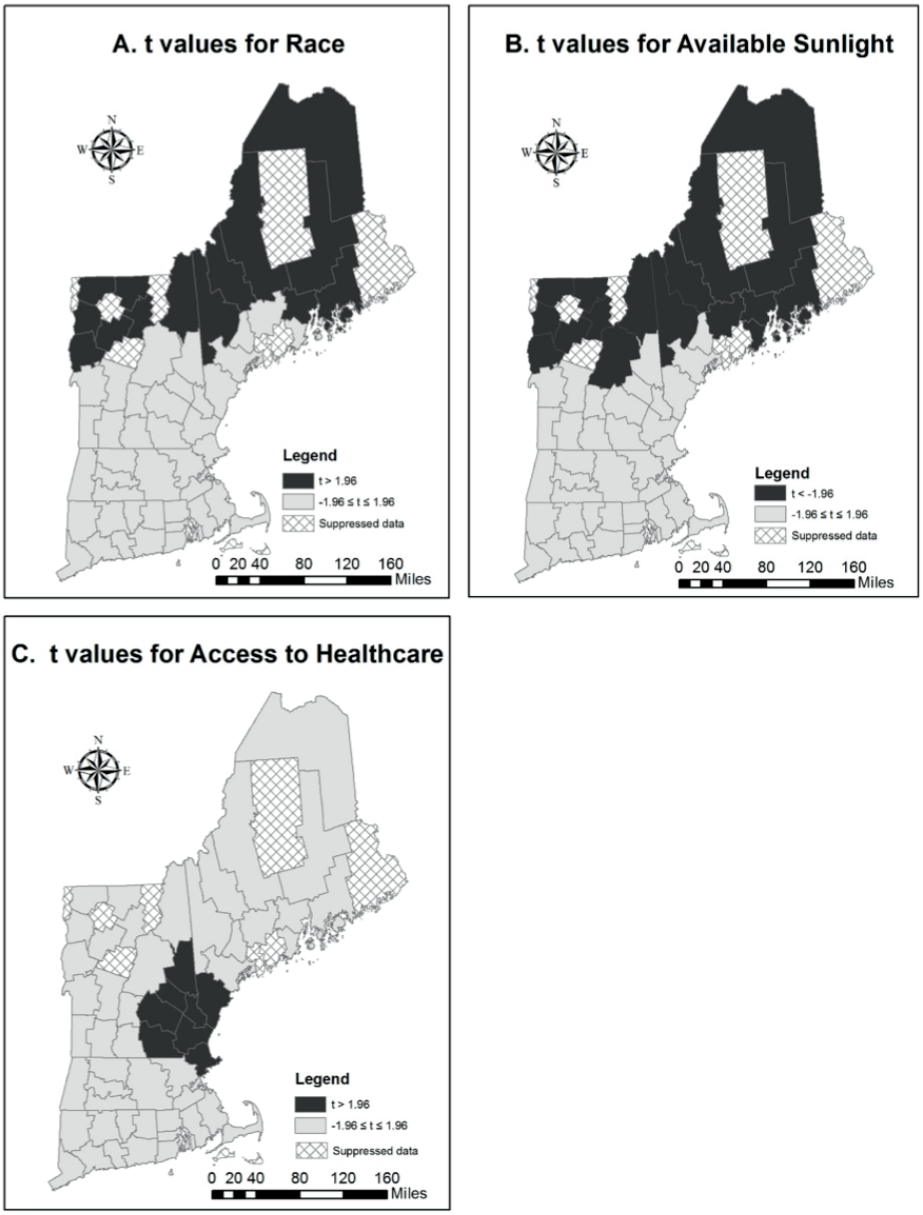

Figure 4. Spatial variations in t values in New England counties for explanatory variables: race (map A), available sunlight (map B), access to healthcare (map C). Note: 1.96 is the cut-off value for t-test. When $|t| > 1.96$, the β coefficient estimate for a variable is significant at a significance level of 0.05.

Variables	β coefficients		Percentage of Counties by 95% of t Statistics		
	Min	Max	$t^* < -1.96$	$-1.96 \leq t^* \leq 1.96$	$t^* > 1.96$
Intercept	-0.74	0.96	-----	-----	-----
Available sunlight: yearly average sunlight	-3.48×10^{-4}	-1.08×10^{-4}	24.5	75.5	0.0
Race: % of White Population	1.16	2.61	0.0	80.7	19.3
Access to healthcare: % of Uninsured Population	2.1	2.6	0.0	86.0	14.0

Table 4. Results from GWR Model of New England County-Level MS Death Rates.

* 1.96 is the cut-off value for t-test. When $|t| > 1.96$, the β coefficient estimate for a variable is significant at a significance level of 0.05.

As shown in Table 4, available sunlight, defined by yearly average sunlight, negatively associated with county-level MS death rates. This finding supports previous research which suggests the farther away from the equator a person lives and the less sun exposure they could have the higher the risk of developing MS which can lead to more deaths caused by the disease. As demonstrated in Table 4, race, defined by the percentage of White population, is positively associated with county-level MS death rates. This finding is consistent with previous research findings which suggest that MS, so far, has been found to be most prevalent among Caucasians, particularly those of European ancestry. As illustrated in Table 4, access to healthcare, defined by the percentage of uninsured population, is positively associated with county-level MS death rates.

The direction of the relationships between the dependent variable and the explanatory risk factors in Table 4 provides insights regarding MS disease intervention in the region. The negative relationship between MS death rates and yearly average sunlight confirms the importance of sun exposure. Recent research suggests the risk of having a preliminary symptom of MS decreased by 30.0 percent for every 1,000 kilojoules of exposure to ultraviolet light (Lucas et al. 2011). Given the fact that yearly available sunlight is a constant in a place, people living farther North in the New England region should have more sunlight exposure by spending more daylight hours outside.

The positive relationship between MS death rates and the percentage of White population should not be mistakenly explained as African Americans, Asians or Latinos are risk free. In fact, for example, given the false impression that African Americans are less likely to develop MS disease, research shows they are less likely to receive care from a neurologist specializing in MS or to go to an MS clinic (Khan et al. 2015). Also, research shows that, for African Americans with multiple sclerosis, the MS disease progresses much faster than it does for White peers (Khan et al. 2015). Therefore, further research is needed to examine the relationship between MS correlates and race-specific MS prevalence rates if race-specific MS data is available.

The positive relationship between MS death rates and the percentage of uninsured population is particularly important because the United States does not have a uniform health system, has no universal health care coverage, and only recently enacted legislation mandating healthcare coverage for almost everyone. In 2014, there were 283.2 million people in the United States. 89.6 percent of the U.S. population had some types of health insurance while the rest of the population didn't (Smith and Medalia 2015). Given the fact that the Affordable Care Act (or ACA) may be repealed in the near future, a significant increase of MS prevalence or death in the New England region may happen in the long run.

As shown in Table 4 and Figure 3, the change in magnitude of the coefficients suggests spatial non-stationarity of the relationship between MS death rates and the predictors. The variation in parameter estimates from GWR suggests thUe necessity to apply this spatial statistical tool to future MS studies that would be restricted by using global OLS models, since GWR provides insights on how a particular explanatory variable influences MS death rates across the study area. As demonstrated in Figure 3A and 4A, the race variable had the highest impact in counties located in northern Maine and southern Vermont. As shown in Figure 3B and 4B, available sunlight had the greatest effect in counties located in northern New Hampshire, Maine and Vermont. Counties in these areas have a relatively less available sunlight with disproportionately high rates of MS death. As illustrated in Figure 3C and 4C, in counties located in southern New Hampshire together with Essex County, Massachusetts, and York County Maine, access to healthcare had a greater association with MS death rates than any other variable. The GWR results are potentially useful in targeting priority areas for MS disease prevention and intervention, and for informing local health planning and policy development, since they suggest that preventive policies should be informed by an understanding of MS death's contextual factors. In particular, these factors should be examined locally, and different policies aimed at preventing and reducing MS death should be applied in different counties of the New England region. For example, different prevention policies could be recommended for the counties located in northern New Hampshire, Maine and Vermont as well as the counties in southern New Hampshire. A policy designed to increase access to healthcare may be sufficient to reduce MS prevalence or death in southern New Hampshire. However, the same approach is unlikely to be effective in the counties located in northern New Hampshire, Maine and Vermont. In those areas, regeneration initiatives and MS prevention/intervention programs aimed at increasing people's outdoor time and early and frequent screening of MS disease should be considered as tools for preventing and reducing MS death.

The importance of using spatial statistical tools such as GWR in future MS studies can also be confirmed by the adjusted R^2 value (see Figure 3D). The adjusted R^2 for the GWR model ranged from 0.17 to 0.36, with an average of 0.27, while the adjusted R^2 in the OLS model was 0.21. Explicitly, the OLS R2 of 0.21 masks a wide distribution of local associations between the independent variables and MS death rates. In other words, without GWR, it would be unable to estimate the variance of local associations. In a county such as Penobscot, Maine, the GWR model explained 36.0 percent of the variance in MS death rates. However, in counties such as Litchfield, Connecticut and Berkshire, Massachusetts, the model did not explain much of the

variance (from 17.0 to 20.0 percent), a spatial variation that would have been neglected with the OLS model alone. In addition, the local adjusted R^2 value can be used as goodness-of-fit measure for the GWR model. As shown in Figure 3D, the local adjusted R^2 values increased throughout the New England region from southwest to northeast, indicating the GWR model better explains the variance in MS death rates in counties in the northeast of the New England region.

This study is not without limitations. The first group of limitations is associated with geographic boundary effect, such as Modifiable Areal Unit Problem (MAUP) and edge effect. It should be noted that the statistical relationships drawn from areal data must be carefully interpreted. Robinson (1950) long ago suggested the data scale/boundary problem and clearly explained that inferring individual level relationships from macro-level correlations is inappropriate. In this study, county boundaries were used as the units of analysis and the relationships between MS death rates and contextual characteristics at the county level thus cannot be interpreted as and/or applied to individual level relationships. In addition, GWR model is limited by the edge effect, whereby counties located on the edges of New England do not have the 360° influence of counties in the region's interior.

The second group of limitations is related with data availability. In this study, encountered are missing data and time alignment problem. For example, ten counties in New England have no reported MS death data because CDC intentionally suppressed the data. MS death counts were collected by the CDC during 1999 and 2014, but the benchmark – residential population at each county was collected by the Census Bureau in the year of 2010. In addition, the local R^2 values accounted for 17.0 to 36.0 percent of county-level MS death rates, which means that other risk factors associated with MS disease need to be added into the GWR model. For example, a defected gene on chromosome six is an important risk factor. People whose close relatives have MS are more likely to develop the disease (Donati and Jacobson 2002). However, no organization or government agency collects and releases personal MS genes data or data regarding people whose close relatives have MS at the county level or a finer scale.

Conclusion

This study analyzed the spatial distribution and correlations of MS death rates in the New England region. To be specific, this research incorporates demographic, socio-economic and environmental correlates with MS death rates. The relationship between the disease and predictors, such as available sunlight, race, and access to healthcare, are not new (Freedman et al. 2000; Neri and Kroll 2003; Kakalacheva and Lunemann 2011; Kingwell et al. 2013), but little research was done to investigate the spatial heterogeneity in the relationship. This study fills the gap by illustrating that there is a significant association between MS death rates and the explanatory variables and that this relationship has a spatial but nonstationary association which highlights the need for local and context-specific MS prevention and intervention programs. In other words, using GWR, public health researchers and practitioners can gain an understanding of health-related issues and respond to the notion that "all health is local" (Gebreab and Diez-Roux 2012). The results of this study can also be used by local public health departments to

tailor messages and materials for their target audiences. For MS research, this study presented an initial and exploratory step in this direction, but much more in-depth work remains before public health researchers and practitioners understand why these spatial variations exist and why predictors, such as available sunlight, race, and access to healthcare, have very low explanatory effect in some counties, but explain up to 36.0 percent of MS death rates in other counties. Further explored should be MS deaths caused by the migration from low risk to high risk counties in the New England region (as shown in Figure 2) if longitudinal MS data are available. Such research can help average people to make better migration decisions (i.e. avoiding high risk areas) if MS deaths are found to be correlated to risk factors such as time of migration, race, gender, and age.

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ELLEN SEMPLE'S GEOGRAPHY of the Mediterranean Region: The Biography of a Book

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ABSTRACT

Ellen Churchill Semple's last book, *The Geography of the Mediterranean Region: Its Relation to Ancient History*, is the least known of her three volumes on human geography. Its neglect by geographers, beginning not long after its publication, was accelerated during the 1930s. Reasons include the decline of interest in classical geography as a part of geography's task, the development of small-scale research methods and changing disciplinary objectives, and the designation of historical geography as either a responsibility of historians or, at most, permitting only cross-sections of the geographies of specific pasts, with little attention to historical processes.

This essay examines Semple's Mediterranean project as a whole, including an analysis of her earlier Mediterranean work. It argues for the significance of the changing methods and emphases revealed in her late Mediterranean publications and book chapters and traces her struggle to complete the final product. It also traces the changing relations within American geography as later scholars, several of them women, have reassessed Semple's late work. The article closes with an argument: why today's geographers should read *The Geography of the Mediterranean Region*, as a model of how to write better geography.

Key words: Harlan H. Barrows, history of American geography, Mediterranean region, Ellen Churchill Semple

It was her best book, and unfortunately neglected.
-Samuel Van Valkenburg

Ellen Churchill Semple (1863-1932) was a prolific author, researcher, and faculty member in two major American geography programs during the first third of the twentieth century. Through her teaching, lecturing, and publications, she became an important figure in the early development of American human geography (Colby 1933; Conzen, Rumney and Wynn, 1993; Bushong 1999). In addition to her significant articles, notably "The Anglo-Saxons of the

Kentucky Mountains" (1901), Semple published three major books: *American History and Its Geographic Conditions* (1903), *Influences of Geographic Environment* (1911), and *The Geography of the Mediterranean Region* (1931). The second volume was the most influential, and its varied reception in the English-speaking geography world has been extensively studied in a thoughtful volume by Innes Keighren (Keighren 2010).

The underlying question of this essay is this: what was the twenty-year effort that led to Semple's Mediterranean book, and how does it differ, in kind or in degree, from her earlier publications? In these later years, as we shall see, Semple moved from her earlier work in significant ways. In a sense, we need to understand that there are three kinds of chapters within the covers of the Mediterranean book. To understand the book, one must ignore the chapter numbers and, in effect, see the book as three books, each with a differing intellectual approach. Her late essays and book chapters show little of the "environmental influence" trope that is usually ascribed to her work.

Semple's subtitle for the Mediterranean book, "Its Relation to Ancient History," is also somewhat misleading. Much in the late-written chapters treats of prehistoric human activity, for example. In other places Semple stretches the category of "ancient history" to include events as late as the First World War. The later chapters of the Mediterranean book show an analytic historical mode, which subtly changes the form of Semple's geography.

Why should we read Semple's last book? Why does it matter? Semple's Mediterranean book is less a pendant to *Influences* than a record of Semple's gradually shifting concept of what human geography ought to be, i.e., a geography that incorporates genesis and human-directed environmental change. Semple's articles and chapters increasingly show the power of human activity to shape and create a humanized environment. Aside from that, her scholarship (even if somewhat dated now), has a style and a clarity of writing that makes the book still worth the reading.

Semple's Mediterranean project, if studied on its own terms, provides in its late phases a substantive work that suggests a different path for historical geography than the restricted one that prevailed for three decades after her death. The newer path that she outlined in her later Clark years might have provided human geographers with methods and perspectives that only began to take root in historical geography in the 1960s. Unfortunately, as Allen Bushong has put it, "her geography colleagues, with few exceptions, ignored the work" (Bushong 1999, 637-638).

The Road to Semple's Last Book

That in Semple's early work in human geography, or, as she expressed it, anthropogeography, she embraced the idea of "environmental influence" as a guiding principle is beyond doubt. Nor is her long-term commitment to the classical world. (Semple had taught ancient Mediterranean history and its geographic context in her sister's school in Louisville, KY.) Both appear in the first paragraph of her 1899 study of the Hanse towns of northern Europe. Here Semple argued that the influence of enclosed sea basins favored the emergence of maritime trade and naval power. Land-locked bodies of water, indented coastlines, and numerous islands assisted the early development of maritime trade.

The Mediterranean's eastern sea basin provided an ideal set of conditions that developed Phoenician seamen, their successors, the Greeks, in the same area, and the Romans further west. Rome's maritime power ended with the fall of the Roman empire, but successor city-states in Italy - Genoa, Pisa and Venice - took the places of the earlier groups. All of them were indebted to the development of "capacious, protected" harbors. The happy situation of being at the melting-pot of a continental land route and a sea route were significant elements that aided their commerce and their conquests (Semple, 1899).

A more full-throated environmental explanation occurs in her address, "Emphasis Upon Anthropogeography in Schools," given at the 8th International Geographical Congress, held in Washington, DC in 1904. In it, Semple argues that "geography is the study of the land and its effect upon its people," but that the land is understood "only when studied in the light of its influence upon its inhabitants," such as "the climate which determines" and "the rainfall and soil which control." In these, geography reveals "the persistent, potent forces back of political bodies and legislative enactments...." (Semple 1905, 657).

Quoting Friedrich Ratzel, Semple contended that "the most important fact in the history of Greece was its location at the threshold of the Orient," an influence she developed later in *Influences of Geographic Environment*. Semple argues further that "by comparison of different periods... the same geographic factor is seen to operate continuously, though under new aspects." This point also foreshadows her argument in *Influences*. Among her examples are Greece, from an ancient maritime power to the carrying trade of the present. She ends with a paean of praise for environmental influences: "...geographic forces are stable, persistent; they operate from day to day and from century to century. They constitute the soil in which empires are rooted, and they rise in the sap of the nation" (Semple 1905, 662-663).

If one wishes to characterize Semple as a "geographical determinist," the 1904 paper could certainly support that label. Human initiative and culture change are in short supply. But is such a conclusion, this "scarlet letter" hung around Semple's neck for decades, and endlessly repeated in the lore of the discipline, unchallengeable?

Certainly some, though far from all, of her next book, *Influences of Geographic Environment*, and the articles leading up to some of its chapters, seem to confirm this. This is especially true of the opening chapter, "The Operation of Geographic Factors in History." But a number of the more substantive chapters, such as Chapter 15, "Mountain Barriers and Their Passes," do not. In these, one sees the beginnings of the historical analysis of the *Geography of the Mediterranean Region*. Man is seen as part of "the mobile envelope of the earth." While mountains may "retard, arrest, or deflect" historical movement, that same human movement "seeks the valleys and passes, where communication with the lowlands is easiest" (Semple 1911, 521).

Transition slopes have "human value" and "habitability" (Semple 1911, 524). Mountain passes have facilitated migration of people throughout history: "Nowhere does history repeat itself so monotonously, yet so interestingly as in these mountain gates" (Semple 1911, 545). This is human action, a function of the historian, not the fixed presumption of the "geographical determinist."

This paper is not intended as one for Semple's second book. But it needs to be said that the usual dismissal of it as "determinist" is somewhat misleading. One would have to be extremely myopic to read Chapter 5, "Geographical Location" and Chapter 6, "Geographical Area," to find any trace of environmental determinism. Nor can one dismiss entirely Semple's (1911, vii) own Preface, in which she writes "the writer speaks of geographic factors and influences, shuns the word geographic determinant, and speaks with extreme caution of geographic control."

The Making of the Mediterranean Book

We now turn to the history of the creation of the Mediterranean book itself. How it came together requires a complex analysis. In the process, this late work resulted in something Semple herself might not have fully realized when she began it. As we shall see, the book grew and changed in the process of writing its later segments. As a result, it became something other than what either her contemporaries or later historians of geography have believed it to be.

In a letter to John K. Wright of the American Geographical Society, Semple looked back at *Influences*. (Apparently there was some interest at the Society in republishing it, with a new preface by the author.) In reflecting on it, Semple wrote that she had "no particular hopes or ambitions for the book....My sole aim was to do it well....When the book was finally out I started around the world and did not hear anything about it for eight months. I was content not to. I had worked... to the best of my ability, and was not greatly concerned about the result. A curious state of mind, perhaps, but that's me" (E. C. Semple to J. K. Wright, 1 February 1922, American Geographical Society Archives, University of Wisconsin/Milwaukee).

One can read two things into this note. One is, if this recollection of Semple's state of mind eleven years before is accurate, when *Influences* was out, it was in a sense over and done with, much as her *American History and Its Geographic Conditions* was over and done with once it was out in 1903. Second, Semple apparently by then had no interest in writing a book that would be simply a regional example of the ideas that had already appeared in systematic form in *Influences*. Rather, the gap had put *Influences* to one side.

In her trip around the world, in 1911-1912, Semple and her travelling companions (both Vassar College friends) had spent their time in East and Southeast Asia. In their lengthy stay in Japan, where she also had friends, two of them Vassar college-mates, she gathered material for what later became two significant articles, one on Japanese agriculture and the other on Japanese colonial methods (Adams, 2014). After visiting India, she and her friends arrived in Greece early in 1912.

Here they engaged a car and driver. Since it was only one of two in the country (the other was owned by the King), they were treated with great respect. They travelled as far north as the Vale of Tempe on the Turkish border and returned to Athens on the route Xerxes and his men had taken on the way to what became the Battle of Thermopylae. (Their driver was less concerned with Greek history than with the effect of the hot springs on his tires.) They also visited Sparta and the Peloponnese. All the way, Semple had made notes on stock raising, agriculture, and ancient commercial routes, particularly pass routes, all of which were incorporated into her journal articles and the resulting book (*Worcester Telegram*, 6 July

1921, "Anthropo-geographer is title of woman giving Clark summer course." Clark University Scrapbooks; James, P.E., W.A. Bladen and P.P. Karan 1993).

From Greece, the party moved through the western Balkans to Italy and Switzerland, then north and west to Germany, France, the Low Countries and Scandinavia. Semple then spent several months in Great Britain. Here she lectured to both popular and scholarly audiences, including at Oxford University, the Royal Geographical Society, and the four branches of the Royal Scottish Geographical Society, told in a fascinating chapter in Innes Keighren's important book on the reception of *Influences*. Semple returned to the United States in December 1912, wrote her two papers on Japan, and taught her anthropogeography course at the University of Chicago in the Spring quarter of 1914. She also began work on her first Mediterranean paper, "The Barrier Boundary of the Mediterranean Basin and its Northern Breaches as Factors in History." She read this paper at the annual meeting of the Association of American Geographers in December 1914. It was published in the Association's *Annals* the following year (Colby 1933, 234-235; James, Bladen and Karan 1983, 41-42; Keighren 2010, 97-1010).

Semple had a deep interest in mountains and mountain passes. Chapter 15 in *Influences* is titled "Mountain Barriers and their Passes," and is followed (Chap. 16) by one titled "Influences of a Mountain Environment." Semple allocated four chapters in her Mediterranean book to "The Barrier Boundaries of the Mediterranean Region." The one on "The Northern Barrier Boundary and its Breaches" is most clearly related to her 1915 published paper. We can see from it that there is a difference between the earlier ones – "influences of environment" is replaced by "factors in history," to put it simply. Comparison of the chapters of 1911 and the paper of 1915 suggests the beginnings of a shift of emphasis in Semple's approach. The later essays place more emphasis on the activity in the breaches, the enormous exchange of materials and products through them, and their role in the spread of Mediterranean culture.

Seemingly her experience of having been driven through and studying the western Balkans pushed her into new realities. Indeed, in a footnote in the 1915 article, she wrote that her understanding of the Balkan barrier and passes was "based upon previous observations during a motor trip through Dalmatia, Bosnia, Herzegovina, and Montenegro in 1912." In the spring of 1922, Semple went to Italy for six months, specifically to study the Abruzzi Range, the Brenner Pass, and the Swiss Alps. Again, she made frequent stops and took copious notes (Semple 1915, 29; *Boston Transcript*, 10 March 1922. Miss Semple, only woman member of faculty, to visit Italy. Clark University Scrapbooks).

While still affiliated with the University of Chicago, Semple completed five additional articles on Mediterranean subjects. These were "Pirate Coasts of the Mediterranean Sea" (published in the *Geographical Review* in 1916); "Climatic and Geographical Influences on Ancient Mediterranean Forests and the Lumber Trade" (*Annals of the Association of American Geographers*, 1919); "The Ancient Piedmont Route of Northern Mesopotamia" (*Geographical Review*, 1919, - a version of a paper she had written for "The Inquiry"); and "Geographical Factors in the Ancient Mediterranean Grain Trade" (*Annals of the Association of American Geographers*, 1921). All of these became chapters in the Mediterranean book. In addition, she wrote a lengthy summary of Ewald Banse's Die Turkei: Eine Moderne Geographie, 3rd ed., 1919 (*Geographical Review*, 1921), which she frequently cited in her later volume (Colby 1933, 238-240).

Wallace Atwood had been a colleague of Semple as a member of the closely allied geology department at Chicago. Atwood had moved to Harvard University's geology and geography department in 1913 as Professor of Physiography. In 1920 he had been elected President of Clark University, tasked with establishing a major department of geography there, beginning in 1921. He persuaded Semple, then President of the Association of American Geographers, to join him as the first faculty appointee of the new Graduate School of Geography. She was first appointed Lecturer (the title she held at Chicago), but in 1923, after the University of Kentucky had awarded her an honorary degree, she became Professor of Anthropogeography, the first woman to hold faculty rank at Clark. Charles Colby, in his memoir of Semple, wrote that "At Clark she came into her full powers as a teacher and as a director of research" (Colby 1933, 236; Koelsch 1980).

Figure 1. Ellen Churchill Semple, Clark University Office, 1920's. Photo courtesy of the Clark University Archives.

The School began operations in the fall of 1921. Semple normally taught in the fall semester only, which gave her the opportunity to travel, to teach elsewhere, and to write. Primarily she taught courses in anthropogeography and the geography of the Mediterranean, and occasionally offered courses in the geography of Europe or of portions of Asia. Her courses were attended largely by graduate students, though select advanced undergraduates might be admitted. Occasionally she offered seminars or research courses in anthropogeography or the history of geography. She was unquestionably the most internationally visible faculty member in the School (Clark University Catalogues; Koelsch 2013, 339-345).

Semple published seven professional articles on the Mediterranean world while at Clark before her disastrous heart attack in 1929. These were "The Influence of Geographic Conditions Upon Ancient Mediterranean Stock-Raising" (*Annals of the Association of American Geographers*,

1922); "Climatic Influences in Some Ancient Mediterranean Religions", presented at the Toronto meeting of the British Association for the Advancement of Science in 1924 (*Scottish Geographical Magazine*, 1924); "Templed Promontories of the Ancient Mediterranean" (*Geographical Review*, 1927); "Ancient Mediterranean Agriculture" (in two parts, *Agricultural History*, 1928), originally given at a meeting of the Agricultural History Society in December 1927; "Irrigation and Reclamation in the ancient Mediterranean Region" (*Annals of the Association of American Geographers*, 1929); and "Ancient Mediterranean Pleasure Gardens," (*Geographical Review*, 1929) (Colby 1933, 239-240).

If we examine these articles in chronological order, we see an interesting shift in Semple's point of view. In the earlier papers, though Semple still plays the "influence card" in the titles, the internal content gets less and less deterministic. As she discovers more, owing both to her travels and her additional research, other explanations begin to enter her argument. Here we might cite the experience with "The Inquiry" during World War I, and even such small changes as changing her anthropogeography course from "Principles of Anthropogeography" to "Anthropogeography of the Mediterranean," to say nothing of her wide reading and her interactions with other scholars.

"Semple and Harlan Barrows" "Geography as Human Ecology"

Harlan Barrows, Semple's former colleague in Chicago, had succeeded her as President of the Association of American Geographers. As such, he had given an important address, "Geography as Human Ecology," at the Association's annual meeting in December 1922, subsequently published in the Association's *Annals*. In it, Barrows argued that "Geographers will, I think, be wise to view this problem in general from the standpoint of man's adjustment to environment, rather than from that of environmental influence ... and especially to minimize the danger of assigning to the environmental factors a determinative influence which they do not exert." The concept of "human adjustment" runs throughout the address (Barrows 1923; Koelsch 1969).

Semple was no fan of her former Chicago colleague. She wrote her former colleague and protégé Derwent Whittlesey from West Palm Beach in 1932 that "Barrows is like the deadly upas tree of the oriental tropics: contact with him seems to kill every aspiration above a deadly mediocrity" (E. C. Semple to D. S. Whittlesey, 8 March 1932. Harvard University Archives). But Semple began gradually to shape her later papers to Barrows" concept of "human adjustment." This enabled her to step away from her earlier argument for "environmental influences." That concept is "missing in action" in her late published articles, and from the additional chapters of her Mediterranean book. Furthermore, as Keighren has shown, at Clark she began to reshape her teaching. Although her early graduate students there, such as Preston James, found her teaching quite rigid, her later students found her more open to a give-and-take mentality in her classes. By the mid-twenties a sea change appears evident, within Semple's publications and in her courses (Keighren 2010, 142-144, 151-154).

The first Clark publications, on Mediterranean stock raising and Mediterranean religions, do not clearly show this. But beginning with her paper (in publication expanded to two papers and becoming two chapters of her book) given before the Agricultural History Society in 1927, she uses the trope of "human adjustment." In her opening statement of the first of the pair of papers, she begins to signal this shift of emphasis: "Ancient Mediterranean agriculture had to adjust itself to a complex group of geographic conditions." And this is restated in the same paragraph: "Agriculture was stimulated by the necessity of adjusting itself to these varied geographic conditions, and hence attained a precocious development which in many respects anticipated the best modern achievements" (Semple 1928a, 61).

Note that here she does not use the word "Agricultura*lists*" who are actually making the adjustments; that comes later. Yet throughout both articles, humans modify their environments in a number of ways: by improving methods of cultivation, by terracing, and by manuring and seed selection. Their methods include "careful tillage, intelligent selection of crops..., importation of foreign seed and foreign plants, painstaking seed selection," resulting in "a precocious form of intensive tillage" (Semple 1928a, 62). Further along, we read that "The ancient Greeks thus improved upon nature's method, while following nature's example, at a very early date. ..." (Semple 1928a, 91).

In the second article in *Agricultural History* (Chapter 15 of the book), we read that "The essence of ancient Mediterranean agriculture was the improvement of the soil. ..." (Semple 1928b, 129). And who improves the soil? Semple writes "The treatment and application of animal manures by the ancients reveals a painstaking adjustment to climactic conditions" (Semple 1928b, 136), "By age-long experiment the ancients learned the power of legumes to open up and mellow the soil..." and to make further adjustments to their environment. In this way "the ancients reveal a deep understanding of the manurial value of green legume crops...." (Semple 1928b, 143). And so on. These events are described not within a framework of environmental determinism, but of human adjustment to and use of the environment. In other words, the theme of Barrows" "Geography as Human Ecology".

The same theme appears in several of the chapters in *The Geography of the Mediterranean Region* that were not previously published as articles, and therefore dateable to Semple's Clark years. In the opening paragraph of Chapter 3, "Earthquakes and Volcanoes," physiographic features "stimulated observation, the correlation of facts; and finally they stirred the scientific imagination of the ancients to formulate theories of their origin. This intellectual response of a people to their environment was conspicuous and persistent...." (Semple 1931, 35). And again, in Chapter 5, "The Mediterranean Climate": "Advancing civilization was chiefly progressive adjustment to this environment, made by the peoples living within reach of the Mediterranean coasts" (Semple 1931, 83).

In Chapter 6, "The Rivers of the Mediterranean Lands," Semple writes that conspicuous erosion and deposition "impressed the ancient mind," and it was the ancient mind that led to the formation of sound physiographic principles. And again, in Chapter 8, "The Nile and Red Sea Breach," referencing Ferdinand de Lesseps, who enlarged the old Suez breach with his Suez Canal. This had made "a new adjustment to geographic conditions...." Similar statements can be found elsewhere in the book, and may serve to date the particular chapter (Semple 1931, 170).

Other chapters that seem to revert to Semple's older, more deterministic views? Take Chapter 9, "The Eastern Barrier Boundary and its Breaches." Under the subheading "The Transit Land of Mesopotamia," Semple cites "the recurrent operation of geographic factors in history" as responsible for the practices of commercial and territorial expansion between the Persian Gulf and the eastern Mediterranean. In the next paragraph, she raises the question "What are the geographic factors in this recurrent historical development, the drama which returns with monotonous action and theme, though the actors change in race, nationality and civilization from one age to another?" Many similar statements could be found in other chapters (Semple 1931, 178,180).

How do we make sense of such contradictions in the same book? The answer is simple. The chapters that embrace Barrows" formula of "human adjustment to environment" were clearly written after Barrows" Presidential Address. Those that express variants of Semple's focus on geographic factors or "environmental influences" were written earlier. For the quotations above from Chapter 9, we have an exact knowledge of the date. Semple incorporated in this chapter material from her study of Mesopotamia written for "The Inquiry." A partial copy of that document is with other Semple papers for that activity, now in the Manuscript Division of the Library of Congress. Its date of completion is on it: February 1, 1918 (Semple 1918, *passim*; Semple 1931).

The Nature of the Mediterranean Book

This brings us to rethink the nature of *The Geography of the Mediterranean Region*. It is a book that is not quite a book in the conventional sense. There is no single intellectual theme tying it all together, except that its content primarily covers the Mediterranean and its borderlands. Rather, it is a collection of essays, an anthology of Semple's writings on the subject, changing over time.

In his bibliographical review of American historical geography in *American Geography: Inventory and Prospect* (1954), Andrew Clark commented on Semple's last book. Clark argued that "the individual parts of the great series ultimately collected in *The Geography of the Mediterranean Region*... are important documents in any inventory of American historical geography." This is a significant statement. It suggests that in attempting to appraise the book as a unified whole, we can miss the diversity and utility of the individual parts (Clark 1954, 82).

In this respect, Semple's Mediterranean book is similar to that of her sometime student and Chicago colleague Derwent Whittlesey. Semple had encouraged Whittlesey to pick up the work she had hoped to write until, late in her final illness, she knew she could not complete a book on political geography. She provided him with several pages of notes she had made for her own use (These are now in the Whittlesey papers at Harvard University Archives).

Whittlesey agreed to take on that task, though the book he ultimately wrote, T*he Earth and the State* (1939) was very different from the one Semple, following Ratzel, would have written. The relevance of Whittlesey's book here, however, is that it too is a collection of essays that are somewhat independent of each other. Richard Hartshorne correctly described it in the *American Historical Review* as "a collection of related essays" (Hartshorne 1940, 92; Koelsch

2006). Semple's Mediterranean book was also a collection of essays, rather than a unified work. But the point here is that one can hardly pick out only the deterministic sentences in the earlier essays and ignore the shift of emphasis that characterizes the later ones.

But Semple's Mediterranean book is even more complex than we have seen thus far. Another scholar commented on it, in an essay almost contemporary with Andrew Clark's. In 1953, the Chicago sociologist Louis Wirth found three stages in Semple's intellectual growth, all represented in her work. He described them in this way:

[Semple's] "early emphasis on the determinative influence of habitat on ways of life and institutions subsequently shifted to a concern with man's adjustment to his natural habitat and still later to a primary interest in the interrelations between man in his group existence and his habitat. This brought human geography to a position where it was virtually identical with human ecology" (Wirth 1953, 66).

One finds this third stage, that of "the interrelations between man in his group existence and his habitat," most clearly expressed in Semple's late work at Clark. Such chapters and papers include "Templed Promontories of the Ancient Mediterranean" (1927); "Irrigation and Reclamation in the Ancient Mediterranean Region" (1929); "Ancient Mediterranean Pleasure Gardens" (also 1929); a late shorter piece, "Domestic and Municipal Waterworks in Ancient Mediterranean Lands" (1931); and the last two chapters in the Mediterranean book, "Trade and Industry" and "Colonization and Culture." These all conform to Wirth's view of human geography as "virtually identical" with human ecology.

The comments of Andrew Clark and Louis Wirth need to be taken seriously if one is to understand *The Geography of the Mediterranean Region*. With their thoughtful appraisals as tools, we are better equipped to understand both the merits of Semple's last book and its flaws. Semple's approach to human geography over time reflects the progressive sequence of her modes of thought. There are significant changes in Semple's work as she moved from an earlier commitment to environment as a major determinant in human action, to the intermediate status of Harlan Barrows" concept of adjustment to environment, to man's role in creating the human habitat. The final paragraph of "Trade and Industry" tells us that "the great universities, poets, philosophers and artists of the ancient world were found in commercial cities,... for here the currents of thought flowed full and fast" (Semple 1931, 686). And in the final paragraph of the book, in the chapter on "Colonization and Culture," we learn that "the high-water mark of Mediterranean civilization is to be found in the polished manners which characterized these ancient people" (Semple 1931, 705). Such lines are not frequently found in geography books. More to the point, they are not subject to "environmental determinism."

The Completion of the Mediterranean Book

In his interview with Semple, published in the *Worcester Telegram* on 3 March 1929, the reporter told his readers that twelve chapters of the Mediterranean book were now complete, including the two most recent, "Ancient Mediterranean Pleasure Gardens" and "Ancient Mediterranean Irrigation." Semple told the reporter that she hoped to have the book completed "within two years" (Worcester Telegram 3 March 1929: "Dr. Semple to leave for vacation in Kentucky." Clark University Scrapbooks).

But in November of that year, a time when she was teaching her Fall courses at Clark, Semple had a severe heart attack, coupled with the more lasting condition of "cardiac asthma." She was taken to a local hospital, where she remained under 24-hour care for about nine months. At times her doctors thought she would not survive, and only close relatives and President and Mrs. Atwood were permitted to visit, during her better days. But she rallied enough during the fall of 1930 to be moved to the home of Clark's Dean of the College, Homer Little, and his wife. There Semple remained, under 24-hour nursing care.

Her former Ph.D. student, Ruth Baugh, volunteered to come to Worcester that summer to help Semple finish her book. Working for at most two hours a day, Semple continued to write in bed. Clark provided secretarial help to type drafts as they were completed. By November, Semple was able to sit up for an hour or so each day. As she wrote Gladys Wrigley, "Desire to complete this book has kept me alive" (E. C. Semple to G. M. Wrigley, 29 August 1931, American Geographical Society Archives). Progress was gradual, but Semple was able to complete her final professional paper, "Domestic and Municipal Water Works in Ancient Mediterranean Lands," which was read for her at the Association of American Geographers meeting in Worcester in December, 1930, and subsequently published (Jackson 1931, Baugh 1932, Baugh 1961, Nash 1986, Trussel 1987).

Letters from Semple to Henry Holt in 1930-1931 suggest that Semple had taken full charge of her book manuscript. In October 1930 she reported "steady progress on my book. I confidently expect to finish every word of the text...." On 12 January 1931 she wrote that "My manuscript will be entirely ready by April first, all but the last chapter by March first.... All maps will be ready by March first, and half of them earlier." There was in fact some delay, but another letter on April 24 was accompanied by the first twenty-two chapters of the book and notes that all of the twenty-four maps had already been sent. She promised the incomplete Chapter 23 within three weeks. Miss Baugh, she noted, would be in Worcester around June 18th to aid Semple on the galley proofs. By 10 June her editor had gone over the manuscript "with increasing interest" (E.C. Semple to H. Holt & Co. 18 October 1930; 12 January 1931; 24 April 1931; H. Holt to E.C. Semple, 10 June 1931, all in H. Holt & Co. Archives, Princeton University Libraries).

Atwood had sought funding to bring Ruth Baugh for a second summer, ultimately securing support from the National Research Council. Miss Baugh was able to aid Semple in completing the book manuscript and to send off completed chapters to Holt. She accompanied Semple to cooler Petersham, Massachusetts where they completed the indexing, proof-reading, and other final matters. Miss Baugh remained in Worcester during the Fall semester to teach Semple's Mediterranean course, using rushed advance copies from Holt.

As Geoffrey Martin has told us, the original title of Semple's last book was "Geographic Influences in the History of the Mediterranean Region." All of President Atwood's appeals for financial support for Miss Baugh in the spring of 1931 used that title. Martin would not speculate as to who changed the title, though he thought the idea that Semple would have given up the word "influences" in the title "seems most unlikely" (Martin 2015, 416-417).

Nothing in the Holt files, whether for or to Semple, gives us the exact date of the title change. Semple uses "Mediterranean Book" in her correspondence with Holt. But it may be

possible to establish the change by indirection. First, we know from the *Telegram* report of March 1929 that Semple had then completed twelve chapters. Seven of these were written in her earlier "geographic influence" period; five were written later. She wrote twelve additional chapters (some of which began as published articles) after her illness, as well as one for a university magazine in Syria and "Promontory Towns of the Mediterranean" for Clark's short-lived *Home Geographic Monthly*. These too reflect her post-determinist period.

Semple had not used "environmental influence" (or its variants) in any title in seven years, and in the content of seventeen of the twenty-four chapters. Would either Semple or Holt then wish to continue the original title? It seems more probable that either Holt or Semple herself suggested the new title. This would probably have been about the time of the submission of the manuscript. This would be the last chapter Semple sent to Holt in early May, and Holt's letter to Semple of 10 June, when the editor had completed reading the manuscript. There is no letter, however, suggesting the change in either the Atwood or the Holt papers. (Semple to Holt, 24 April 1931; Holt to Semple 10 June 1931).

Figure 2. Ellen Churchill Semple. In recuperation, c. 1930 – 1931
Photo courtesy of the Clark University Archives

In late August, Semple had written Miss Wrigley from Petersham that she had made "a definite gain in health and strength" there. This was not to last. After spending a month in the hills of North Carolina, where the Atwoods visited her, she was taken to West Palm Beach for the winter. After Christmas, however, she had a relapse. On 7 May 1932, she wrote Isaiah Bowman that by June "I may be wandering through fields of asphodel to the Great Beyond." She died in West Palm Beach early the following morning (E. C. Semple to G. M. Wrigley, 29 August 1931.American Geographical Society Archives ; E. C. Semple to I. Bowman, 7 May 1932, American Geographical Society Archives).

On April 14th, 1932 the President of Henry Holt and Company had sent a letter to Semple, then in Florida, enclosing a royalty statement. In it he says that "We regard [Semple's] book as one of the most important books we have published in the last several years, and are proud to have it on our list." And her former Chicago colleague Charles Colby, in *Annals of the Association of American Geographers*, got it right: "No more courageous page has been written into the annals of American science or of American letters" (H. Holt to E. C. Semple, 14 April 1932. Princeton University Archives; Colby 1933, 237).

The Reception of the Mediterranean Book

Semple's friends produced a flurry of tributes in the guise of reviews in the geography periodicals during 1931-32, so that Semple could see them before she died. After her death, the Mediterranean book was of course mentioned in her obituaries. Charles Colby's memoir listed all of her publications, and praised her for completing *The Geography of the Mediterranean Region*, but made no comment on its substance. Three years later, in his Presidential Address to the Association of American Geographers, Colby praised Semple's *American History and its Geographic Conditions* and her contribution to "the philosophy of anthropogeography." Curiously, he does not mention her Mediterranean book (Colby 1936, 21).

Carl Sauer liked Semple as a teacher and a human being, and in a late address praised her abilities as a lecturer. "When she was dealing with the ancient Mediterranean," Sauer recalled, "you could watch the ships turning the promontories on which the temples stood. You went with her!" But Sauer was less pleased with her scholarship. His short biographical piece on Semple in the 1934 *Encyclopedia of the Social Sciences* asserted that she "was never concerned with the origin, content and succession of culture areas," that she "deals with the ancient Mediterranean area without regard to historical sequences," and that, though she had "no restrictions as to kinds of cultural data," she was "interested in whatever data could be related to environmental conditioning" (Sauer, 1934, 1970).

In his "On the Background of Geography in the United States", Sauer does not specifically mention the Mediterranean book, but discusses Semple's work as setting forth "the continuity of environmental influence on history," and that "her view of historical geography was of the persistence of advantage or disadvantage of place, not one of change" (Sauer 1966, 259). And in his late assessment of the history of the discipline, in 1974, Sauer asserted that Semple "read history from the recent American past to classical antiquity as persistence of environmental advantage or denial," and that, like Ellsworth Huntington, "the human past was explained by favor or constraint of the physical environment" (Sauer, 1974, 190).

Clearly, Sauer had not read her Mediterranean book very carefully. These half-truths, however elegantly written, do not allow for the perspective Semple had developed in her later years, based on her additional reading and field experience in the Mediterranean, and on Barrows" Presidential Address. Her late papers and book chapters simply do not support Sauer's characterization.

During the 1930s, younger geographers were not interested in the ancient Mediterranean. In any case, the few American geographers working in historical geography during that time,

following British practice, split the field into two halves: historical geography proper, which during the 1930s and 1940s generally meant a spatial slice of the geography of a past time, and something called "geographical history," which allowed for analysis of historical processes, but was best left to historians (Myres et al, 1932). Semple's books and others like them were essentially, under this rubric, tossed out of the discipline.

Richard Hartshorne, in *The Nature of Geography* (1939), channeling Alfred Hettner's dictum that "the cultivation of historical geography should lie mostly in the hands of historians," nevertheless modified that statement to permit historical geography to become a part of the geographic discipline, if confined to cross-sections of past periods. But Hartshorne denied the geographer the opportunity of studying "the detailed processes of development" except for individual features. The only one of Semple's books he cites in that treatise is her *American History and Its Geographic Conditions*.

Hartshorne modified his position, however, in a later volume, *Perspective on the Nature of Geography* (1959), especially in a long footnote on pp. 56-57. George Tatham, writing on "Environmentalism and Possiblism" in Griffith Taylor's *Geography in the Twentieth Century*, lists Semple as "a third and last exponent of determinism," citing her *Influences of Geographic Environment* (as Hartshorne does in *Perspectives*). But neither man mentions Semple's *Geography of the Mediterranean Region* (Hartshorne 1939; Tatham 1951, 143-147; Hartshorne 1959, 56-57).

A period of serious reexamination of the Semple legacy began with a doctoral dissertation completed in 1973 at St. Louis University. The study, titled "Ellen Semple: Contribution to the History of American Geography," was the work of Judith Bronson, and, unfortunately, never published. In it, Bronson devoted little space to the Mediterranean book, but what she wrote about it was incisive.

To Semple, Bronson argues, "mountains and plains were not objects of study in themselves, but barriers or passages for human intercourse. Seaward-facing promontories related to trade routes, serving as obstacles to navigation or as sacred shrines and temples built to appease angry gods of water and wind." Bronson continued: "Justinian's law governing water rights expressed man's response to scant rainfall in an agrarian environment. Mediterranean pleasure gardens, whose forms, colors, sounds and smells she portrayed with artistic sensitivity, represented man's expression of the aesthetic impulse, as well as the result of intensive cultivation in a land of marginal agricultural values. . . .Her last work was her greatest contribution to American geographic literature" (Bronson 1973, 129).

In Bronson's encomium, then, we find a turning-point in the discussion. She recognized that Semple's major contribution to American geography in her later years was not "environmental determinism," but Mediterranean peoples" roles in "changing the face of the earth," to steal the title of a major symposium held at Princeton University in 1955.

A second important study, this one focused solely on the Mediterranean volume, was a master's thesis written by Carolyn Baker Lewis, earned at the University of South Carolina under Allen Bushong's direction. "The Biography of a Neglected Classic: Ellen Churchill Semple's "*The Geography of the Mediterranean Region*"," completed in 1979, is a comprehensive treatment, 179 pages long. Lewis situated the work in the context of earlier classical geography; its reception in geography, classics and history journals; and ruminations on its fate as a

forgotten book. Like Bronson's dissertation, no part of it has ever been published. More's the pity; it should have been. It is a thoughtful, well-sourced work. If published, it would have made Semple's last book more widely known to geographers, ancient historians and classicists (Lewis 1979).

Vassar College held a conference on Semple, a Vassar alumna, in April 1992. The last in a series, "The Evelyn A. Clark Symposium on Excellence in Teaching" (in honor of a retired Vassar professor), this conference was sponsored by Vassar's geography department. Fred Lukermann was the keynote speaker. Among the papers, Pradyumna Karan and Wilford Bladen offered a paper on "Semple in Kentucky and at Chicago" and Mildred Berman one on "The Geographical Influence of Ellen Churchill Semple at Clark University."

All of the papers were the work of highly competent scholars. There was talk of publishing the conference papers in the *Occasional Papers of the Association of American Geographers* series, but unfortunately nothing came of it – another missed opportunity. Berman presented a slightly different version of her paper as "Ellen Churchill Semple at Chicago and Clark" for a session on "Geography in Illinois" at an AAG meeting in Chicago in 1995, but neither version reached publication.

The only conference paper to be published was Kathleen Braden's "Regions, Semple and Structuration", published later in 1992 in the *Geographical Review*. Its argument rested heavily on Semple's last book. In two quotations, one from Semple's 1910 study of the "Anglo-Saxons of the Kentucky Mountains" and the other from Chap. VI of the Mediterranean book, Braden shows us the major change of emphasis. "In the first quotation, nature is the agent, humans are the victims...In the second quotation, humans are the agents, and nature the transformed victim...In the latter case, humans make choices..." Semple's third section, "Vegetation and Agriculture," is mainly a narrative of case study after case study of human modification of the Mediterranean environment. Braden summarizes these case studies conclusively: "For each demonstration of a natural constraint on human affairs, she offers an example of how humans overcame it. For every barrier, humans found a breach" (Braden 1992, 238, 240).

Two biographies of Semple have been "works in progress" for decades; neither has appeared. In 2011, Ellen Adams completed a doctoral dissertation on Semple, "Ellen Churchill Semple and American Geography in an Era of Imperialism," at the College of William and Mary. Adams' work has little on the Mediterranean book, but follows Braden in pointing out that Semple, in much of it, writes of human agency "as the decisive factor in the formation of ancient Mediterranean cultures," and suggests that Semple's analysis is similar to the geography of Paul de la Blache (Adams 2011, 290-291).

The latest published material on *The Geography of the Mediterranean Region* appears to be in two books in the Tauris Historical Geography Series. Innes Keighren's *Bringing Geography to Book* (Keighren 2010, 142-145,155), though centered on *Influences*, has brief material on Ruth Baugh and also on Semple's later years. My *Geography and the Classical World* (2013), devotes eleven pages to Semple's work at Chicago and Clark. Both briefly treat the Mediterranean book. In my 2014 study of Semple's American Historical Association conference paper at the American Historical Association's 1907 meeting, I briefly point out Semple's later acceptance of Barrows" "human adjustment to environment" concept (Koelsch 2013, 334-345; Koelsch 2014, 56).

Why Should Geographers Read This Book?

The Geography of the Mediterranean Region remains a major, if ignored, contribution to the American geographical literature. It is one of the most important books by an American geographer to have been written in the first third of the twentieth century. As a major work of geographic scholarship, flawed though it may be, the book has few equals in the disciplinary corpus. In the period before World War II, only one other geography title comes close, Derwent Whittlesey's *The Earth and the State*.

Why should today's geographers read Semple's Mediterranean book? First, because it is beautifully, almost flawlessly written. Semple knew how to attract attention, enticing the reader with a seductive opening line or first paragraph. Take the opening sentence of Chapter 1: "All the world is heir of the Mediterranean." Or the opening words of "Templed Promontories": "The traveler who crosses the Aegean Sea from Smyrna to Athens is greeted at the threshold of Greece with a vision of ancient Hellenic beauty."

Such a suggestion - or such an example - may come as a shock to professional geographers, who tend to leave such matters up to the *National Geographic* or even Rick Steves' televised travelogues. But good writing respects the reader. There is no requirement to bludgeon him or her into submission, much less to leave the reader bored to death. Semple never made such a mistake. Her paragraphs bring the reader quickly into a relationship with the subject at hand and enable him or her to want to go further. It's important.

Second, Semple's book should be read as an example of the level of scholarly research we all need to muster. The number, variety and selectivity of her primary sources is truly astonishing. Her secondary sources were written by leading scholars of her time and earlier. Semple is clear about where her sources are coming from and makes good use of them, fashioning them into a well-grounded argument. Her book is both the mark of a seasoned scholar and a model for students (and faculty members) to emulate.

Third, I fully realize that today's academic atmosphere imposes special burdens on younger scholars that scholars in Semple's day (and mine) did not experience. Quick publication appears increasingly to be a necessity in the fevered competition for finding the path to permanent academic appointments, themselves shrinking in number.

Still, there is much to be said for geographers (once securely tenured?) embracing substantial research projects requiring a lengthy period of commitment to larger, long-term objectives (Berg and Seeber 2016). Semple did this, as did H. C. Darby, Clarence Glacken, Donald Meinig, Geoffrey Martin and others. Short-term, minor league projects that find temporary funding tend to lead only to temporary usefulness. The place of geography as an academic discipline is always at risk. If for no other reason, recognition for its security in the academy suggests that we would do well to emulate Semple in her careful research on a major topic of interest, and her ability to present it in accessible and pleasing fashion.

If one example could best pull together Semple's genius for searching out important, if neglected, topics and presenting them with polished erudition, it would be "The Templed Promontories of the Ancient Mediterranean." This article was published with copious illustrations (unfortunately not retained in the book version) as the lead article in the July 1927 issue of the *Geographical Review* (Semple, 1929).

The enterprise began with a question: Why was a temple placed on the headland of the Attic peninsula? Semple began to wonder whether there were other, similar temples on such sites. Searching the memory of her Latin classes, she recalled a reference to temples on southern Italian promontories, mentioned in the *Aeneid*. Semple then began "throwing out a dragnet" over the classical literature. Over a fourteen-year period, she found 175 such promontory shrines, as well as more than a dozen sacred headlands for which no structures have survived.

As any good geographer would do, Semple then distributed these sanctuaries, locating them on a large map. (Her original manuscript map, probably created by Clark's cartographer, Guy Burnham, survives in the Clark University Map Library.) From there, she began to develop hypotheses, incorporating both the literary evidence and the physical phenomena of winds and currents around certain promontories, such as the dreaded Cape Malea in the southern Peloponnese. To these, she was able to affix the various "Promontory Gods" and how they were related to specific promontories. Then she worked out the succession of human occupance, from remote Antiquity to Greek, and to Roman. These were succeeded by the chapels and churches of Christian saints, often on the exact sites of earlier pagan sanctuaries.

The text of the article is accompanied by two maps by the American Geographical Society's cartographers, who cut down the numbers of sites from Semple's original (lent them for the evidence). Some thirty charming illustrations accompany the text, most the work of eighteenth and early nineteenth-century artists associated with expeditions in the Mediterranean. Indeed, Semple herself wrote Gladys Wrigley that "the subject has been full of charm for me" (E.C. Semple to G.M. Wrigley, 15 January 1927). Anyone reading the illustrated version would agree.

Of all of Semple's published papers, I would recommend this one to students, both as an exemplary way of "doing geography" and for a mental cleansing of the common professional stereotyping of its author. Although necessarily she treats of environmental matters, the changing human uses of these promontories over time is the dominant motif of the article.

Semple's Mediterranean treatise, as Samuel Van Valkenburg described it to me, was "her best book, and unfortunately neglected" (Van Valkenburg 1958). That it was indeed her best book, the product of many years of scholarly and ground-level research, is to her credit. That it is still "unfortunately neglected" is to the shame of the geography profession.

Since 1931 scholars have greatly advanced our knowledge of Mediterranean history and geography and in the expansion of the evidence on which to base it. Some, with reason, have suggested that Fernand Braudel's *La Mediterranee et le Monde Méditerranéen a l"Epoque de Philippe II* (1949) subsequently expanded and published in English offers a more refined model. Indeed, the work of both the early (including the work of Roger Dion) and the later work of the "Annales School" with its respect for historical geography, has brought us new sources and new methods of assessing them. More recently, there is the important work of the prolific David Abulafia, and one could list many others.

Mediterranean research since 1931, while it certainly has enhanced our knowledge, in no way denigrates Semple's late work. Perhaps someday, some geographer will take up Semple's challenge and write the better book or provide the better replacement model she welcomed. In the interim, we would do well to avoid the behavior of those commentators whose appraisals of Semple's late work are too often "without fear and without research."

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THE GEOGRAPHICAL INFLUENCES OF
Ellen Churchill Semple at Clark University

Mildred Berman
Salem State College

Editorial Introduction:

When the Northeastern Geographer began publication in 2008-09, Professor Bill Koelsch sent me a copy of an unpublished conference paper written by Mildred (Millie) Berman on Ellen Churchill Semple's Clark career during the 1920s and 1930s. He recommended it for publication in the journal. Professor Berman, who taught at Salem State from 1971 to 1994 and passed away in 2000, presented the paper at a Semple Conference at Vassar College in 1992[i]. The article sat on my shelf while I waited for the opportunity to include it in the pages of our journal. Last year, when I accepted Bill's paper on Semple's "Mediterranean" book for publication in the journal, I dusted off Berman's paper and considered including it in the same issue. I consulted with Bill and we decided that Berman's paper would make a nice companion piece to his Semple paper. Thus, the two papers appear side by side in this issue; both contributing to the history of geography and, in particular, enhancing our understanding of Ellen Churchill Semple, one of the pioneers of American Geography in the early twentieth century.

I never met Millie Berman having joined the Salem State Geography Department two years after her death in 2002. I learned about her from former and current colleagues at Salem State. I also remember hearing about her from Clark University geography graduate students who were mentored by Millie and who in turn, mentored me when I was an undergraduate at Clark from 1980 to 1984. She was well-liked at Salem State and is still remembered fondly by faculty and staff on our campus. NESTVAL and *The Northeastern Geographer* are pleased and proud to be able to publish this paper and make it accessible to geographers and other scholars interested in the history of geographical thought and the history of geography in New England.

A special thanks goes to Millie Berman's nephew, Neil Berman, for permission to publish this paper. I also wish to acknowledge and thank Professor Judy Olson for a photo of Millie and the Salem State Archives for the photo of her in a Salem State classroom.

Introduction

By now the general outlines, and much of the detail surrounding the life and scholarship of Ellen Churchill Semple is well known and has been well documented in the geographic literature. Indeed, several aspects of her life have entered the folklore of the discipline and have, in some instances, achieved the status of legend. I am indebted to my good friends at Clark who have shared and discussed much Semple material with me over the years, legendary and otherwise. One relatively small item brought to my attention was a clipping from the *Boston Globe*, 15 June 1985, which merits brief mention. The clipping shows a photograph of the librarian of one of Chicago's city branch libraries holding a copy of Semple's *American History and Its Geographic Conditions*. The book was returned to the library during its annual amnesty for overdue books. It had been checked out on 1 November 1903, the same year the book was published. Had the library insisted on payment for an overdue book, the fine would have amounted to almost $1,500.00. The elderly man who returned the book for a "friend" chose not to identify himself or his "friend." It is here that I venture to speculate that whoever did check the book out of the library may have done so after reading the highly positive reviews it received soon after its publication. Perhaps the culprit was a teacher, since the book was adopted by several education departments for their Teachers' Reading Circles in the Chicago area.

Ms. Semple's time in Worcester, Massachusetts is the focus of this paper[ii]. However, the Chicago connection which preceded and was contemporaneous with much of her time at Clark, necessitates frequent mention. Ms. Semple lived and worked during the most important formative period in the development of graduate training in American geography and in the two major universities who prepared the largest number of doctoral candidates in the discipline in this country for many years.

Her work in early American geography at Clark University is of interest to me, because when I matriculated for the M.A. at Clark, some sixteen years after Semple's death, her ideas were still being vigorously discussed. One of the first courses I took as a graduate student was Human Geography, originally scheduled to be taught by Dr. W. Elmer Ekblaw, one of Semple's students, who earned his Ph. D. at Clark in 1926, and then joined the staff. When Ekblaw's illness intervened, Dr. S. Van Valkenburg, director of the Graduate School of Geography at Clark, who had been a colleague of Semple's between 1927 and 1929, took over with his customary aplomb. He immediately assigned *Influences of Geographical Environment* as the text for his course, which Dr. Ekblaw had apparently been planning to use. During class discussions I particularly remember his differences of opinion with much of the material, especially that contained within Chapter VI, titled "Geographical Area," and specifically the section dealing with the weakness of small states. The section states that small areas are easily conquered and further handicapped by a "numerous weakness in population." The same paragraph goes on to say, "Belgium, Holland, and Switzerland exist as distinct nations only on sufferance." (Semple 1911, 177) Since Dr. Van was a rabid Dutch nationalist, suffice it to say his comments did not concur with those of Ms. Semple. Earlier in the same chapter, some of the most problematic statements in the book on the nature of strong vs. weaker races provoked long and thoughtful commentary from both Dr. Van and the graduate students. I was one of three young women in

a class of thirty-five students. The group was made up primarily of young men who were recently returned veterans of World War II. They came from Canada, Britain, Holland, Burma, Sri Lanka (then Ceylon), as well as the United States. Looking back at this same chapter in my copy of the book, I noted that I had underlined parts of the following paragraph,

> Mankind has in common with all other forms of life, the tendency toward expansion. The more adaptable and mobile an organism is, the wider the distribution which it attains and the greater the rapidity with which it displaces its weaker kin..... [the] Tasmanians have vanished, the Australians are on the road to extinction....So the process of assimilation advances, here by the simple elimination of weaker divergent types of men, there by amalgamation and absorption into the stock of the stronger.....(Semple 1911, 172-173).

It goes without saying that classes at Clark were never dull. This material and its subsequent political discussion made an unforgettable impression on all of us.

In 1973 I saw an entirely different side of Ms. Semple when the contents of the now famous codicil to her will were revealed to me by Bill Koelsch, who was then University Archivist in the Goddard Library at Clark. Up until the time that portion of the will was written, it is probably fair to say that she really was not a feminist, a fact later verified by Preston E. James. Still, her correspondence with W.W. Atwood, declared that the School of Geography ought to recruit more women graduate students to spread the gospel of geography in the public schools. She was unimpressed with the older tired teachers from the Worcester public schools whom she had met, and declared, "We need to catch them young." (Atwood Papers, Semple to Atwood, 19 April 1923).

The exact date of the epiphany which revealed that Clark University paid Ellen Semple $500.00 a year less than the male professors is unclear, but suffice it to say, her consciousness was visibly raised in the statement preserved in the codicil which states the reason for the lower salary. She quotes the university trustees as saying that she was "a woman, and without dependents." No mention was made of marital status, although it seems clear that would have made no difference to those Worcester worthies.

Beginning at Clark

At this point it seems appropriate to review the events leading up to Ms. Semple's hiring at Clark, and the conditions of her employment as the first woman and first professional appointee to the newly formed Graduate School of Geography under the directorship of Wallace W. Atwood. On 1 June 1920, shortly after being hired as president of Clark University, Atwood wrote to Semple indicating that he was going to "promote geography in a much larger way than ever before," and that he would look forward to her permanent association with his new organization (Atwood papers, Atwood to Semple). When Semple assumed her duties at Clark, she was 58 years old and president of the Association of American Geographers, two facts which prompted one Clark geographer to remark years later that Atwood's hiring of Ms. Semple was a coup analogous to the acquisition of a used Rolls Royce in good running condition. (Arthur

Krim, as quoted in Koelsch 1988, 41). She taught one semester each year until 1928, for a salary of $2,000.

C.C. Colby who was first Semple's student, and later her colleague at Chicago, penned the following line to fellow Chicago alumnus Derwent Whittlesey in 1932, when he was preparing to write her memorial for the Annals of the Association of American Geographers (AAG): "I shall be more than careful to do justice to her work at Clark, for after all, Clark did afford her an outlet for her energies, which she much desired" (Colby to Whittlesey, Whittlesey Papers, Harvard University Archives, 18 June 1932.) The implication here is that conditions for doing research at Chicago were not as satisfactory as she wished, or perhaps it had something to do with the discontinuous nature of her time at Chicago. She lectured there one quarter in each of the following years, 1906, 1908, 1910, 1914, 1916, 1920, 1921, and 1923, and stayed on there for part of 1924. It was at Chicago that she made the acquaintance of Wallace W. Atwood, who taught physiography in their Department of Geology from 1903-1913 (Harris 1979, 22).

The Graduate School of Geography offered its first classes in late September 1921 with a staff consisting of Ellen Churchill Semple, specialist in Anthropogeography, Charles F. Brooks chair of Meteorology and Climatology, who was the only full-time appointment. Special arrangements with the federal government allowed Curtis F. Marbut, Homer P. Shantz, and Oliver E. Baker to give lectures on Soils, Plant Geography, and Agricultural Geography, respectively. The titles of Semple's first courses were: Influences if Geographic Environment (a three-hour course); Seminar in Principles of Anthropogeography, which required students to do research in the application of such principles; and a two-hour session, once a week, in Geographic Factors in the Location and Development of Cities to be offered at the undergraduate level, so that people not in regular attendance at the University could take it. Semple referred to these potential students as "the untrained group who would come from Worcester." (Atwood Papers, Semple to Atwood, 10 March 1921) These were the aforementioned public school teachers.

In addition to her celebrated course in Anthropogeography, she also frequently taught the Geography of the Mediterranean, and the Geography of Europe. From time to time she offered other regional courses and The History of Geography. It seems clear from her correspondence and the writings of those who knew her that she enjoyed her colleagues and her students at Clark, and that although she demanded much from her students, she was devoted to those whose research she directed. A letter from Preston E. James validates this point. In 1982 while doing research on an article about Semple for the Clark alumni magazine, Clark Now, I wrote to James asking what he remembered of his former professor. I received the following reply:

> ....It is true that I was one of Ellen Semple's students. I found her to be an exciting, inspiring teacher. She was a friendly, delightful person and always found time to talk to and encourage her pupils. I was especially fascinated by her course on Palestine.
> I can remember that she had a rocking chair in front of the boarding house where she lived and as a graduate student, I used to sit on the grass in front of her and listen to the many stories she had to tell. She was very helpful in guiding me in my doctoral dissertation.....
> Miss Semple advised me to go to the University of Chicago for my Ph. D. and told me

> that I would never amount to anything if I didn't go there. When I investigated the Chicago catalogue, I realized that I had never had a course in Economic Geography, and I hadn't taken other beginning courses that were required. Thus, I was too far along to start anew. It was Miss Semple also who wrote to Professor Hobbs at University of Michigan and recommended that I become a member of their expanding department. It was here that I absorbed a great deal of Chicago "thought" from McMurry, Dodge and other colleagues. And I became very friendly with the Chicago group. Miss Semple was first and foremost a fine geographer. She did not seem to be filled with a desire to advance the cause of women as such. (Letter, James to Berman, 8 February 1982)

Clearly, Chicago and Clark were the leading geography departments in this country at the time Ms. Semple was a faculty member in first one, then both departments. Her concern about recommending that James attend Chicago reflects her understanding of the relative strengths and specialties of the two graduate institutions with which she was academically involved. She acted as Atwood's liaison person to Chicago in several ways. In her early years there, Charles C. Colby became a much-valued colleague and friend. In 1924 she told Colby that Atwood discouraged University of Chicago students from coming to Clark because he felt that each institution should draw students only from its own "sphere of influence." He also made it abundantly clear that he did not want Chicago's discards.

Semple also assisted Atwood in recruiting geography faculty for the fledgling department of Clark. In April 1923 she strongly urged Atwood to hire Clarence Jones who was finishing up his work for the Ph. D. at Chicago, and that four universities were after him. She writes: "The abundant calls for instructors and professors which come in here at Chicago make me realize that Clark will have to make every effort to increase the demand in New England by arousing an interest in geography in the educational circles of that region." (Atwood Papers, Semple to Atwood, 19 April 19 1923) Clarence Jones was hired as a commercial geographer and was appointed as one of the Associate Editors of a new quarterly journal. The first issue was published in March 1925, and continues publication to the present day, as the well-known and highly respected publication, *Economic Geography*. (Atwood 1937, 35).

It is quite clear that there was a growing rivalry between Clark and Chicago for geographic leadership and prestige. Atwood makes a note of this in a letter to Ms. Semple in the year preceding the publication of the first issue of *Economic Geography*. In a discussion of the appointment of Jones and O.E. Baker to serve as associate editors, he refers to a group of men who have agreed to serve on the Advisory Council to the magazine, but then says, "I regret that the Chicago crowd are unwilling to cooperate, but I have continued to extend to them in every courtesy." (Atwood to Semple, May 7, 1924). Several years later, Semple strikes the same note in a letter written to Atwood in 1931 from West Palm Beach where she had gone in the hope that her health, already seriously impaired, would improve. She indicates great joy in the fact that Clark had gotten national recognition and been awarded a medal for geographic excellence. "....I think with pleasure of Barrows' chagrin when any such recognition came to you, because he was so venomous where you were concerned. How his department has sunk into mediocrity." (Atwood Papers, Semple to Atwood, December 1931).

Researching the Mediterranean

From the beginning, the Clark University Graduate School of Geography expected staff members to take time off every two or three years in order to carry on research in their respective fields. Semple had always done this at Chicago and continued to do so at Clark, gathering material for her journal articles and eventually her "big book on the Mediterranean." She also took time to travel and to lecture. In 1922 she went to Oxford University, where she was already known, having lectured there in 1912. She taught at the summer school there. In 1925 she taught in California at UCLA for the spring term. Her frequent travels made good copy for the graduate student publication at Clark, *The Monadnock*. She was apparently well liked by the students and in the May 1929 issue there is an account of her travel plans, her research, and a bridge party held in her honor.

The number of students at Clark during the early years of the graduate school was small. Students were either full or part time throughout the year or enrolled for only one semester (full time). All those numbers combined added up to 11 in the first year of the graduate school and grew slowly with a few fluctuations to a peak of 28 in (1927-28) during the Semple era, (1921-1932). During those years Semple gave unstintingly of her time to students who were writing theses and dissertations, particularly when it came to the matter of both geographical content and writing style. Two of the doctoral dissertations she supervised were written by W. Elmer Ekblaw and Ruth F. Baugh.

Ekblaw had come to Chicago with the intention of matriculating for an advanced degree in geography, but eventually changed his mind in favor of Clark. He had spent some time in the Artic and wanted to get more formal training in geography. Atwood offered him a post as Assistant Editor on the staff of *Economic Geography* a part-time job he could perform while taking courses. His dissertation written under Miss Semple's guidance in 1926, was titled "The Polar Eskimo." During that same year he was appointed to the staff of the graduate school of geography. Semple had a high opinion of Ekblaw's abilities, and as her illness began to take its toll, she left a written statement bequeathing to him her original copy of *Influences of Geographic Environment* and asking that he make the necessary superficial revisions the book needed for a new edition. After indicating what types of changes were necessary, she wrote, "I am happy to give you this task because you will be happy in performing it, and because you will do it well." (Atwood papers, For Elmer Ekblaw, May 13, 1930). There is no indication, however, that this revision was carried out. Apparently, Ekblaw was away in Russia at the time Semple left the written request that he revise *Influences*. There is a letter to her from Atwood telling of most praiseworthy lecture Ekblaw delivered, in which he described Russian economic life and analyzed "this experiment in communism." (Atwood to Semple, November 11, 1930)

Ruth Emily Baugh played a significant role in the Semple scholarship. She was indispensable to her mentor during the final writing and editing of *The Geography of the Mediterranean Region*. Baugh met Semple for the first time in 1913 at Los Angeles State Normal School. They met again in 1919 when Semple taught there for a semester. Baugh received her AB in geography at Berkeley in 1921 and continued her geographic training at Clark under Semple's guidance, earning her master's degree in 1925 and the doctorate in 1929. Her thesis

was written on the "Antelope Valley" and her dissertation on "The Geography of the Los Angeles Water Supply." Both pieces of research necessitated a great deal of detailed field work to which Semple gave high praise.

Thus, when Semple fell ill with a serious heart condition, and entered Memorial Hospital in Worcester in the fall of 1929, Atwood wrote to Baugh asking if she would be able to come east in order to assist Semple with the Mediterranean book. Baugh replied immediately that she would feel privileged to help with checking references and data, offer general criticism and assist with proofreading and indexing of the final copy. She declared, however, that there was no one who could assist Semple in the actual writing, for her style was so uniquely her own. Fortuitously she was very familiar with Semple's idea for the book from their many informal conversations dealing with it, and from hearing the lectures in Semple's course on the Geography of the Mediterranean twice—first in Los Angeles, and later in Worcester.

Baugh had been planning to go to the Mediterranean during her forthcoming sabbatical to help in her preparation for a course in the Geography of the Mediterranean which she was scheduled to give for the first time at UCLA. She wrote Atwood that she would willingly change her plans in order to help Ms. Semple complete the book as expeditiously as possible. Atwood then asked Baugh if she would stay on after a summer of work on the book with Semple; teach her graduate course on the Mediterranean and help him edit one of his manuscripts for a forthcoming book on physiography. She apparently did both during the 1931 fall semester.

In the preface to the book on the Mediterranean Semple expresses her "lasting gratitude" to Baugh for her intelligent, efficient and devoted service in helping her to complete the book. Baugh's colleagues at UCLA felt that, had not Semple been so ill in the last stages of the writing, and had not Baugh been so modest, the latter's name would have had a more prominent mention on the title page. (Bruman et al., 1976)

Upon publication of the book, accolades arrived from all over the world. "Considered...a classic in both form and content, "according to the AAG Geographical Bibliography, the book continues to invite favorable comment just as it does here. Fortunately, Ms. Semple lived to enjoy the highly positive early reviews and praise-filled letters which came pouring in. Although she withdrew from Clark in November 1930, she was technically on a "leave of absence," and her name continued to appear on the list of Clark faculty until her death in 1932. Just prior to the book's publication she had begun to feel somewhat better and thought she would be able to lecture at Clark for half-hour periods. She also wanted to start some major new research, as soon as all the details associated with publication of the Mediterranean book were completed. But this little spurt of energy was short-lived.

A Life of Firsts

Although the last months of her life were spent in West Palm Beach, Florida, she was in great pain, and frequently had difficulty in breathing. She was convinced that the doctors in Worcester had misdiagnosed her illness and hence her treatment. Yet, she never lost her sense of humor. In a letter written to Atwood six months before her death she mentions that her blood

count is low, and that she is taking "iron and extract of liver, and much good bootleg whiskey and brandy. The bootleggers make spooky visits after dark, but I get bottled-in-bond products from Cuba and Canada. My doctor....says it is the great remedy for lungs." (Semple to Atwood, December 1931)

She probably never realized that she had achieved so many "firsts" while at Clark. She was the first person appointed to the School of Geography, the first woman faculty member at Clark., the first woman to receive tenure at Clark, the first woman to supervise a doctoral dissertation in geography in the United States, the first woman president of the Association of American Geographers.

Perhaps it would be fitting to mention the tribute penned by Samuel Van Valkenburg (1935), her colleague during her last teaching years at Clark University. He dedicated the first edition of his book on Europe to her with these words:

To Ellen Churchill Semple

Human Geographer

A Wise Counsellor

A Charming Friend

Inspirer, by her Achievements

Of her Contemporaries

And the Younger Generation of Geographers

Clark has not forgotten Ellen Churchill Semple. On February 21, 1991, the Graduate School of Geography inaugurated the Ellen Churchill Semple lecture series. The first person to deliver a lecture in this series was Saul B. Cohen, former director of Clark's Graduate School of Geography. His topic dealt with geopolitical balance in the Middle East, a part of the Mediterranean world to which Ms. Semple dedicated so much of her research—a fitting tribute to Clark's first lady of American geography.

Mildred Berman taught in the Geography Department at Salem State College from 1971 to 1994. She received her BA degree from Salem State and her MA and Ph.D. from Clark University. She was a cultural and economic geographer who focused on the Middle East. In the early 1970s she was one of the first to focus attention on the status of women in the discipline. As Monk and Olson (2007, 635) note, she "wrote about women in the discipline a good decade before writing on gender was broadly accessible in geography, and her work provided a foundation for much of what was to follow."

For a full biography of Millie and her contributions to geography, see the 2007 memoriam written by Janice Monk and Judy Olson in the Annals of the Association of American Geographers, 97 (3): 635-640.

Notes

[i] Thanks to Dean M. Rogers, Special Collections Assistant in Archives and Special Collections, Vassar College for information concerning the 1992 Vassar College Evalyn Clark Symposium on Ellen Churchill Semple. Copies of the presentations were not in the archives, but it did contain a list of the presenters, which included: Harvey Flad, Fred Luckerman, Allen Bushong, P.P. Karan, Karen DeBres, William Koelsch, Kathleen Braden, Carolyn Cartier and Janice Monk.

[ii] Primary Sources: The basic sources are the letters written from Atwood to Semple and vice versa. They are contained in the *Wallace W. Atwood Papers, Clark University*, located in the archives of the Goddard Library at Clark University in Worcester, Massachusetts.

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OUT THERE LEARNING:

Critical Reflections on Off-Campus Study Programs

Deborah Curran, Cameron Owens, Helga Thorson,
and Elizabeth Vibert (eds.)
Toronto: University of Toronto Press, 2019. xii and 283 pp.
ISBN: 9781487504113

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In contemporary higher education, "internationalization" and "experiential learning" are all the rage. A full ninety-seven percent of Canadian universities offer students international experiences, and field schools, or short-term study abroad programs, are one of the hallmark options. Students love them, institutions are proud of them, and employers glow when they see real-world experience on the student resume. But we must remember that in the past two decades, the international field school model has been criticized on multiple fronts. Field schools: reinforce social inequality and colonial relations; benefit students, but not communities; and don't go far enough to consider the environmental consequences of short-term, long-distance travel. To remedy this, one goal has been to improve field schools by making them culturally appropriate, community-based, relational, and locally grounded. So, how do we do that in practice?

Out There Learning: Critical Reflections on Off-Campus Study Programs is a playbook on how to make field schools successful for students, faculty, and the local communities with which they engage. At a broad level, the chapters in this book come to us from diverse scholars in a range of disciplines—geography, theatre, anthropology, history, psychology, law — who take the field school as an analytical departure point for critical reflection on curating interdisciplinary, community-engaged learning experiences. Together, the authors reflect on field schools, highlighting pedagogical challenges and best practices, and paying attention to the perspectives, and experiences of students themselves. The student vignettes dispersed throughout jive nicely with the scholarly perspectives that discomfort, deeply personal reflection, and vulnerability are so valuable to learning. At one level, this volume serves the important (perhaps obvious) purpose of illustrating the benefits and challenges of short-term international field schools. But in my mind, its core contribution comes in the form of a the challenge to faculty educators to think seriously about the embeddedness of the field school in capital accumulation, systems of inequality, and the dominant growth-centred approach to higher education. The great hope in

this text lies with the authors' suggestions for change: meaningful field school assessments that interrogate myths of student transformation; course objectives that challenge perceptions of the real world as somewhere "out there" that we can target and plunge students into; and best practices of how innovative instructors are connecting with the "global" in immersive, deep-learning field schools from home.

Certainly, the authors are cognizant of that traditional international field schools can be valuable to student learning. Yes, international experiential learning can facilitate openness to diverse epistemologies, and place can be an important window on structural inequalities, histories of exploitation, and unequal power relations. But the authors do no take this as a given, and they challenge the common rhetoric that international experiential learning is a ticket to transformation. More concretely, the authors ask us to think critically about what we mean when we say that our field schools are community-engaged (Vilbert & Sadeghi-Yekta 2019); to challenge the discourse of transformational learning, both as a pedagogical practice and aspiration (Glass 2019); and ask us to take seriously that field school assessment has tended to lead to positive reviews and has contributed a-critical self-promotion (Peifer & Meyer-Lee 2019).

In my view, the most compelling chapters are those that grapple with the characteristics of field schools that make many of us cringe: that short-term learning abroad is often hierarchical, power-laden, and perpetuates Western domination of the "other", and extraction of resources, knowledge and opportunity from local communities. As a starting point, the editors reveal that much of the traditional student sending model associated with field schools is embedded in the ideology that the real world happens "out there". This book asks readers to challenge a binary view that distinguishes the "classroom" and the "field", and to question what is it exactly about the international field school sending model that contributes to student growth: "Is a different place necessary for transformative learning?" (Thorson & Harvey 2019, 5). This is *the* question that should guide environmentally-conscious international experiential learning programming in Canada today. Can we justify the continued push for field school models that have such a long history of deleterious environmental and community implications, when the benefits to student growth and learning are so uncertain?

The authors affirm that higher education cannot take for granted that changing place will lead to student transformation, personal or academic growth, and they are calling for institutions and faculty to think critically about the international field school model. This may sound like a tall order given the emphasis higher education institutions are placing on internationalization and international experiences. Thankfully, the authors provide practical tools to help us imagine how immersive international experiential learning can be done from home. For example: Castledon et al. (2019) illustrate how interdisciplinary, place-based field courses can happen in the Canadian Indigenous context; Nakanyike (2019) explores how instructors can bridge distance to create on-campus learning atmospheres that are transformational, dialogic, and playful; and Owens and Sotoudehnia (2019) emphasize how legacy projects and commitments to active renumeration in local communities are pathways to rich reflective learning, and can help foster long-term community partnerships that can move

towards reciprocity. We can complicate and unsettle the traditional place-based fields school model and maintain student satisfaction, and engagement with the global.

This edited volume offers a rich review of the field school, and a heavy dose of pedagogical critique. It is both an excellent resource for faculty instructors to explore and unpack the roots, complexities and trajectory of international experiential learning in a globalized age, and challenges traditional field school practice, and assessment. However, this is not a doomsday kind of read. It is aspirational — it is a vision for field schools to be something better. The author contributors to this volume are showing us reflexive teaching and learning full throttle, illustrating how playful engagement with students, openness of heart, and willingness to learn from others can foster new knowledges and can start us off on a process of transformation. Early on, I started ear-marking pages that would help in my own teaching practice. By the end, there are so many flipped corners that they are no longer very useful as reference points! It is one of those kinds of books.

References (all to chapters in the reviewed book):

Castledon H., Daley K., Sloan Morgan V., and P. Sylvestre. 2019. Settlers Unsettled: Using Field Schools and Digital Stories to Transform Geographies of Ignorance about Indigenous Peoples in Canada (p 87-106).

Nakanyike B.M. 2019. Settlers Unsettled: Using Field Schools and Digital Stories to Transform Geographies of Ignorance about Indigenous Peoples in Canada (p 87-106).

Peifer J.S., and E. Meyer-Lee. 2019. Getting Beyond "It Changed My Life": Assessment of Out There Transformation (p 181-197).

Owens C., and M. Sotoudehnia. 2019. Assessing Learning "Out There": Four Key Challenges and Opportunities (p 205-228).

Thorson H., and M. Harvey. 2019. Introduction (p 3-22).

Vilbert E., K. Sadeghi-Yekta. 2019. Power in Place: Dilemmas in Leading Field Schools to the Global South (p 153-173).

HOMELANDS AND EMPIRES:

Indigenous spaces, Imperial Fictions, and Competition For Territory in Northeastern America, 1690-1763

Jeffers Lennox
Toronto: University of Toronto Press, 2017. xiv and 334 pp.
cloth, ISBN: 9781442614055

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With *Homelands and Empires*, Jeffers Lennox sheds light on the first decades of the colonization of Northeastern North America, a time when colonial empires were competing for power in a land they knew little about. "To talk about Acadia or Nova Scotia in the eighteenth century is to engage in an act of imagination" (3). Through the angle of cartographical knowledge, the author pens a powerful account of how imperial competition happened through partial cartographic knowledge and relied on connections with local Indigenous communities.

This book, published by the University of Toronto press, is part of a new collection focusing on the history of New England and the Canadian maritime provinces. This collection is a welcome one, as this geographical area is not extensively published about in the field of history. In the words of the author himself, "many studies that are focused on broad themes, such as negotiation, lack specificity, however, and places such as Nova Scotia are either ignored or subsumed into New England's sphere" (12).

What is of particular interest in *Homelands and Empires* is the use of ancient maps circulated at the time in Europe to promote colonization of North America, used as a source of data to show how competition for control and colonization was done as much in the offices of power and newspapers of Europe as on the ground in Acadia and New England. This is rich data that has seldom been used while explaining the early years of colonization.

The first part of the book sets the stage by explaining very well how Acadia and Nova Scotia were "imperial fictions," for they existed "on a few maps and in the minds of many officials, but not on the ground" (16). It was an area claimed by both French and British crowns, but controlled by Indigenous peoples. We are led to understand how it was essential for both colonial powers to weave alliances with local Indigenous peoples in order to control and secure the land to be settled and act as a buffer between French Acadia and British New England. It shows that it was through the knowledge of local Indigenous groups that European reports about what was going on inland far from the shores of the ocean could be penned, and land could then better be described to imperial centers of power.

The second and third chapters focus more specifically on maps, and on how these maps were used in Europe to create the fiction of a French and a British empire. It convincingly shows

how the vagueness of hard knowledge about North American land was used to manipulate maps to one or the other's advantage, and how maps were a central instrument in settings borders between empires when on-the-ground knowledge was lacking. Geographic fiction required a cartographic foundation. These two chapters offer vivid images of the role of cartography in the early seventeenth century. Maps were used in European publications to build a narrative of an existing empire in North America, and throughout the literate population, to promote colonization with potential settlers willing to emigrate to the new continent. Maps created an illusion of a land controlled by an empire, ready for a new population to settle, even if the reality on the ground was quite different as the land was still mostly controlled by local Indigenous populations. By explaining this situation, the chapter gives life to the argument that the concept of terra nullius is a fiction. "European maps that emphasized boundary lines favorable to one side or the other could not prevent the Mi'kmaq and their allies from exerting geographic control over the northeast" (65).

In the fourth chapter, the reader is transported to the time following the founding of Halifax, when the British Empire intended to "transform an imperial fiction into a territorial force that could defeat French Acadia and pose a real threat to the Indigenous homelands in the Northeast" (124). The reader really feels that as the knowledge of Nova Scotia by the British augmented, their foothold on the place became stronger. The British were establishing themselves as a regional force, able to push Indigenous and Acadian populations to the margins.

In chapter 5, *Acadia in Paris*, the author focuses on the knowledge (or lack thereof) mobilized by the French in the Acadian border dispute with Britain in the mid-18th century. Here again, the reader is shown how maps and geographical knowledge were "diplomatic tools used to reify a geographic fiction in the face of weak political authority and limited military power" (172).

The final chapter of the book reports on the transition of Nova Scotia from "imperial fiction to British plantation" (237) and enlightens the reader on how a war of information was raging between the French and the British in the period leading up to the deportation of the Acadians, which vastly increased the capacity of the English to establish a strong foothold in Nova Scotia. Chapter 6, which explains what happened after the deportation of the Acadians, is interesting in that it shows the power vacuum that was left after the deportation, and the subsequent knowledge building that had to happen for the British settlers to gain a stronger foothold in Nova Scotia. We feel that the settlers gain in confidence progressively, as their knowledge and encroachment of the land expands. The book ends with the end of the Seven Years War, at a time when the British have a stronger foothold on the continent.

This well-written book is a useful addition to the study of the connections between mapmaking and imperial power, and to Maritimes studies. The book is the first of this new collection published by University of Toronto Press that tries to shed some light on the Maritimes, an understudied area. It brings life to Acadia and Nova Scotia during the years of 1690 to 1763. We hope that this collection will be expanded in the years to come. It is a book that will be useful to history and geography students and scholars alike and is a welcomed contribution to the understanding of the construction of imperial power in the context of North America.

INVENTING FUTURE CITIES

Michael Batty
Cambridge, MA: The MIT Press, 2018. xviii and 282 pp. illustrations, maps. ISBN: 9780262038959

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In his recent book Michael Batty discusses how, and to what extent, the future of cities can be foreseen. Paradoxically, the book opens with a statement that the future cannot be predicted – which is appropriate given Batty's premise that cities should be approached as complex systems. Indeed, one of the book's strengths is that it introduces the notion of complexity - and applies it to urban change - in an accessible and practical way: it is not necessary to be a systems theorist or a data analyst to follow the book's argument and to understand why unpredictability does not preclude planners, geographers, students or practitioners from thinking through how cities may evolve as communication and transport technologies develop.

The book is divided into eight chapters. The first sets out Batty's argument about predictability and complex systems, encapsulated by his statement that one cannot predict future inventions. The unpredictability of invention – if inventions were predictable they would hardly be inventions – is at the heart of his contention that the long-term future is unknowable. This message is qualified by the suggestion that certain smaller-scale and shorter-term processes can (by-and-large) be predicted, and that this can help in understanding and managing cities. In the second chapter the problem of long-term predictability is shown to be further compounded by the recent acceleration of change, particularly in terms of population size and the rapid transition from an essentially rural to an essentially urban world.

What is meant by 'city'? This question is addressed in chapter 3, a chapter that asks a basic but often over-looked question. It succinctly sets out the challenge of conceptualising and of identifying cities, which increasingly overlap, merge, and which are constituted of networks inter-twined at various scales. This theme is picked up again in chapter 4 where the question of urban form (i.e. the physical lay-out of cities at a meso-scale) is discussed. Batty's contention is that identical forms can house different functions: it is misleading to read function from form or to assume that as functions change (e.g. as the economy evolves, as mobile communications become ubiquitous) so urban form will necessarily follow. To make this argument, the chapter marshals historical evidence of different ways urban form and function have been understood and projected over the last century, with particular emphasis on how the form of cities responds to changes in transport and communication technologies: as many flows critical to cities become

dematerialised, so the connection between city form and function distends.

The next three chapters are thematic, each focussing on a key element that may impact the way cities evolve in the 21st century. Chapter 5 focuses on Big Data – the role it can play in cities and how it can measure their 'pulse'. Michael Batty is a leading expert on data and cities: this chapter provides accessible insight into the meta-conclusions he draws from his empirical research. Whilst data can increasingly be used to measure flows and locations in real-time, Batty suggests that these data may not alter cities as decisively as certain smart-city proponents anticipate: the data are often error-prone, incomplete, biased, not tied to individuals, private and scattered. This does not mean they cannot be useful in managing traffic flows or in tracking goods and passengers, for instance, but does mean that the realisation of a fully managed and monitored city (based on Artificial Intelligence learning from vast amounts of data) is unlikely. Chapter 6 focuses on the physical expansion of cities, outwards (towards the suburbs), upwards (skyscrapers) and inwards (brownfield development and densification) and on how these different types of expansion relate to travel and communication technologies. In the final thematic chapter, Smart Cities are discussed directly: the concept is defined, and Batty argues that plans for the smart city are "no different from any other kinds of grand plan" (177) – i.e. they are unlikely to be fulfilled, though they will orient – to some extent – how cities develop. This chapter, which situates smart cities in the wider discourse of technological change, ties together the two previous thematic chapters and draws upon the conceptual thinking about form and function set out earlier. In conclusion Batty discusses what he means by 'inventing the city', and how the future of cities can usefully be apprehended given the uncertainty that governs complex systems.

This excellent book is both fascinating and (slightly) frustrating. It is frustrating because it unabashedly views the city as a physical artefact. Batty writes (161) that "the approach to cities we have adopted here is sometimes called "physicalism", a kind of materialism, even positivism" : although the phrase appears in chapter 6, it applies to the whole book. The book is about the morphology of cities, their layout, their infrastructure, their form, and how these may evolve *ceteris paribus. Quod ceteris paribus*?[1] Climate, the environment, politics, social relations – these are hardly mentioned (though their omission is acknowledged in the last chapter). Throughout the book I was wondering about the rise in extremism, riots in Hong-Kong, floods in England, heat-related deaths in Chicago – these, too, will impact the future of cities. Furthermore these are also human (re)inventions or the consequences of inventiveness – not so different from smartphones and the internet-of-things. Whilst I was reading *Inventing Future Cities* I was also reading Richard Harris' *Second Sleep* (2019), a thriller set in the medieval-type society that emerges after catastrophic failure of 21st century communication devices: Michael Batty's book assumes that no such catastrophe will happen, and that technologies will evolve unpredictably but apolitically without backlash or city-altering environmental consequences.

Related to this morphological take on cities, the book's argument is underpinned by an assumption that may raise some eyebrows, viz. that cities are built from the bottom up, that, as complex systems, their form emerges from an almost infinite number of uncoordinated individual decisions. This implies that planning is bound to fail, and that structures are emergent, not thought-through or imposed. This assumption – which has merit and can usefully

serve to understand many urban processes – excludes the possibility that politics, agency, social movements and, of course, urban planning can shape cities. As such, this assumption – presented as self-evident by Batty - is somewhat tendentious: unlike isolated complex systems in physics and biology for which it is safe to assume that politics and urban planning play no role, it is incorrect to assume these away for cities. Indeed, given the neo-liberal trope about government being 'a bad thing', assuming that cities are only built from the bottom up can carry political overtones. Whilst it is undeniable that cities are not solely shaped by politics and plans, and that these are probably less influential than their proponents like to believe, plans can be effective at inflecting and channeling trends and at altering urban morphology to some extent.

Finally in the list of (slight) frustrations is Batty's adoption of five guiding principles (15-17): i) Zipf's "iron law" of city size distribution; ii) the paradox of the modern metropolis, attributed to Glaeser, whereby physical proximity is becoming more important as the costs of travel and communication diminish; iii) the effects of information technology and the internet of things, which allow urban form to be examined and influenced by way of shorter and shorter feedback loops; iv) the geography of population distribution being dependent upon transport technologies (a principle attributed to HG Wells); and v), Tobler's Law, that near locations exert a stronger influence than locations father away. These principles are useful heuristic devices, and cannot be fully explored in a short and accessible book: yet none are self-evident, and all can be debated. I'll just give two examples: 1) Glaeser's paradox is far too general – there is considerable evidence (e.g. Amin & Roberts, 2008; Bathelt & Gibson, 2015) that temporary travel and web-based communities (each facilitated and mediated by communication technologies) can obviate the need for physical proximity *for some activities and for some people*; 2) Tobler's law may be of little consolation to Tuvalu islanders, whose way of life will soon disappear because of climate change induced thousands of miles away by industrial development in the global north (Roy, 2019). The five 'laws' are merely regularities which brook important exceptions.

So, why, despite these frustrations, do I highly recommend this book? The book is fascinating precisely because it adopts a circumscribed physical and bottom-up view of cities, and does not challenge some well accepted (though questionable) generalisations. By deliberately omitting political, social and environmental considerations, and by avoiding debates over accepted wisdoms, it addresses practical questions that designers, researchers, students, city planners and administrators face today without getting mired in academic debate: Michael Batty remains focussed and has picked his battles carefully. As a foil to techno-utopian[2] visions of driverless cars, fully automated cities, seamless communications and universal data acquisition – such as Google/Sidewalk labs' vision for its Waterside development in Toronto[3] – he provides an informed, nuanced and thoughtful evaluation of techno-utopianism, debunking some of its more extravagant claims on its *own terms*.

He explains in accessible language and without polemic what the potentials and limits of new urban technologies are, and, more importantly, how no amount of prospective thinking can map out the long-term future of cities: the future will be *invented* – partly, dare I suggest, by planners! – and cannot be *deduced* from current trends, technologies and utopias. Political economists, environmentalists and urban sociologists may find the book wanting: however, urban politics, climate change and social processes all occur in the material world

described by Batty, all are influenced by the techno-utopian thinking that underpins smart-city plans, and all are in the difficult business of inventing future cities. Michael Batty has seized techno-utopianism by the horns, has knowledgeably assessed its empirical, technical and epistemological foundations, and has provided readers with a balanced, well-written and accessible demystification. The book's power lies in the fact that it informs current debates without backing a particular agenda: it provides logical, rather than ideological, arguments about the possibilities and limits of technology and artificial intelligence as they relate to the city, it carefully thinks through their likely effects on city management and physical development, and provides a useful set of concepts and evidence that will allow students, researchers and practitioners (as well as political economists, environmentalists and urban sociologists!) to think through these questions.

Notes

[1] "ceteris paribus" is a phrase used in economics meaning "all other things being equal". "Quod ceteris paribus?" means "what other things remain equal?"

[2] This term is used advisedly: in chapter 4 Batty refers to other utopian visions of the city as developed by the Garden City Movement, modernists such as Le Corbusier, and pastoralists such as Frank-Lloyd Wright's.

[3] https://storage.googleapis.com/sidewalk-toronto-ca/wp-content/uploads/2019/06/23135715/MIDP_Volume2.pdf

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BREAKPOINT: RECKONING WITH

America's Environmental Crises

Jackson, J. and Steve Chapple
New Haven and London: Yale University Press, 2018. pp. xvi, 275.
hardcover, ISBN: 978-0-300-17939-2

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> "...our journey became a metaphor for the range and scope of the environmental problems we all face, and of how the things we do in one place affect the wellbeing of far-away places and peoples we have never met—not just in the Heartland or Delta, but everywhere that human actions are pushing the environment beyond its limits" (Jackson and Chapple, xii).

In *Breakpoint: Reckoning with America's Environmental Crisis*, co-authors Jeremy Jackson and Steve Chapple bring together a wide range of literature and interviews to problematize interconnections in the social and ecological systems that have contributed America's greatest environmental crises. Jackson, a distinguished ecologist and environmentalist, provides historical ecological discourse to backdrop their understanding of environmental impacts, as well as regional social-ecological histories and the recent evolution of global market demands for natural resources. Meanwhile, journalist Chapple's contribution is evident in the book's structure, which follows a series of interviews from trips southward along the Mississippi Delta to New York, Florida, and California. Their argument is clear: the effects of climate change on global social-ecological systems will be profound, but all is not hopeless (yet). They contextualize and humanize their argument around three main issues as they are rooted: industrial agriculture, sea level rise, and extreme weather.

In the first section of the book, "Heartland", Jackson and Chapple discuss the impacts of industrial agriculture on the hydro-ecological systems of the United States in an era of climate change, globalization, and changing economic demands for natural resources. The Heartland, once an area famed for its production of corn and soybean for human consumption, has overwhelmingly evolved to produce corn for ethanol and animal feed. Consequently, soil erosion, groundwater contamination, cyanobacteria blooms, and superweeds are but some of the negative human-environment impacts experienced in some proximity to industrial agricultural complexes. In this section, the authors bring together the picture of America's agricultural system in crisis and point our way out of it through solutions like vertical farming and ecosystem-based agricultural management practices.

In the second section of the book, the "Coast", the authors use New Orleans and Miami to explore the impacts of sea level rise and inappropriate land use. America's coastal cities are extremely vulnerable to erosion and land loss, even under conservative climate model projections. Along the Mississippi Gulf Coast, the authors cite upstream nitrogen runoff and mismatched human-environment land use systems as having further entrenched us in the misfortunes of our coasts. The authors argue we are at a crossroads that requires critical decision-making and systemic changes, including managed coastal retreat and more advanced and just mitigation strategies.

In the third section of the book, "Too little water and too much" the authors remind us that people all along America's coasts will be impacted by climate change, and the cost of relocation efforts and other long-term mitigation strategies are far more favorable than the costs of simply *responding* to disasters as they happen. The authors also argue that the United States cannot afford to roll back environmental protections nor leave them unenforced. We need look no further than the Mississippi Delta's 'cancer alley' to see how chemical plants pose great risks to life and safety; or to the droughts, wildfires, and intense storms that have pummeled the United States in recent years.

The strength of the book lies in the immediacy of these complex issues. The way this information is presented is what keeps the reader's attention; the authors move beyond rich facts and data to storytelling. Thanks to a cast of characters, environments, and subjectivities, the introduction of each place along the Delta builds further complexity around modern issues of land use practices and environmental change. The book could be strengthened by drawing more heavily on the United States' global connections to policies and places over time. Additionally, while the authors highlight the experience of living within a landscape of change, I wish this compelling aspect of the book was further developed and returned to.

Overall, their book put into conversation some of the many environmental crises facing Americans, making it suitable for an audience interested in learning more about them. However, it may not be suitable for non-academic audiences with little knowledge of the subject matter. Within academia, this book is well-suited for undergraduate courses in Environmental Studies, Geography, or related disciplines; particularly those that explore dimensions of the food-energy-water nexus or the impacts of climate change and land use management practices. Throughout the book the reader is invited to think critically about their human-environment connections to other places—across the world and just downstream.

FLINT FIGHTS BACK,

Environmental Justice and Democracy in the Flint Water Crisis

Benjamin J. Pauli
Cambridge, MA: MIT Press, 2019. xviii and 432 pp., paperback, ISBN: 9780262536868

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Flint Fights Back, Environmental Justice and Democracy in the Flint Water Crisis examines the political origins of the water crisis in Flint, Michigan, which has received international attention. The author Benjamin J. Pauli, who completed his PhD in political science and is currently assistant professor of social science at Kettering University, moved to Flint in 2015 and began engaging in local water activism in 2016. His book presents an exhaustive review of the water crisis from the perspective of a self-described "activist-scholar". The format—methods, concepts, references—is suggestive of an academic work, and it rigorously describes the discursive and organizational roots, and ongoing evolution, of pro-democracy and water activist movements in Michigan in the 2010s.

Specifically, Pauli provides a singular account of the water crisis from the perspective of a heterogeneous local political activism. In the context of the state-imposed emergency managers (EM) in the post-2008 era, concerns related to the usurpation of representative democracy merged with water contamination issues in Flint when non-elected public administrators decided to change the city's water source from Lake Huron to the Flint River. The decision resulted in unprecedented water contamination among the city's homes and caused devastating damage to the residents' well-being. The author invites readers to dive into the experience of residents becoming political agents as individuals and as a group in their struggle for justice and democracy. Pauli practises an ethnographic immersion consisting of what he identifies as "militant ethnography", a politically engaged participant observation with water activists, combined with around 70 semi-structured interviews with activists from different backgrounds, their allies (journalists, public health experts and public interest figures), elected representatives and scientific knowledge producers.

Pauli explores how Flint residents came to see that, in the words of Dr. Mona Hanna-Attisha, they have been "poisoned by policy" (32), which serves more to describe than to explain. He refuses to rely on any theoretical framework to avoid counterproductive generalizations. The author's engagement with the main concepts of the book and the structure of its argument are meant to be closer to the activists' engagement with the water crisis. Accordingly, Pauli describes in the introduction and chapter 1 different meanings and frameworks to the themes of justice and democracy. For instance, he compares different definitions of the environmental justice framework and its critiques in a well-documented way. However, this work is not meant for the author to place his own understanding of the framework to analyze the case study. Instead, he states how local activists and external actors used the themes in different ways throughout the crisis and describes their political engagement over the next chapters. The structure of the book follows this same approach. The first three chapters offer different analytical approaches to the water crisis in which water activists synthesize their own narrative. The remaining chapters explore different chain of events that led to the constitution and evolution of the pro-democracy and water activist community in Flint. The author's consistency on this position throughout the book may be one of its major weaknesses. Without an attempt to take a step back from the crisis and propose a thesis, the readers are left with multiple narratives and chains of events to sort out.

The core of the book begins with a reconstruction of different narratives mobilized by actors of the crisis. Pauli focuses on what he names the "technical" (incompetence and problematic infrastructure caused the faulty water treatment) and the "historical" (deep structural factors such as racial, economic and political dynamics are to blame) narratives. He explains how both narratives were partly used as arguments by the activists, but also by opponents to depoliticize and simplify the crisis. The political narrative constructed by the activists is presented as the one that really allowed them to put forward the sustainable and global solutions beyond the search for culprits or causes. From a geographer's point of view, to present those narratives simply as conflicting political positions seemed incomplete. It would have added some perspective if the political narrative was discussed as rooted in a politically motivated assemblage of different timelines and scales.

The second part of the book emphasizes on the evolution of the pro-democracy and water activism in Flint and how it merged during the crisis. Pauli contextualizes local activism to repeal EM laws in Michigan along with larger movements for democracy of the early 2010s, such as the Arab Spring and the Occupy movement. He highlights how the residents' experience lead them to strategically mobilize as both "victims" and "warriors" and how this move seemed to transcend race and class-based divisions in their discourse. The elements of discussion throughout the book about how Flint residents are especially vulnerable to the crisis depending on class, gender and race are eminently interesting. The author discusses how evidence of environmental racism and classism has been brought by external commentators, but that residents felt that Flint as a *whole* was exposed to the threat. He addresses how residents have organized themselves to unite Flint's political actors despite the fact that the crisis affects them differently. To resolve the common threat beyond their particularities, they mobilized around their place of residence with slogans like "Flint Lives Matter". Pauli also describes the evolution

of the Flint water movement over time as it came to meet the limits of representative and deliberative democracy offered by the state, along with the limits of institutionally controlled citizen science and the help of so-called "experts". He describes the rise of participatory initiatives among the community to organize resistance, produce social movement-controlled knowledge and enlarge popular empowerment. Pauli concludes by illustrating how, once state officials declared the crisis over, some activists tried to keep the community organized to maintain the spaces of deliberation and radical democracy opened by the rise of local political consciousness.

Throughout the reading, it is not clear what the targeted audience of the book is. The detailed overview of the different organizations active in resolving the crisis and their methods of actions could be useful for community organizers. However, the language used might be hermetic and the singular structure, from conflicting narratives to multiple experiences of activism, could be hard to follow for environmental and social justice activists with no academic background. On the other hand, although some conversations are initiated when the themes of this book are explored and documented, it can hardly be considered an academic piece since it lacks comparisons against arguments made in other scientific works. As this book stands out as a unique account of a political crisis, other activists-scholars involved in environmental justice and pro-democracy movements have worked around issues like participatory democracy, class, gender and race-based environmental justice, and place-based solidarity.

In Flint Fights Back, Environmental Justice and Democracy in the Flint Water Crisis, Benjamin J. Pauli provides a comprehensive summary of the events surrounding the water crisis in Flint from an activist-scholar perspective. This book highlights the narratives built by a community that wanted both to stop being poisoned and to decide its own future so that such a crisis would not happen again. Their inspiring struggle highlighted how the lack of democracy and citizen control over health decisions and vital infrastructure can degenerate and cause irreversible harm.

THE HEART OF THE CITY:

Creating Vibrant Downtowns for a New Century

Alexander Garvin
Washington, DC: Island Press, 2019. xiv and 244 pp., maps, diagrs., notes, appendices and index. paperback, ISBN: 9781610919494

Reviewed by Andrew Riely
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The planner Alexander Garvin helped create Atlanta's BeltLine, direct New York City's 2012 bid to host the Summer Olympics, and oversee redevelopment in Lower Manhattan following the September 11th attacks. His long career has tracked the transition to the post-industrial, consumption-oriented city, a development that his own practice has helped bring about. Hoping to familiarize colleagues with methods and rationales for making downtowns more productive and livable, he has written several books describing lessons from his career. *The Heart of the City: Creating Vibrant Downtowns for a New Century* is the latest.

Garvin is not interested in debating the merits of neoliberal urban policy. He treats the political consensus as a given and exhorts planners to do the best they can with the tools at their disposal. In fact, his experience with bureaucracy, particularly the planning permitting process, has left him justifiably wary of government agencies. The first few chapters provide an overview of the functions of contemporary U.S. downtowns, as well as recent urban history. Most points will be familiar to urbanists, but Garvin does include some important insights. One enlightening section on the impacts of the digital economy describes how, amidst the burgeoning of technology industries, most companies' needs for office space have declined markedly, as typists and filing cabinets have become obsolete. However, tech businesses do require architectural infrastructure that can handle up-to-date digital wiring, making old industrial buildings ill-suited to office conversion. Instead, such structures tend to be remodeled as residential space. These early chapters serve as a preface to Garvin's main argument: advocating for the use of Business-Improvement-Districts (BIDs) to spur downtown development.

Hundreds of these quasi-governmental entities already exist in American cities. They first appeared after WWII and multiplied prodigiously following the urban cutbacks and crises of the 1970s. Chartered by city governments and sometimes requiring state or Federal empowerment, BIDs, generally overseen by a board of directors, have assumed responsibility for many downtown services formerly performed by municipal governments. Funded by a surcharge

on businesses within the BID's boundaries, their activities usually include, at a minimum, security, cleaning, and park maintenance. In locales where BIDs enjoy access to local property tax revenues, which allow them to issue bonds and take on large-scale property acquisition, they have become key players in driving urban development. Garvin supports using tax increment financing (TIF) to fund their activities. This method maintains a base-level stream of property tax revenue for city governments but permits BIDs to recoup the tax gains that accrue from property value increases stimulated by their own investments. Not surprisingly, given their core constituency, BID goals tend to reflect the interests of downtown private businesses. In essence, they constitute a method for circumventing conventional democratic decision-making processes. Garvin implies that BIDs are responsive to ordinary voters, but the evidence suggests otherwise (Unger, 2016).

There are plenty of reasons to bemoan U.S. municipal democracy. Many city governments have proven inadequate to contemporary urban challenges: the need for more mass transit, affordable housing, social services, and so on. However, the causes of bureaucratic impotency are manifold, of which administrative bloat and NIMBYism—the culprits Garvin fingers—are only two. Taking governance out of public hands, rather than seeking to reform it, yields substantial gains in efficiency, but the costs are steep—loss of civic trust, participation, and equitable distribution of services. Garvin does not acknowledge these trade-offs. At the very least, it seems logical to limit the duration of BID charters so that they remain accountable to elected representatives.

As Garvin's preference for BIDs indicates, he prefers an expert-driven approach to planning. He sees downtown development as a supply-side process that should be organized by elite institutions and, presumably, planner consultants. Their mission is to identify neighborhoods with potential as housing and office markets and endow them with the infrastructure and amenities needed to stimulate private investment. Despite sprinkling Jane Jacobs quotes into the text, he shows little concern that his top-down approach to planning might alienate many city residents. He titles the book's last sub-section, "Reducing Opposition to Change."

Garvin relates the redevelopment of neighborhoods such as New York's Hudson Yards and Boston's Seaport District, among others. Such projects represent impressive examples of growth and technical planning ability, and they are generating substantial gains in tax receipts that fund municipal services. However, the downtown landscapes they have created are bland, exclusive enclaves, where the prevailing ethos of consumption and surveillance make for a corporate, rather than civic, culture.

It is possible to celebrate how downtowns such as New York and Los Angeles have become more populous, productive, safe, and clean in recent decades, in part due to the efforts of BIDs, while still acknowledging how those changes are imperfect. In addition to Garvin's rosy characterization of many downtown rehabilitation projects, he is lax in places about acknowledging his involvement in them. The mask of disinterest slips embarrassingly when he gushingly praises Daniel Doctoroff, New York City's deputy mayor for economic development and rebuilding during the Bloomberg administration, for devising a financial scheme to pay for extending the No. 7 subway line to Hudson Yards (198). In the previous chapter, Garvin describes how he himself had suggested the idea to Doctoroff (167-168).

BIDs, like elites, belong in American cities due to their particular capacities. Planners and developers cannot wait forever for reforms to municipal government, and BIDs possess unique abilities to get things done. But they should remain subject to strong oversight and have their mission carefully articulated and limited in their charters. Like public authorities, another legal entity developed to circumvent democratic bureaucracy, they generate their own set of problems—opacity and devotion to growth that serves particular actors, i.e. business interests, rather than the municipal polity as a whole. They should not be deployed as a cure-all but as part of a carefully calibrated and monitored urban strategy.

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DREAM CITY: CREATION, DESTRUCTION,

And Reinvention in Downtown Detroit

Conrad Kickert
Cambridge, MA: The MIT Press, 2019. xi and 444 pp., maps, diagrs., notes, and index. hardcover, ISBN: 978-0-262-03934-5

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In *Dream City*, Conrad Kickert examines how two centuries of changing social, economic, political, and cultural forces shaped the urban morphology of downtown Detroit. With a series of detailed maps of the built-environment, he meticulously documents how city planners', politicians', and developers' never-ending focus on creating a car-oriented built-environment to emulate the suburbs not only sacrificed attempts to create a vibrant pedestrian orient urban core but also exacerbated the movement of wealth and people from the central city to the suburbs. Whether it was the removal of businesses for street widening projects in the 1920s, the razing of land for freeway constructions in the 1940s and 1950s, the leveling of African American neighborhoods for urban renewal developments in the 1950s and 1960s, or the clearing of downtown blocks for casinos and sports stadiums in the 1990s and 2000s, Detroit's decision-makers continually prioritized short-term automobile-centric developments that have resulted in a downtown devoid of any authentic sense of place and vibrancy and disconnected from its neighborhoods. Today, the downtown is nothing more than a series of self-contained corporate fiefdoms with highly choreographed and controlled public spaces that cater to a suburban clientele and a new generation of gentrifiers.

By juxtaposing the ebb and flow of downtown developments against a backdrop of urban planning paradigms and changing city administrations, Kickert shows that Detroit struggled with a deteriorating urban core, traffic congestion, and retail decline well before such issues became national trends plaguing American downtowns. Likewise, Detroit was the forerunner of urban renewal programs and a pioneer in private revitalization strategies common in urban planning and local economic development circles. Kickert's morphological approach to the historiography of downtown Detroit is thematically organized into four seasonal subsections, spring (birth), summer (growth), fall (decline) and winter (stagnation).

Chapters 1 and 2 comprise the Spring section of the book and discuss the birth of downtown Detroit from 1805 to 1911. These chapters focus on the changes to Detroit's built-environment brought about by its transition from a trading outpost and port city to a prosperous industrial and automotive powerhouse. The city's economic growth was reflected in the establishment of a retail, commercial, and entertainment center anchored around

the Campus Martius section of the downtown. This nascent commercial downtown was surrounded by residential neighborhoods, which were becoming increasingly overcrowded with the arrival of European immigrants and African Americans from the South. As the city grew and prospered, the downtown expanded and skyscrapers dotted the landscape. With the establishment of a streetcar network in the decade following the Civil War, middle-class and wealthy Whites began to relocate out of the downtown while the surrounding neighborhoods segregated along class, ethnic, and racial lines. In order to offset the ills associated with this growth, civic leaders inspired by the City Beautiful movement focused on creating spaces for public art and parks and other developments to make the downtown a more livable and orderly urban space.

Chapters 3 and 4 make up the Summer section and detail how the automobile driven growth of the city transformed the built-environment into one that prioritized cars over people from 1911 to 1929. In these chapters, Kickert details how the rapidly growing automobile industry was a double edge sword for the physical, social, and economic landscape of downtown Detroit. The car industry employed the majority of residents, ushered in an era of prosperity, and its growth continued to benefit an expanding commercial downtown. Yet, it also was the catalyst for the suburbanization that would eventually undermine the downtown. Many automobile plants were relocating to the suburbs and edges of the city, which spawned new subdivisions and commercial districts. The increasing affordability of the automobile enabled residents to live farther away from the downtown.

The magnitude of suburban growth weakened the symbiosis between the downtown and its surrounding residential areas as retail establishments followed residents into the suburbs and automobile-oriented commerce became a staple in the downtown. In response, a new typology of car-dependent architecture and urban design arose to alleviate traffic congestion and to ensure that suburbanizing workers could easily reach downtown. Street widening became the norm to help augment these developments. Yet, these efforts only served to disconnect people from the existing retail establishments while increasing property values and bankrupting commercial businesses located on the streets. The end effect was a declining downtown residential fringe marked by vacant land and parking lots.

Chapters 5 through 8, the Fall section, encompasses the steady erosion of downtown Detroit and its surrounding neighborhoods from 1929 to 1967. During the Great Depression, half of the city's auto workers became unemployed and the downtown began to shrink as a wave of business closures ushered in an era of demolitions that hollowed out the downtown landscape. By the late 1930s, the downtown was surrounded by a ring of parking lots and vacant land that effectively cut off the struggling downtown from the residential neighborhoods which were themselves deteriorating.

Even with the economic resurgence brought on by the Second World War, the downtown still was losing population and economic activities to the suburbs. Traffic congestion in the downtown was at an all-time high and deteriorating social and physical conditions in the neighborhoods was exacerbating racial tensions in the city. Rather than implementing programs to strengthen the urban core and its surrounding neighborhoods, city officials and planners implemented a series of street improvements, urban renewal projects, and freeway constructions in an attempt to lure suburbanizing middle-class residents back into the city.

During the 1950s, the exodus of White residents and businesses into the suburbs combined with the growing blight around the downtown led city officials to hire Charles Blessing as the head of the City Plan Commission. Blessing's revitalization strategy was to utilize modernist design principles to emulate the suburbs in the downtown by creating a retail core surrounded by ample parking to mirror the region's first shopping malls while shielding the downtown from the deteriorating residential neighborhoods. Subsequently, low-income and predominately African American neighborhoods were cleared to make way for his vision.

As Kickert details in chapter 8, Blessing's urban renewal projects failed to rejuvenate the downtown and exacerbated racial tension in the city. New downtown buildings only cannibalized workers from existing buildings rather than lure in new tenants. These projects also solidified an unwalkable ring of freeways and parking lots around the downtown. In the African-American neighborhoods bordering this ring, worsening socioeconomic conditions and persistent racial residential segregation boiled over into the 1967 rebellion that devastated the city.

Chapters 9 through 12 encompass the Winter section and examine the long struggle to reinvent downtown Detroit from 1967 to 2011. Chapters 9 and 10 examine the two decades after the Detroit rebellion which saw White middle-class suburbanization surge and the election of Mayor Coleman Young in 1974. Young condemned the racial prejudice of past planning regimes that placed downtown business interests over the well-being of the African American community. Consequently, Blessing left and Detroit's planning department was weakened under Young as the modus operandi for revitalization shifted from public to privately funded programs.

During this era, Kickert identifies the seeds of corporate consolidation and control of the downtown with Detroit Edison buying city blocks to build a corporate campus and the Detroit Renaissance, a coalition of business interests, bought up riverfront properties to build the Renaissance Center. Similar to past developments, these projects failed to remedy the challenges facing the downtown and the street-widening and land clearances associated with them carved up the downtown. Throughout the 1980s, the downtown retail market continued its decline and the residential periphery of downtown fared worse than the core.

Chapters 11 & 12 focus on the slow revitalization of the downtown in the 1990s and 2000s. Kickert carefully details how corporate entities utilized public subsidies to acquire and transform entire sections of the city into a series of entertainment districts. These publically subsided districts were self-contained venues surrounded by ample parking in which suburbanites could parachute in for a few hours then leave. By the late 2000s, downtown Detroit had transformed itself into a corporate-owned center of leisure that failed to revitalize the surrounding neighborhoods.

*Dream Cit*y is a methodically crafted narrative about the rise and fall of downtown Detroit. Kickert excels at presenting a detailed urban morphology of the downtown that intersects with the well-known social, economic, and political forces reshaping the city. He elegantly shows how the potential for a strong pedestrian orient core was sacrificed in order to emulate the suburbs and cater to suburbanites at the expense of the surrounding residential neighborhoods. *Dream City* will be a welcomed addition to the bookshelf of Detroit scholars and for geographers and urban planners interested in the history of American downtown development trends.

Abstracts

2018 Annual Meeting of NESTVAL

October 12–13, 2018, Keene State College
Keene, NH

Zachary Adams
Eastern Connecticut State University

Analyzing Spatial Relationships Between Cellphone Towers and Honey Production As A Measure Of Honey Bee Health

The global loss of biodiversity is devastating, as crucial ecosystem services are being lost and extinctions, have resulted in a disruption of the symbiotic relationships. Humans rely on these relationships which can greatly affect the environment, industry, and our food supply. Commercial agriculture has relied on honey bees to pollinate various crops to produce a higher yield. However, the loss of bees due to Colony Collapse Disorder (CCD), has been devastating. If the rate in the loss of bees continues its current trend, it may affect agriculture on a large scale. While the precise cause of CCD is unknown, some research shows that radiation emitted from cellphones and cellphone towers can affect the health of honey bees, possibly leading to CCD. These studies are all experimental in nature, and there have been little analyses conducted on the effect of radiation emitted by cellphone towers spatially. Therefore, purpose of this study was to conduct a spatial analysis using a geographic information system to examine the influence of cellphone towers, along with critical environmental variables (i.e., temperature, precipitation, crop area), on honey production for counties within the Northeast. Results showed that the density of cellphone towers and environmental variables had no influence on honey production in the Northeast which suggest that radiation emitted from cellphone towers may not contribute to CCD. While this study was unable to find causal relationships between honey production and cellphone towers, historical analysis of cellphone tower may give insight into the causes of CCD. *Keywords:biodiversity, ecosystem services, honey bees, colony collapse disorder (CCD), cellphone tower, radiation*

Stephen Axon
Southern Connecticut State University

(Dis)Connections between the principles and applications of sustainability: What do our students really think?!

Implementing sustainability projects is challenging. Even more challenging is ensuring that such projects follow the principles of sustainability that have been embedded within the last 50 years of international agreements and policies. This raises more questions than it answers. What do

sustainability studies students really think about how sustainability should be applied, and its importance? Is it important to encapsulate these principles within applied sustainability? Are newer concepts such as justice and engagement more worthwhile to incorporate? This presentation will address these questions with results from a survey of sustainability studies students at SCSU. The paper will conclude with implications for sustainability studies and applied sustainability. *Keywords: Principles of Sustainability; Applied Sustainability; Sustainability Engagement; Social Justice*

Caroline Banville
Central Connecticut State University

Site Selection for a New Starbucks in Savannah, GA Poster

Retailers from fashion to food are utilizing Geographic Information Systems to aid in site selection for their business. Utilizing industry socioeconomic criteria and data from the American Community Survey for Savannah, GA to select a new site for a Starbucks Coffee. Creating a series of choropleth maps to analyze patterns in the socioeconomic criteria. Followed by a selection by attribute by querying the data using logical OR to find a suitable location. Resulting in creating more rigorous criteria to find a suitable location. *Keywords: Geographic Information Systems, Query, Retail Site Selection, Economic Geography, Savannah, Georgia*

Darren Bardati
Bishop's University

Sustainable Agriculture Innovation in Quebec: A Geography of Resilience?

This presentation explores the state of agriculture in Quebec and its emerging transitional forces. First, a survey of the challenges, problems and possible causes of industrial/conventional agriculture production is outlined. Questions are raised about both the sustainability and resilience of the food systems under these conditions. The focus is on economic, social and ecological sustainability, as well a social-ecological resilience, in an era of climate change. Second, recent innovations in the small-scale entrepreneurial, regenerative agriculture sector are presented, with case studies of organic agriculture; farmers' markets, urban rooftop farming and insect farming are presented. Quebec's new Biofood Policy, a seven-year $5 million investment, to improve the food system is also discussed. The presentation concludes by asking a question about whether that a geography of resilience is emerging in Quebec. *Keywords: Sustainable Agriculture, Innovation, Resilience, Quebec*

Klaus Bayr
Keene State College

The New Hampshire School Atlas in Elementary Education

School Atlases for New Hampshire, Vermont, Massachusetts, Connecticut and Rhode Island were produced as student projects at Keene State College. The Atlas of New York, Maine and The Massachusetts School Atlas are the newest editions. These atlases help the teacher to introduce the geography of the state to the fourth graders in elementary schools but they can also be used from Kindergarten to sixth grade. The workshop will introduce the participant to the overall concept of these atlases and especially to The New Hampshire School Atlas. Several lesson plans will be used. In addition to the maps from The New Hampshire School Atlas a large tile map and parts of the tile map will help the participant of the workshop to complete the lessons. Each participant will receive a free booklet and CD copy of The New Hampshire School Atlas. The CD of The New Hampshire School Atlas includes the maps in digital form plus the overall tile map, the individual tiles, lesson plans and several outline maps of the state. The workshop is limited to 15 participants.

Jana Brady
Southern Connecticut State University

Cultural Heritage Tourism and Wine: Whitewashing South Africa's Dark History with Alcohol

South Africa is keen on incorporating the huge growth potential of tourism into its failing economy. While there has been a big push to attract international visitors, domestic tourism has also received considerable attention. Agritourism, wine tourism, and rural tourism often work in tandem with cultural heritage tourism to attract visitors to the main farming communities near Cape Town and further afield. Wine routes across the Western Cape offer nature, adventure, and a chance for visitors to explore the agricultural regions that contribute to South Africa's unique 300-year-old winemaking tradition.

The recent focus on wine cultural heritage is a curious choice for an industry with such a dark history. Many of vineyards and wine estates operating today were built by slave labor and maintained through the 20th century thanks to the racist and oppressive policy of Apartheid. The upper echelons of the industry have seen little in the way of diversity since the advent of democracy in 1994 and working conditions for farm laborers have not improved dramatically either. Additionally, black South Africans were legally barred from drinking "European alcohol" under Apartheid, while mixed-race farm laborers in the Western Cape paid a portion of their salary in dop, a daily allotment of cheap wine produced on their farm. The negative effects of these policies led to massive amounts of alcoholism in both of these communities. The dismal

history of wine production and consumption in South Africa begs the question: Whose heritage is truly being celebrated in South Africa's wine country? *Keywords: tourism, wine, South Africa, Apartheid, heritage, alcohol*

Christipher Brehme and John C. Woodward
Keene State University,

Silent Spaces in Protected Places: A GIS Model of Tranquility in United Kingdom National Parks

The United Kingdom mandates the protection of tranquil spaces in its National Parks and Areas of Outstanding Natural Beauty. To support park planners, we collaborated with colleagues in the UK to develop a GIS tool known as BETER (Broadly Engaging with Tranquillity, Easier and Refined). Written in Python, BETER is a software extension to Esri ArcGIS that automatically prepares and combines more than 25 distinct GIS layers to identify areas with the lowest sound and visual interference. Many of the processes involve viewshed and soundshed analysis using fine-scale digital elevation models, which can be computationally intensive. However, a moderately experienced GIS user can produce output in map formats in order to highlight areas most at risk to visual and audio intrusions. We are partnering with Esri to deploy BETER across the UK, and continuing to develop similar applications for other GIS platforms such as QGI.
Keywords: GIS, National Parks, Recreation Planning, United Kingdom

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Robert Bristow
Westfield State University

Cultural Heritage Volunteerism in Parks and Protected Areas

Parks and Protected Areas across the globe offer numerous opportunities for tourism. In the United States, the one-hundred year history of the National Park Service (NPS) manages these resources for a multitude of reasons. Within the parks we find thousands of archaeological and cultural resources. While the more popular and well known sites are protected, thousands of smaller, less known sites are not. The management and protection of these valuable assets is imperative to insure these smaller, yet significant archaeological sites are preserved in our history. The challenge facing managers is how to do this with limited funds and staffing.
Here an example of industrial archaeology on National Park lands will be explored. Recognized for the historic importance these cultural resources have attracted the attention of tourism scholars who recognize the need to locate, record and preserve these treasures.
The purpose of this paper is to illustrate a useful management tool for our managing our cultural

resources. By employing trained volunteer stewards, these historic treasures can be monitored and protected. A case study will be highlighted as the author prepares a Cultural Site Stewardship Manual for the Appalachian Trail, part of the National Trails System administered by the NPS. Further it can be suggested that the example illustrated here could be adopted in other areas, where funding is scarce but a strong network of volunteers are in place. *Keywords: Parks and Protected Areas, Cultural Resources, Stewardship, National Parks*

Jennifer Croteau
Eastern Connecticut State Universityy

Analysis of the Frequency and Cause of Connecticut Motor Vehicle Accidents

The cost associated with motor vehicle accidents (MVA's) in the year 2018 is estimated to exceed $500 billion and the total number of deaths due to MVA's will be approximately 1.3 million. The World Health Organization identified MVA's as the leading cause of death for people between the ages of 10-24 given that 31% of accidents are individuals under the age of 25. Unfortunately, the number of vehicles on U.S. roads has increased due to urban sprawl and more sedentary lifestyles. Given these current trends, MVA's will be the fifth leading cause of death by the year 2030. Therefore, the objective of this study was to spatially analyze the distribution of MVA's throughout Connecticut for 2016, which are available from the Connecticut Crash Data Repository (CTCDR), supported by the Department of Public Safety and the Connecticut Department of Transportation. A multivariate regression analyses was conducted to determine whether weather conditions, road conditions, terrain, time of day, or driver choices (alcohol or speed) influence distributions of MVA's. Results indicated that more MVA's occurred and clustered in Connecticut's largest city, Hartford, and rain, speed, alcohol and slope were statistically significant in predicting the number of MVA's on urban roads ($p < 0.05$). Additionally, the locations with a high density of MVA's at various times of the day were inconsistent for 2016. Increased police in eastern and northern Connecticut will reduce MVA's associated with alcohol or speeding and a greater police presence during the morning school commuting hours will result in less MVA's across Connecticut. *Keywords: motor vehicle accidents, regression, geographic information systems, Connecticut*

Saha Davis
Keene State College.

Untangling The US / China Rivalry In The Pacific: Studying Big Processes In Small Places

The geopolitical and economic rivalry between the US and China is one of the central tensions in contemporary politics and international relations. While the rivalry plays out through different social processes and realms (trade relationships, international development projects, human rights discourses, diplomatic maneuvers, and military posturing), this presentation takes a geographical approach that examines the shifting threads of influence in the western Pacific – a region that serves as a border of sorts between these two powers. Through an examination of island nations in the Pacific, this presentation will examine how economic, military and cultural practices are deployed by China, the US, and other external powers into this strategic region as well as how these various influences are absorbed, resisted and reshaped by people in the islands themselves. *Keywords: Political Geography, Asia-Pacific, Hegemony*

Hope Finch and Charlie Comstock
Southern Connecticut State University

The Effects of Farmer Creation and Maintenance of Microclimates on Eider Populations and Eider Down Production Poster

This poster argues that the individual farmer's role in creating and maintaining a conducive habitat for eider duck populations through local site adaptations and specific population management strategies is instrumental in the eider's success or failure. The "farmer's role" for the purpose of this paper can be defined as the creator and maintainer of micro climates, the eliminator of subsequent predators, and the facilitator of artificial incubation strategies which support the proper maturation of stray or abandoned eggs. In our observations at Skálanes, a research center in East Iceland, we have pinpointed multiple location-specific factors that are created by the farmer and are conducive to the common eider. The return rate of the ducks is likely encouraged by the presence of infrastructure to form nests and sheltered water areas supplied by the farmer. In addition, the potential for sustainable eider down production at Skalanes will be discussed. *Keywords: Eider Ducks, Eider Down, Farmer Infrastructure, Microclimates, Iceland*

Michael Gaffney

Persons with Disabilities and Their Locations

The purpose of this research was to identify those census tracts with a critical population of persons with disabilities. A critical census tract was defined as a census tract with a population of persons with disabilities that is greater than two standard deviations above the mean population of persons with disabilities for the respective census tract. The data used in the research was obtained from the U.S. Bureau of the Census American Community Survey for 2012 through 2016. Once the critical census tracts were identified each was mapped at the national, census region, census division, state and county level. The resulting research showed that the presence of persons with disabilities is not mainly confined to the major cities but can be found in outlying areas. The research can be further utilized to establish such things as the need for funding and the establishment of programs for persons with disabilities where such programs will do the most good.

Timothy Garceau
Central Connecticut State University

Cold & Calm, But Clear? Assessing The Impacts of A Woodstove Changeout Program in Keene, New Hampshire Poster

Keene, New Hampshire sits in a valley surrounded by 800 to 1,200 foot high hills. On cold, calm winter nights, Keene's topography frequently results in thermal inversion events. Since wood burning is a primary or supplementary heating source for many Keene households, inversion events have frequently resulted in poor air quality due to the particulate matter pollution from wood smoke. Seeking to improve air quality, Keene partnered with several agencies to enact a woodstove changeout program where 86 households received incentives for replacing their outdated, inefficient woodstoves with newer EPA-certified models or alternate heating appliances. This study assessed the changeout's impacts on Keene's ambient air quality by comparing PM2.5 levels before and after the 2009-2010 changeout program using t-Tests that assume unequal variances. It was determined that Keene has experienced a significant reduction in PM2.5 on calm winter nights with drops of 7-52% (1.28 to 7.30 μg/m3) when winds were below 2 miles per hour. As a result, Keene's woodstove changeout program appears to have improved local air quality on the nights when it was most likely to violate national standards; providing evidence that such programs can be an effective means towards moderating the effects of wood heating in communities with similar environmental conditions. *Keywords: Urban Air Quality; Inversions*

Michaela Garland
Southern Connecticut State University

A Comparative Analysis of Blue Economy Planning: The Case of Connecticut and New England

The need for sustainable ocean resource management has created a number of Blue Economy planning initiatives that recognize the need to minimize conflicts between natural resources and traditional uses. Upon recognizing the need for Long Island Sound to be sustainably managed, the state of Connecticut has created their own "Blue Plan." Along with the Long Island Sound Blue Plan, the Northeast Ocean Plan has also been created to sustainably manage New England's ocean environment; in which Long Island Sound is located. Long Island Sound consisting of state and federal territories presents many challenges involving local, state and federal jurisdictions. Challenges and/or opportunities regarding multi-scalar complexities, uneven development, social justice, and sustainability are discussed using a comparative analysis of how Connecticut's Blue Plan and the Northeast Ocean Plan both value and define the Blue Economy for the same location. *Keywords: Blue Economy; Multi-scalar complexities; uneven development; social justice; sustainability*

Noah Hallisey
Eastern Connecticut State University

A Spatial Analysis of Public School Funding in Connecticut Poster

The U.S. public school system is highly ranked among other developed countries and the U.S. strives to ensure that each child can receive a quality education. In 2017, Connecticut's cost per student was $16,592, which is significantly higher than the national average. Despite this high amount, many public schools are underfunded; hence, the United States Department of Education recently announced that Connecticut has the largest disparity in public school funding for communities with minorities. Therefore, the objective of this study was to spatially and statistically evaluate Connecticut's distribution of publicschool funding to determine if state funding is equal or bias based on the demographics of each town which are incorporated into the Education Cost Sharing (ECS) formula to distribute funding across Connecticut. The formula includes race, the number of English learning students, and the number of students on free or reduced lunch; thus, these variables were incorporated into a multivariate regression analysis to explain the percentage of public school funding received in each town for both the 2017 and 2019 fiscal year. Results found that race, specifically the number of Hispanic or Asian students per school district, was significant in the allocation of funds per school district which suggests

that biases exist in Connecticut. Additionally, urban towns tend to receive a lower percentage of funding compared to rural towns. These results imply that improvements in the ECS formula are needed to accurately allocate public school funding across Connecticut. *Keywords: Connecticut, Public School, Funding, Education Cost Sharing (ECS)*

Emma Knauerhase
Southern Connecticut State University

A Spatial Analysis of Hospice Care in South Africa.

It is important for palliative and hospice care facilities to design services to strategically place these facilities in areas not being served, specifically those that are spatially isolated by land development and other barriers. There is a need to determine which populations have access to these services and those who do not based on income and location. By illuminating geographic and income disparities for people and hospice care facilities, studies have found spatial disparities in hospice access. Therefore, researchers have concluded that there must be a greater access to and more affordable method to utilizing hospice facilities. More specifically for those who do not live within a specified area of a facility. This study examined the geographic distribution of hospice and palliative care facilities in relation to functional age, household income and distribution of the population by population group to determine the disparities of access in the Western Cape of South Africa.

Louie V. Krak
Southern Connecticut State University

Down the Fishing Well: Iceland's Wish for Environmental, Economic, and Social Sustainability

The Icelandic fishing industry is the most environmentally sound in the world because of the creation of the Individual Transferable Quota system in 1984. As a result of capping and regulating fishing quotas, Iceland's fisheries have recovered from the brink of danger to achieve environmental sustainability. However, the Individual Transferable Quota system has created various economic and social problems that require remedy in order to create an enterprise that is also economically and socially sustainable. Interviews of native Islanders were conducted along with a literature review in order to explore possible solutions to these issues. Once such solution is to expand the "free fishing" enterprise in an attempt to make the fishing industry more accessible to small-scale operations. Another solution involves dismantling the nation-wide quota system in favor of instituting smaller quota systems at the town level to keep local jobs from disappearing. While most Islanders agree that the quota systems is environmentally beneficial, they rec-

ognize that in order for it to also become more economically and socially viable, revisions to the Individual Transferable Quota system must be explored. *Keywords: Iceland, fishing, Individual Transferable Quota, sustainability*

Jeff Kreeger
Central Connecticut State University

Recruiting Undergrads Majoring in 'Fun'

For the past few years, student enrollments in the Tourism and Hospitality Studies (THS) major have been declining at Central Connecticut State University (CCSU). In an effort to recruit more THS students, GIS analyses were employed in following the age-old marketing strategy of identifying and analyzing one's current customers (students) in order to determine similarities in order to market to other customers (students) who share those similarities. After the existing THS students' homes of origin (their parent's house in most cases) were geocoded, a cluster analysis was performed in order to produce a heat map. While this provided a visual inventory of current students and their proximity to each other, Moran's I was utilized, which provided statistically significant areas of clustering. Additionally, psychographics were utilized to identify neighborhoods of each students home.

The heat map and output from Moran's I provided ideal target areas where direct mail could be sent to prospective students. The psychographic results revealed that over 52% of existing THS students live in affluent households (High Society, 37.3%; Upscale Avenues, 14.9%). Interestingly, CCSU is the least expensive four-year university option in Connecticut; therefore, this researcher was surprised by how many affluent students there were in the program. An additional variable was considered – GPA. The current college GPA average for those students represented by the High Society psychographic was 2.74 on a 4.0 scale. Assuming their college GPA is representative of their high school GPA, this seems to suggest money was not the issue.

Raguraman Krishnasamy
Massachusetts Maritime Academy

Transforming Canals from Transportation Waterways to Heritage Sites: The Case of the South Hadley and Middlesex Canals

Prior to the famous Erie Canal, there were a few canals already in operation in the New England region and producing substantial accomplishments both from a socio-economic and an engineering perspective. For example, the South Hadley Canal along the Connecticut River (opened 1795) was the first canal built in the United States and it was notable for its use of an

inclined plane instead of locks. The Middlesex Canal (opened in 1802) linking the Merrimack River with the Port of Boston had several civil engineering firsts and it actually served as a model for the Erie Canal builders. These canals contributed significant economic impacts in terms of increased trade as well as industrial and urban growth. In the face of rail development and other changes from the late 1930s, both canals struggled to remain resilient but, by the late 1840s, the "disturbances" could no longer be cushioned and the canals moved into a state of degradation and abandonment and, in many cases, subsequently converted to new uses that were demanded by urbanization. Since the 1960s, the important socio-economic and engineering histories of the canal landscape have increasingly been re-discovered by scholars and heritage groups. Canal associations and societies have emerged to promote a "new" resilience of the canal system based on these important historical connections to the past. This presentation will discuss these changes in the canal landscape using a "resilience" framework and offers some insights on how heritage site development can respond to new challenges and opportunities. *Keywords: Canals, landscape change, heritage sites, resilience*

Timothy LeDeoux[a], Igor Vojnovic[b], and Zeenat Kotval-Karamchandani[b]
Westfield State University[a] and Michigan State University[b]

The Tradeoffs Between Neighborhood Food Environments and Urban Sustainability In Detroit, Michigan

An unintended consequence of supermarket decentralization and disinvestment, a major driver in the formation of uneven neighborhood food environments, has been the increasing energy-dependence of urban neighborhoods. As full service supermarket chains have left the city, a viable form of physical activity, walking to the neighborhood supermarket has been replaced with motor vehicle trips to stores further away from existing urban neighborhoods. This has led to an increase in gasoline consumption and vehicle emissions associated with food shopping. This paper utilizes survey data and robust one-way ANOVAs to examine socioeconomic differences in carbon monoxide emissions and fuel consumption associated with grocery trips in two urban Detroit neighborhoods. Results indicate significance differences by household income with respect to carbon monoxide emissions and fuel consumption. Despite, sharing the same neighborhood food environment, wealthier households tend to produce more carbon monoxide and consume more gasoline in their food shopping travels. *Keywords: Grocery Shopping, Neighborhood Food Environments, Energy & Emissions, Detroit*

Bryce Mase and Meredith Metcalf
Eastern Connecticut State University

A Cooperative Analysis Examining Arsenic and Uranium in Drinking Water. Poster

Previous research on groundwater from bedrock wells in Connecticut show that arsenic contamination is originating from anthropogenic sources rather than underlying bedrock. However, findings contradict other studies conducted in New England, yet no study provides statistical evidence to suggest geology contributes to observed concentrations of either arsenic or uranium. To address this issue and identify potential impacts of bedrock chemistry and mineralogy on drinking water quality, the USGS accurately identified extents and conducted geochemical analyses within the Deep River Quadrangle. Detailed mapping and comprehensive water quality analyses of 100 private domestic wells for the Quadrangle, further suggest a correlation may not exist. The largest formation within the Quadrangle is the Hebron Gneiss, one of several formations commonly assumed to contribute to arsenic in drinking water. Arsenic was present in 7% of the wells sampled across the study area, yet only 4% of the samples exceeded EPA drinking water standards. Thirty-one percent of wells intersected the Hebron Gneiss where most samples with arsenic occurred, but average arsenic concentration for wells within was less than EPA standards. Wells with uranium were randomly distributed across the study area. Neither arsenic or uranium occurrences clustered spatially at the 95% confidence interval yet wells with arsenic were located on or near prime farmland and, unlike previous studies, the pH was within acceptable ranges. Results suggest that for this area of the state understanding arsenic and uranium in bedrock wells is complex and more research on an individual well basis is needed to evaluate this issue.

Matt McCourt[a] and Gabriel Perkins[b]
University of Maine at Farmington[a] and Mahoosuc Pathways[b]

Valuing The Diverse Economies And Climate Possibilities of a Winter Festival In Western Maine

A group of citizens in western Maine was recently galvanized by their shared, volunteer labor of preparing a course for a major regional ski race during a low snow season. Working late into the night they shoveled snow by hand from the woods to the race course, paving the way for the success of the event, as well as animating subsequent efforts to use winter sports to build a diverse economy. Shortly after rescuing the race from a warm spell, the citizens group successfully planned and hosted a larger regional ski festival. Their follow-up festival incorporated an experiment in a walkable/skiable event venue with shuttle buses providing transportation to lodging

and off-site parking for day trippers. In keeping with the diverse economies framework (Gibson-Graham, 2006, 2008), festival organizers worked with researchers to estimate the value of their own volunteer labor, in addition to measuring the emitted and avoided CO2 resulting from their mitigation practices. This paper shares the results of the festival study while documenting how a particular instance of community labor bridges different interests, performs diverse economies and enacts a "climate politics of hope" in the face of climate uncertainty. *Keywords: tourism, diverse economies, sustainability, climate mitigation, Maine*

Matthew D. Miller
Southern Connecticut State University

Aligning Gis Teacher Training With K-12 Social Studies Curriculums

Advocation for Geographic Information System (GIS) education in the American K-12 system has existed for more than 25 years, yet GIS use and training in the K-12 system remains an exception rather than a rule. GIS education is noted as helping students engage with both spatial thinking and technology in ways that align with the future job market and information-heavy society. The difficulties inherent in bringing technology to classrooms and having educators trained in the use of technology, particularly GIS specific technology, remain significant barriers to increasing the presence of GIS in K-12 classrooms. GIS training workshops for K-12 social studies teachers, often funded through grants, are a way to bring GIS capabilities to the K-12 classroom. Given the curricular demands on K-12 social studies teachers, a way to increase the likelihood of GIS exercises being conducted in the classrooms of K-12 social studies teachers that have attended a GIS training workshop is to align the exercises used in the training workshop to the existing K-12 social studies curriculum of the teachers. This paper details how a GIS training workshop for K-12 social studies teachers in the New Haven, CT public school system was aligned with their social studies curriculum. *Keywords: education, GIS, social studies, curriculum.*

Jesse Minor
University of Maine at Farmington

Smokey Bear And The Shifting Use Of Media In Wildfire Prevention Campaigns

Wildfire prevention posters, print ads, radio spots, and digital advertisements featuring Smokey Bear represent the longest-standing and most successful advertising and branding campaign in US history. Taken collectively, the Smokey Bear campaign clearly represents not only a concentrated effort towards wildfire suppression, forest protection, and resource management, but also an attempt on the part of the State to influence and control the behavior of citizens through

mass media. A close study of the Smokey Bear advertisements demonstrates that this advertising campaign was successful for two distinct but related reasons: through its adaptability into new media outlets, as well as a consistent message that could be embedded into discursively flexible imagery. In this way, fire prevention media incorporate themes including war, geopolitics, and economic and social change, while ostensibly focusing on the threat of wildfire. The Smokey Bear advertising campaign has proven to be flexible to changing environmental conditions and to novel social circumstances, while also retaining its ability to meet associated state objectives. *Keywords: Ad Council, advertising, media, Smokey Bear, US Forest Service, wildfire*

Joseph Minor
Southern Connecticut State University

The Environmental Scandal of the Western Cape: Spatial Segregation and Inequality

The Western Cape Province in South Africa is the third most populated province and is also home to the second most populated city, Cape Town (Statistics South Africa, 2016). Analyzing the spatial distribution of economic and class inequality provides a vivid picture of the socio-economic inequality between low- and high-income populations living in informal settlements and/or government housing. This paper aims to critically review these spatial distributions and connect them to policies and practices, implemented by government officials and the upper-class, that use the topography of the Cape Flats to cement the status of low-income populations' and limit housing options. *Keywords: South Africa, Environmental Justice, Spatial Segregation, Western Cape*

Samuel Ndegeah
Westfield State University

Grief and Grave Struggles: Traditional Burial Practices and the Planning and Management of Cemeteries in Contemporary Kenya

Urban areas are more than just people and buildings. In Kenyan urban areas, the availability of and access to public utility land and services are pressing concerns. One of the most significant problems is limited burial space and filled public cemeteries. Most literature cites the lack of burial grounds only in passing, occasionally identifying the actors involved. Typically, neither the national and county governments nor the markets provide suitable land for burial sites. With a rapidly increasing population and urbanization, death and rising demand for internment plots are inevitable outcomes. In response to the concerns raised, this paper has three aims. First, to analyze select ethnic groups' burial practices; second, to assess the state of public cemeteries; and third, to link the traditional burial practices and the state of planning and management of

cemeteries in Kenya. An examination of the situation reveals that public cemeteries in many cities, towns, and urban centers became full, neglected, and degraded. Some of the factors contributing to the crisis are: different socio-cultural attitudes towards death and burial practices among ethnic groups; poor maintenance of existing cemeteries; demand that exceeds supply; corruption around new cemeteries; and the lack of institutional planning framework. Nonetheless, there is a gradual evolution of cultural ideas, private sector involvement in the provision of cemeteries and related services, and more community oversight of local decision-making processes, all leading a greater acceptance of select Euro-American and Asian burial practices. *Keywords: Urban planning, land use policy, cemeteries, burial practices, culture, Kenya*

Judith Otto
Framingham State University

"A River Runs Through It": Small Urban Rivers and Economic Revitalization in Post-Industrial New England Cities

This paper uses the case study method to examine the economic development potential of small urban rivers in New England. The legacy of the industrial past poses challenges for re-use of such rivers (e.g., contamination, underground culverting). Yet the creation or restoration of new urban spaces in these river corridors can provide not only ecological and recreational benefits, but also economic development benefits. I compare the Powwow River corridor in Amesbury, MA with the North River corridor in Peabody, MA. I find that successful strategies for using small urban rivers as part of an urban revitalization strategy depend not only upon a clear, shared mission and the commitment and authority for a very few key stakeholders to create change, but also the ability for citizens to embrace a radically different set of new urban spaces, and synergistic, creative financial support from multiple scales of government.
Keywords: urban rivers, economic development, urban downtowns, riverways, New England

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Robert Pontius, Jr.
Clark University

Criteria to Confirm Models that Simulate Deforestation and Carbon Disturbance

The Verified Carbon Standard (VCS) recommends the Figure of Merit (FOM) as a possible metric to confirm models that simulate deforestation baselines for Reducing Emissions from Deforestation and forest Degradation (REDD). The FOM ranges from 0% to 100%, where larger FOMs indicate more-accurate simulations. VCS requires that simulation models achieve a FOM greater than or equal to the percentage deforestation during the calibration period. This article analyses FOM's mathematical properties and illustrates FOM's empirical behavior by

comparing various models that simulate deforestation and the resulting carbon disturbance in Bolivia during 2010–2014. The Total Operating Characteristic frames FOM's mathematical properties as a function of the quantity and allocation of simulated deforestation. A leaf graph shows how deforestation's quantity can be more influential than its allocation when simulating carbon disturbance. Results expose how current versions of the VCS methodologies could conceivably permit models that are less accurate than a random allocation of deforestation, while simultaneously prohibit models that are accurate concerning carbon disturbance. Conclusions give specific recommendations to improve the next version of the VCS methodology concerning three concepts: the simulated deforestation quantity, the required minimum FOM, and the simulated carbon disturbance. *Keywords: Bolivia; carbon; confirmation; deforestation; Figure of Merit; leaf graph; model; simulation; Total Operating Characteristic; REDD*

Robert Pontius, Jr
Clark University

Methods to Quantify Differences between Maps

Clark University's Professor Pontius (www.clarku.edu/~rpontius) offers this workshop of lecture and discussion concerning how to compare two maps that show the same phenomenon. Examples focus on continuous variables such as temperature and categorical variables such as land cover. Pontius shows how measurements such as Mean Absolute Deviation, Total Operating Characteristic, Quantity Difference, and Allocation Difference are superior to popular measurements such as Root Mean Squared Error, Relative Operating Characteristic, Percent Correct and Kappa. Participants range from students to senior scientists. Participants are entitled to a 50% discount on a general, academic, or student license of the software TerrSet (www.clarklabs.org).

Bin Quan[a], Hongge Ren[b], Robert Gilmore Pontius Jr.[c], and Liu Peilin[a]
Hengyang Normal University[a], Hunan University of Science and Technology[b], Clark University[c]

Quantifying Spatiotemporal Patterns Concerning Land Change in Changsha, China

Changsha has undergone speedy socio-economic development, rapid modification of industrial structure, and acceleration of urbanization, which has influenced land cover change during the most recent three decades. Policies have aimed to conserve total agricultural area, but it is not clear how successful these policies have been. Our purpose is to characterize and interpret spatiotemporal patterns of land change with respect to the policy to maintain agricultural area in Changsha, China. Maps at 1990, 2000, and 2010 show four land categories: Built, Forest,

Crop and Other. We compute change components and apply Intensity Analysis to compare the land changes during two time intervals: 1990-2000 and 2000-2010. We also compare the central region to the peripheral region during 1990-2010. The maps show that Changsha's land change accelerated from 1990-2000 to 2000-2010. Change was more intensive in the central region than in the peripheral region. Crop and Forest experienced net decreases while Built experienced net increase during both time intervals and in both regions. Built's gain targeted Crop and avoided Forest during both time intervals and in both regions. The central region's largest change component is quantity change, due to Built's net gain. The peripheral region's largest change component is exchange, due to simultaneous transitions from Forest to Crop and from Crop to Forest. According to these data, policies have not maintained the quantity of Crop, as the peripheral region has not gained Crop sufficiently to compensate for Crop's loss from the central region. *Keywords: GIS; Intensity Analysis; land change; urbanization; Changsha*

Brendon Recce
Southern Connecticut State University

3D Ocean Farming in Seydisfjordur, Iceland: A Site Suitability Analysis

Abstract: 3D Ocean Farming is a revolutionary concept in aquatic food production, able to produce ~20,000lbs of kelp and 250,000 bivalves (oysters, mussels) every five months, on only one hectare of space. The concept, pioneered in Long Island Sound by a former oyster farmer (Bren Smith) has seen a surge in popularity, with there being a call for expansion in all coastal U.S states and over 20 countries. One problem plaguing the expansion of this idea is the narrow set of parameters in which the current farm design can thrive in. To help better understand potential sites for expansion, a site suitability analysis will need to be performed to analyze things like temperature, salinity, pH, dissolved oxygen, and nutrient availability in a potential site. This project involves performing a site suitability analysis for two sites within a fjord in Seydisfjordur, Iceland so as to see the expansion potential for aquatic agriculture in the North Atlantic.
Keywords: 3D ocean farming, aquatic agriculture, mariculture, sustainable food production, site suitability analysis, Iceland

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Phil Sarrazin
Southern Connecticut State University

Socio-spatial Impacts of the 2010 World Cup in South Africa

In 2010 South Africa hosted the FIFA World Cup and as a result the city of Cape Town—one of the host cities—went through massive redevelopment of the city including the construction of the new Cape Town Stadium and other related infrastructure projects. The overall research

project aims to analyze the socio-spatial impacts of these developments using a mixed-methods approach involving archival research and field observation. This paper will outline some of the initial results from the archival research and discuss subsequent field research methodologies. *Keywords: 2010 World Cup, Cape Town, Urban Development, Social Justice.*

Megan Schultz
Southern Connecticut State University

Home vs. Garden: Land Use Conflict in the Philippi Horticultural Area, Cape Town, ZA Poster

The area of land used for food production in South Africa is decreasing due to urban encroachment issues. The purpose of this project is to emphasize the impact of residential development pressures in Cape Town on the production of vegetables in the Philippi Horticultural Area. The Philippi Horticultural Area benefits the community and greater Cape Town region while residential development supports the growing city's housing needs. The results of this study support the concern that development in the Philippi Horticultural Area will have strong detrimental impacts on vegetable production and thus food security. The Philippi Horticultural Area is a contested space because the need for urban housing has created conflicts between the city's main food resource and their government. *Keywords: Cape Town, Land Use Conflict, Housing, Food Security, Sustainability*

Allie Smith and Olivia Thorndike
Southern Connecticut State University

Determining the Academic and Professional Value of Southern Connecticut State University's Annual Study Abroad Trip to Iceland Poster

Southern Connecticut State University offers students the opportunity to experience Iceland with the school's geography department in a 3-week long study abroad trip. The goal of this trip is to educate students with real-life observations, hands-on field research techniques, and interactive learning, in a way that will be applicable to the students' classes at SCSU and their jobs after graduation. We wanted to determine if this goal was achieved to gauge whether or not the Iceland trip should be continued, and whether or not it deserves more funding. To find these answers, we surveyed students who had previously been on the trip to find how much they learned and retained, how useful the lessons were, and how applicable this trip has been to their academic and professional careers. *Keywords: Travel, Education, Study Abroad*

Carolyn Thompson
Southern Connecticut State University

Industrial Heritage in an Era of Climate Catastrophe: Representing the Past, Reimagining the Future

The purpose of this presentation is to preliminarily explore the fruitfulness of understanding industrial heritage sites through the lens of environmental catastrophe in the 21st century. Geographers have been increasingly exploring heritage over the past few decades, concerned with its significance in terms of cultural and social representations, as well as its meaning as an economic commodity. Moreover, researchers have recognized industrial heritage as a key aspect of place identity in the cities of the westernized world, but have thus far not engaged in the fascinating nexus between the industrial production marked in these heritage, or potential heritage, sites and the environmental outcomes of those processes. As heritage has been described as "a view from the present, either backward to a past or forward to a future" (Graham, Ashworth and Tunbridge 2000, p. 2), the concerns of the present are integral in what we consider heritage and the meanings we imbue upon it. There is no concern more pressing in the present than the reality of climate change and environmental catastrophe and so this presentation considers exploring the interconnections between remembering the social and historical significance of industrial heritage sites and recognizing the ways these sites threaten our future. Through a preliminary case study of English Station, a disused power station on the Mill River in New Haven, CT, I will explore how this site represents the aspirations and progress of New Haven as an industrial, electrified, automobile city, as well as the current environmental catastrophes on our doorstep. *Keywords: Urban geography, heritage, industrial cities, post-industrial cities, climate change, urban environmentalism*

Jose Torres
Central Connecticut State University

Urban Tourism Implications of the Restoration of the Tagus Riverbank in Lisbon, Portugal

In recent years the city of Lisbon, Portugal has engaged in urban regeneration projects that include the upgrading of public spaces in neighborhoods and unblocking views and access to the northern bank of Tagus River by tearing down built structures in order to create urban park spaces and/or open-air recreational spaces for the benefit of residents and tourists alike. This paper presents a case study that relies on reviews of published material as well as the author's fieldwork to explain which urban regeneration and urban tourism practices account for Lisbon's redevelopment of the Tagus riverbank in the form of new open recreational spaces,

and to explain how, as hybrid resident-tourist spaces, open-air recreational spaces differ from traditional and from gentrified urban tourism spaces. The results of the study and the analysis of the redevelopment of the Tagus riverbank provides a comparative framework that explains how, while traditional urban tourism spaces and gentrified urban tourism spaces focus more on specific attractions and leisurely consumption, respectively, the emerging practice of developing open recreational spaces in places such as the Tagus riverbank focuses on sustainable practices that benefit riverbank urban landscapes as well as local residents and visiting tourists.
Keywords: urban tourism, urban regeneration, urban parks, sustainable tourism, Portugal

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Idongesit Udo-Okon
Southern Connecticut State University

South African Climate Change

South Africa has received a lot of attention due to unjust usage and distribution of freshwater. As fossil fuel continue to be a major energy provider for electricity and energy, climate change also continues to persist. Climate change effects the coastal areas of countries including countries as South Africa, But the true victims of the consequential use of fossil fuels are the marginalized population, especially the elderly and infants, who significantly vulnerable to heat stress and sea level rise and are also dependent on others due to their weaker state of being. This paper will present the result of the influence of climate change (sea level rise and heat stress) that is negatively affecting seniors and children, even resulting in death.

Samuel Vazquez, Jake Delguidice and Matt Dupont
Southern Connecticut State University

Creating a 3D Water Column Map Using a Shallow Water CTD Meter from Data Collected in Seydisfjordur, Iceland for the Purpose of 3D Ocean Farming Poster

The purpose of this poster is to show how the data collected from a Shallow Water Conductivity Temperature Depth (CTD) meter from the Seydisfjordur, Iceland can be used to create a three dimensional map of the water column. By using GIS we are able to create multiple horizontal maps that show temperature and salinity along the water column from surface to nine meters in depth. Through krieging interpolation, we are able to estimate what the water conditions are in the surrounding area. The poster will highlight the challenges that came with using this methodology, while suggesting potential solutions if this methodology is repeated.
Keywords: Interpellation, Iceland, Krieging, Shallow Water CTD

Christina Woehrle
Oklahoma State University

Unmanned Aerial Vehicle (Uav)-Structure From Motion (Sfm)-Based Three-Dimensional Characterization of Grapevine Canopy

On demand monitoring of vineyards at a high spatial resolution can help vineyard managers assess the health of the vines as well as monitor for pests and diseases. Uniform management practices in vineyards can be greatly improved upon, as spatial and temporal variation in health and fruit quality exists across the vineyard at a per-vine level. Precision viticulture (PV) utilizes cutting-edge geospatial technologies (e.g., remote sensing, spectral imagery) to improve vineyard management practices by identifying spatial variability in the vineyard so that it can be addressed by managers. A methodology for site specific management to assess the changing conditions of each vine can be created. Using an unmanned aerial vehicle (UAV) equipped with a digital camera, one can assess many aspects of the vine, including overall crop health by way of canopy assessment. The structure and density of the vine canopy can be evaluated using Structure from Motion (SfM) computer vision techniques. SfM enables assessment of the canopy in three dimensions. To add to existing literature and refine the geospatial methodologies adopted in PV, this paper will address two objectives: (1) to create an optimal method of image collection for a high density point cloud in assessing vine canopy, including variations in altitude and angle of the image acquisition, and (2) to assess the replicability of winegrape canopy structure and density estimations from SfM point clouds. *Keywords: unmanned aerial vehicle, UAV, structure from motion, SfM, GIS, remote sensing, viticulture, precision viticulture, canopy modeling*

Barry Scott Zellen
Georgetown Center for Australia, New Zealand and Pacific Studies

At the Interface of Tribe and State: The "Fourth Image" in World Politics - Tribal Homelands, Expanding States, and the Foundations of International Order

While my current research in IR examines the interface between expanding states and the indigenous homelands they would eventually incorporate, my earlier work explored the Arctic region and in particular the Western Arctic where the northward-expanding fur empires of Russian-America, New Britain (and the quasi-sovereign domain of the HBC, Rupert's Land) and (until its defeat in the French and India War), New France established a thriving political economy founded on indigenous hunting, trapping and marine mammal harvesting, which under colonial pressures evolved gradually from subsistence harvesting to commercial activities that catalyzed the global integration of hitherto remote Arctic indigenous peoples with the Eurocen-

tric Westphalian states-system of the colonial era. While the Arctic is perceived as a remote and isolated region, much the way Borneo and other remote regions are perceived in the West, it has in fact been part of a globally-integrated world economy for well over three centuries. Rather than directly address the Arctic, my talk will instead examine some commonalities shared by remote regions from the Arctic to the Tropics that experienced a similar wave of colonial expansion, globalization, and economic integration with the world economy, where tribal peoples remain(ed) demographically predominant, and where political order has come to depend on a reconciliation between tribal and state interests. A global comparative look at remote regions - from Borneo to Baffin Island - presents us with not only a new model for state formation and expansion rooted in a balancing of state and tribal interests, but an understanding of an enduring but often overlooked pillar of international order that suggests that the world system has been (and continues to be) defined not only by states and their economic, military and diplomatic powers as is commonly presumed by theorists of international relations, but also by tribal peoples in the more remote frontiers and interiors of former colonial states whose homelands were ultimately absorbed, but whose original peoples were neither displaced nor annihilated (as experienced in Europe and much of the Americas), but who instead became part of the very constitutional fabric of the polities that emerged during state formation. While neorealist IR theory was rooted in its Trinitarian structure of Individual, State and World System (the "three images"), there is in fact a "fourth image" that has long been overlooked by western IR theorists, one that becomes increasingly obvious when examining remote regions far from the Westphalian core, where states and tribes have struck an enduring (though not always equal) balance. My paper will discuss these commonalities, and some preliminary insights gained from looking comparatively at the Arctic and Tropics - and how beyond the Westphalian core of Europe and the conquered indigenous territories of the Americas, world politics and international order are, have been, and will continue to be defined by the reconciliation of tribe and state, and a balancing of state and tribal interests. *Keywords: State-tribe relations, Tribal foundations of world order, Aboriginal peoples and polities, International relations, Tropical geopolitics, Arctic geopolitics*

Instructions For Contributors to *The Northeastern Geographer*

A typical manuscript should be between 12 and 20 double-spaced pages of text. The journal will consider both shorter and longer pieces depending on their appropriateness. Articles submitted for consideration must be typewritten using Times New Roman 12-point font, double-spaced, 1-inch margins and with a minimum of special formatting. Electronic submission is preferred as a Word document. Do not place any identifying information in your manuscript or your file names to ensure a blind review. This includes names of authors, their affiliations or acknowledgments.

Articles MUST contain the following:

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An abstract of no more than 250 words with 4-5 keywords
The body of the paper
Separate pages for notes
Separate pages for references
Separate pages for figures, table and maps
The *Chicago Manual of Style* should be consulted for all style questions. Authors may also use the *Annals of the Association of American Geographers* to help resolve any formatting questions or issues. See: the *Annals* Style Sheet: http://www.aag.org/galleries/publications-files/Annals_of_the_AAG_Style_Sheet.pdf

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