



Faculty of Humanities, Social Sciences and Education

Broadband as a community development tool

Studying the societal changes broadband developments, or lack thereof, bring about to rural coastal and island communities in Maine

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Photograph by Zuzana Duffy

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Abstract

While various internet speeds and options have been available in Maine for decades, and increased investments were made in response to the pandemic, access to internet is still inadequate or unaffordable in many areas of the state. Broadband expansion efforts have been underway for at least a decade and communities are at various points in what sometimes can be years long process of acquiring and building out the infrastructure. Remoteness and rurality of Maine communities pose challenges in even deployment and affordability, and many have been neglected by large telecommunication corporations due to unattractiveness of the investment. Maine now finds itself at crossroads where municipalities are expected to receive additional funding, but at the same time the focus is starting to shift towards implementation of state's Digital Equity Plan. During this transition, I examined the impacts of broadband on coastal and island communities by studying the experiences with and perceptions of broadband expansion by residents who now have or still lack affordable and reliable connectivity. Additionally, changing climate, new federal fishing regulations and shifting demographics are threatening the coastal and island communities, further compounding the issue and begging the question of a long-term planning approach. Drawing on previous research about rurality, the importance of broadband for economic prosperity and the role of digital services in advancing rural resilience, I used qualitative data gathering methods such as semi-structured interviews, ethnographic research and document analysis to inform my research. This thesis is structured as follows. In the next section I introduce the problem statement and present the reader with the background of the area. Then, theoretical lenses and relevant research are reviewed. Next, I describe the methods and inform the reader of my position statement. After that, I present the analysis of my data by discussing how increased need for connectivity is perceived by coastal and island residents by looking at the economic, social and civic aspects of society. Lastly, the summary of my findings as well as recommendations for further research are presented.

1. Introduction

1.1. Problem Description

After years of investments in broadband expansion, most of Maine still experiences inadequate internet service and many residents lack access to reliable and affordable broadband service. This is mostly due to the state being heavily dominated by regional monopolies that failed to uniformly deliver affordable broadband despite decades of federal subsidies, regulatory favors, and tax breaks, thus most severely impacting small rural coastal and island communities that are often left unserved (Bode, 2024). Bode explains, that as a result, “local Maine communities are taking matters into their own hands, beginning with long-neglected unbridged year-round island residents (Bode, 2024). However, the barriers and challenges rural and especially island residents face are vastly different than those of their urban counterparts. Limited resources, high cost of living, lower level of educational attainment, aging and shrinking population as well as logistical barriers are just some of the factors that contribute to the inequality and disparity found in rural America. This impedes their ability to access new economic opportunities, obtain quality education, travel, civically engage, stay connected to their loved ones and benefit from telehealth care. As things are becoming increasingly digital even for the historically more traditional industries, the demand for reliable and affordable connectivity as well as digitally literate workforce increases. Broadband presents an opportunity to diversify the economy and create a more equitable society. Since COVID-19, more federal funding has been made available for broadband expansion, with money being allocated specifically to rural America in a pursuit of connecting everybody to fast, reliable and affordable internet and closing the digital divide. As broadband expansion and access become a priority for improving the quality of life for people living in rural remote areas, significant social and cultural transformations and changes are to be expected. In this paper, I shed light on how coastal and island residents perceive and experience the availability, or lack thereof, of broadband and what their perceptions of increased need for connectivity and digital literacy skills are as inevitable changes to their community ensue. Building on top of previous research I explore how broadband has affected the rural coastal and island communities in Maine, how it has changed the lives of the residents and what challenges are still being experienced regarding the lack of broadband and the shift towards digital economy.

1.2. Aim and Problem Statement

With this paper, I want to contribute to the knowledge of local perceptions of the impacts and changes adequate broadband availability, or lack thereof, bring about to the lives of people living in rural coastal and island communities in Maine. By interviewing residents from various demographic groups, business owners, town officials, civically engaged volunteers and residents, I hope to paint a picture of social changes that are taking place in this area and unpack people's perceptions as the need for connectivity and digital literacy skills increases and digital technology take over. To collect data, I undertook ethnographic research as my main form of inquiry and employed several qualitative methods such as interviews and document analysis to enrich my own experiences and observations. The theories activated in my analysis were inspired by the concepts of rurality, strengths of participatory planning and the movement towards creation of livable rural communities.

1.3. Background

1.3.1. Geographic Scope

There are over 4,600 islands in Maine, only 14 of which are unbridged year-round communities (Explore Maine by Ferry, 2019). Until 2016, zero of these islands had ubiquitous broadband or fiber-to-the-premise (FTTP) networks (MCA, n.d.). The combination of climate and hard geology in Maine make it extremely expensive to install the infrastructure and federal funding has not been ample enough to fund expansion to the most rural remote areas until recently. In fact, the biggest obstacle to broadband expansion is not funding, but rather the complicated coastal geology which makes installation challenging as it is immensely cost intensive and, in some areas, nearly impossible due to the topography (Bonam, 2024). As of 2024, 11 out of the 14 unbridged islands communities have attained fast, reliable and affordable internet for their residents, and 6 of these FTTP networks are community owned (MCA, n.d.). There are also several remote bridged year-round islands, such as Stonington and Deer Isle, with very small populations that were also able to build out the infrastructure. The rest of the islands in Maine are primarily privately owned islands with seasonal residences, or they are uninhabited wildland areas and are therefore not relevant for this paper. The population of year-round islands ranges from a couple dozen on some of the most remote islands to around 1,200 on the bigger islands closer to the mainland (Community Profiles, n.d.).

Moreover, they vary in area size, proximity to mainland, ferry service availability, predominant form of economy, demographic make-up, history, and availability of municipal and educational services, all of which contribute to a diverse host of communities. In fact, none of the two islands are alike and it could be said that they are more different than they are similar.

1.3.2. Demographics

Maine is a coastal state located at the tip of the Northeastern region of the United States (Fig.1). It borders Canada to the north and New Hampshire to the west, with the Atlantic Ocean to the east. The population of the state in 2020 was 1,362,359 with a population density of 43.1 people per square mile, making it one of the most rural states in the nation (U.S. Census Bureau, 2020a). Most of Maine is sparsely populated or uninhabited wilderness with the bulk of the population living along the coast and in the southern portion of the state. The population density decreases, and age increases the further inland or up north one goes. The definition and discussion of what constitutes rural and what are the challenges associated with this terminology will be examined later in the theory section. With the median age of 44.8, Maine ranks as the oldest state in the country by population age (State Economist, 2024). Resulting from the fact that 23% of Maine's population is 65 or older (U.S. Census Bureau, 2023a) and being one of the most rural states in the country, several challenges arise for Maine's rural areas, mainly poverty, lack of access to resources, scarcity of services, low income, high unemployment, insufficient population density to support public transit and low educational attainment. Most of Maine's population is white (90.1%), with Black (1.8%) and Native American (0.4%) being the biggest minorities (ibid). About 5.7% of people living in Maine use language other than English at home (U.S. Census Bureau, 2023b) and about 10.4% of the population lives in poverty (U.S. Census Bureau, 2023c). These populations are often marginalized and are especially susceptible to the digital divide and other existing inequalities.

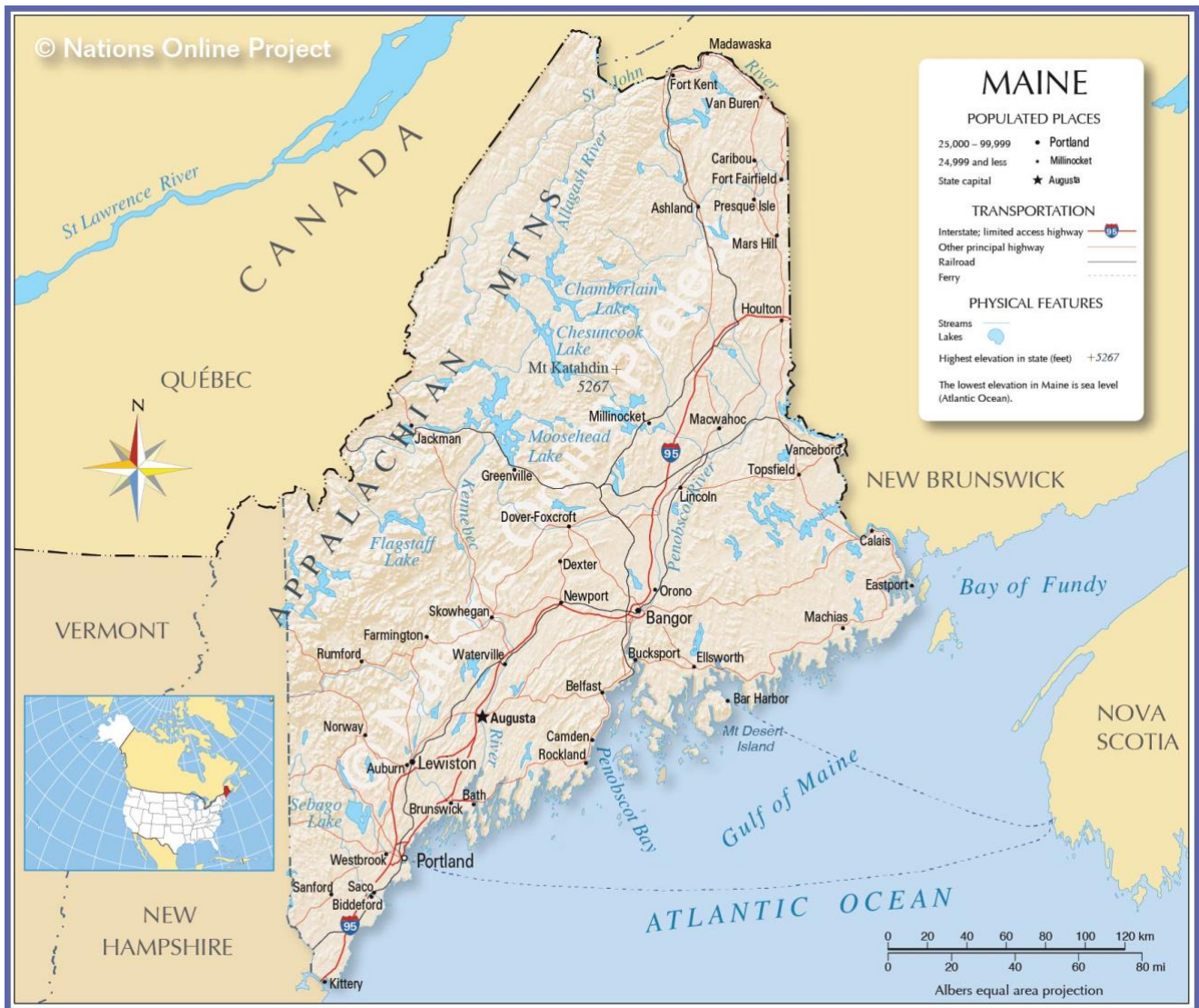


Figure 1 - Map of Maine. Figure by Nations Online Project

1.3.3. Broadband development backdrop

Maine has had some form of internet since its first invention in the 1990's, however most of the early form of infrastructure is now outdated and highly inadequate for modern needs and demands (Kittredge, 2013). To remain competitive and attractive in the 21st century economy, businesses and individuals need connectivity. As the older infrastructure is wearing down and the demand for connectivity increases, it is natural that replacement and expansion would follow. Based on the Federal Communications Commission's definition, broadband is just a fancy word for high-speed internet access that "allows users to access the Internet and Internet-related services at significantly higher speeds than those available through "dial-up" services." (Getting Broadband Q&A, 2024). There are many different types of broadband

available, such as digital subscriber line (DSL), cable modem, fiber, wireless and satellite, offering various speeds. To put Maine on the map of broadband infrastructure and to attract outside investors, the state completed its first major infrastructure upgrade in 2012 by building a 1,100-mile-long fiber network connecting urban and rural areas also known as Three Ring Binder (Fig.2) (Kittredge, 2013). Since then, it has been focusing on building out the last-mile infrastructure, which is “the physical part of a broadband network that serves as the final leg connecting the provider’s network to a home or building – the hookup between the larger backbone of the network to the end point” (The Last Mile Explained, 2023). This also happens to be the hardest and most expensive part of the infrastructure build out especially “in rural and remote areas where populations are low, homes and buildings are far apart, and tough terrain poses difficult challenges” (ibid.). As a result, the development has been slow, and many areas are still underserved or left to fend for themselves as the large telecommunication companies are unwilling to serve areas that are financially risky.

'Three Ring Binder' route

A 1,100-mile fiber network providing high-speed Internet service to rural communities has been completed six months ahead of schedule and under budget. The \$31.7 million project, which included \$25.4 million in federal stimulus money, creates a high-speed core network that telecommunications companies can link to as they expand broadband service.

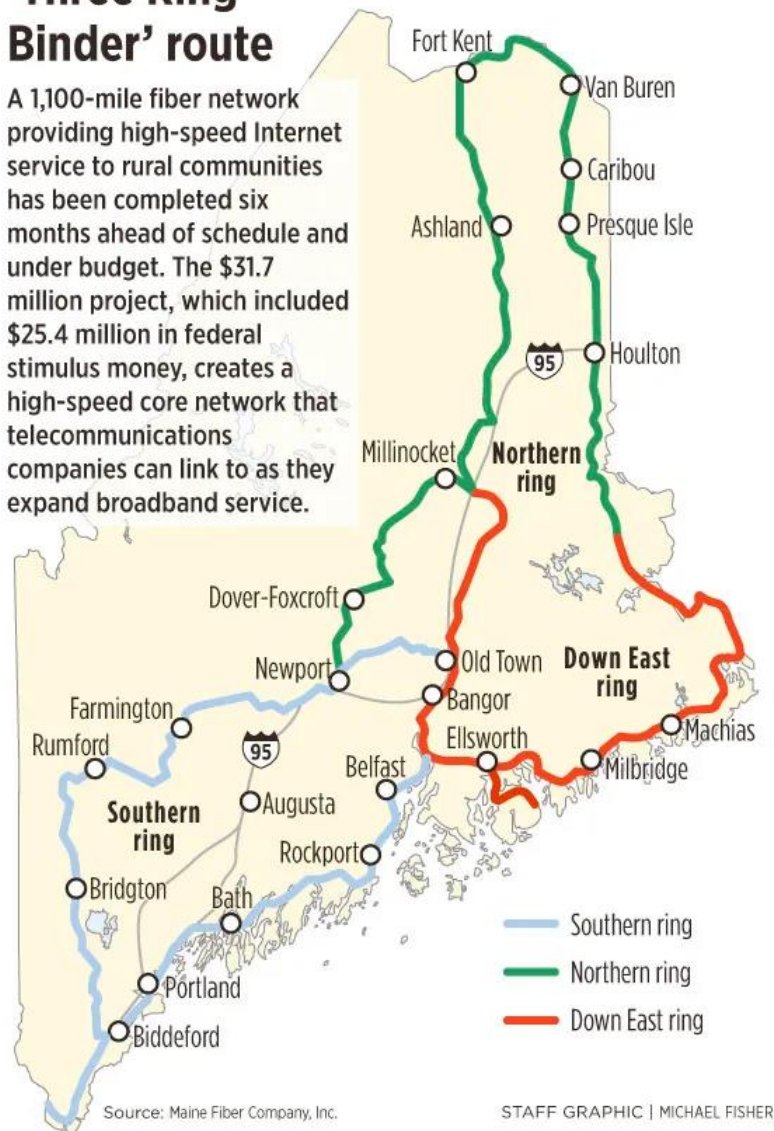


Figure 2 - Three Ring Binder. Figure by Maine Fiber Company, Inc.

In 2022 survey, Maine Connectivity Authority (MCA) found that “most community members...see access to broadband as essential but find it difficult to rely on existing broadband infrastructure...(and)40 percent of respondents are dissatisfied with their connection” (Maine's Vision of Digital Equity, 2023). As a result, internet availability and affordability are primary barriers to ensuring digital equity in Maine (ibid.). As many communities in the state are still unserved or underserved, in 2024 the state of Maine published its own Digital Equity Plan, the first one in the nation to be accepted by the National

Telecommunications and Information Administration (Digital Equity Initiatives, n.d.). The document outlines the steps the state plans to take to expand access to high-speed, reliable internet and break down the barriers especially for populations most impacted by the digital divide (ibid.). Thus, Maine is currently at a crossroad of navigating the equitable expansion of the infrastructure and making sure that the transition is truly beneficial for everyone.

1.3.4. Municipal Broadband

Regulatory context

Broadband is not considered a utility in the US yet which means it is not federally regulated and is predominantly controlled by the forces of market economy. The idea in a capitalistic context is that competition will reduce cost, ensure fair prices and secure the highest level of services. However, the federal government also favors and funds large internet service providers (ISPs) that can build out the infrastructure quickly and can promise the largest number of subscribers to show impact. This means the existing ISPs are not willing to build out the network in remote hard-to-get-to places with small populations unless someone else pays for the construction. Moreover, the large telecommunication companies push out any smaller competition despite their lack of focus on expansion in rural areas. As a result, the lack of competition means the largest ISPs can charge whatever they want. In addition, “expecting several potential suppliers of high-speed internet isn’t realistic because it costs too much to create the necessary infrastructure, and having only a small number of for-profit suppliers puts citizens in a bad position in terms of bargaining power” (COMMUNITY VOICES: Why We Support Community-Owned Broadband, 2023). Since in rural areas “the potential return on investment from subscriptions over time is most often too small or too slow for private internet service providers; ... the financial risk of the initial build out largely falls on the community” (Community-Driven Broadband Process, n.d.). This leaves individuals and smaller communities on their own to find an ISP that would be willing to serve them and figure out the best connectivity plan for themselves. However, this often comes with affordability and lack of capacity barriers. The smaller municipalities hoping to obtain broadband need the tax revenue to finance the infrastructure build out, but they also have the most limited capacity and are generally strapped for resources and funding.

One of the solutions that proved to have high rates of adoption and gives communities the ability to control rates and levels of service is the community owned broadband (Weng, 2022). Community broadband is an “internet infrastructure owned and, in some cases, operated by a local government or a collection of citizens” (ibid.). The goal of this model is to bring down prices, expand coverage, and increase competition. However, since Maine is sparsely populated and communities are spread out over large areas, they are economically unattractive to most ISPs. The installation is further complicated by existing land use regulations that may require easements to provide access to private properties or to allow development of the infrastructure in a protected area, prolonging the process of build out. Other faster but more expensive alternatives for individuals include broadband provided by wireless service providers such as Starlink – the low altitude satellite by SpaceX or if the option is available in their locale, they can get a subscription from a larger ISP such as Consolidated or Spectrum. However, in most cases it is more profitable and beneficial for the entire community or even several communities to come together and undertake the broadband project as one as there is strength in numbers. For example, the towns of Freedom, Liberty, Montville, Palermo, and Searsmont formed a non-profit broadband utility district (BUD) and were able to collectively apply for grants and borrow and finance the development of publicly owned broadband network which they otherwise wouldn’t be able to as individual towns (Gonsalves, 2022).

Participatory planning

In any participatory democratic system, both the municipality and its residents play an important role. Participatory planning has long been the backbone of Maine’s political establishment. “There is the “direct” form, often referred to as the town meeting form of government, in which the town meeting serves as the legislative body, passing laws, approving the spending of monies. Then there is the “representational” form, in which an elected council serves as the legislative body” (Forms of Government, n.d.). Most Maine’s municipalities exercise a direct form of governance, ruled by a town meeting which relies on a board of selectmen, that usually comprises of 3-5 selectmen who are elected by the members of the town. This has also been called the ‘purest form of democracy’ by some and ensures maximal accountability and transparency while allowing for minimal overhead. The selectmen hold administrative and executive power which allows them to administer, enforce and carry out the decisions made by the electorate. The board also holds some legislative power, allowing

them to change local policy and laws. Therefore, “interdependence, negotiation and trust are” amongst the most important of the “the basic governance principles in governance networks” (Sehested, p.247, 2009).

Moreover, Maine municipalities are unique as they enjoy “a special authority called ‘home rule’. This authority is given to the towns and cities of Maine in the state’s Constitution. Under ‘home rule’ municipalities may govern themselves in any way that is not denied them by state or federal law” (About Local Government in Maine, n.d.). This decentralized form of governance allows for more citizen participation and empowerment. Maine prides itself on having strong, active, educated and well-informed citizenry that takes the matter into their own hands. Citizens are not only crucial players in planning their communities, in the smallest of communities they are sometimes the sole actors due to the absence of intermediary professionals. Maine utilizes a governance where open and integrating networks with a plurality of participants are encouraged and even necessary for proper functioning of municipalities. The top-down approach is more common as the size of the municipality increases but “a large variety of actors” and other “political organs such as user boards, partnerships, voluntary organizations, citizen councils etc.” are still very much present (Sehested, p.248, 2009).

1.3.5. Public shoreline access in ‘Vacationland’

Maine’s famous state motto “Vacationland” and “The Way Life Should be” attracts people from afar (Fig.3). In the summer, the beaches are filled with vacation-goers, families with children, dogs and people engaged in recreation activities. The significance of public access to the shoreline is especially important in the context of working waterfronts in Maine. It is not just the beaches that attract tourists, but also the bustling harbors with lobster boats bringing in fresh catch and ability to watch people working on the water. “Working Waterfronts provide critical access to coastal waters for people engaged in commercial and recreational fishing, seafood processing, boat building, aquaculture and other water-dependent businesses” (Working Waterfronts, n.d.). However, only about 7% of Maine’s beaches are publicly owned and open to anyone, which means the public has restricted access to the vast majority of Maine’s coastline (Duff, 2004). “The population shift in the state to coastal areas, along with the influx of out-of-staters moving in or buying vacation homes,

has increased concerns that non-property owners will lose even more access to the coast. Public access to and along the shore is a sensitive issue in Maine which, despite its magnificent 3,000+ mile ocean coastline, has less than 40 miles of publicly owned sandy beaches” (ibid.) The trend of second homeowners and remote workers moving to Maine has accelerated during COVID-19 and further threatens the livelihoods of those who depend on waterfront access. The out-of-staters tend to buy up water view properties since they can afford to pay higher prices, leading to gentrification of the area. Moreover, they also bring with them different set of expectations, lifestyle and culture. Sometimes they deny access to those who rely on the water for living by privatizing the beach in front of their waterfront property. Therefore, public shoreline access is especially relevant in light of broadband expansion as more people move to the coast and expect urban amenities in places that are still pretty traditional.



*Figure 3 - State line sign on the border of Maine and New Hampshire showing the state's motto 'Vacationland'.
Photograph by Author*

2. Theory

This chapter serves to establish the theoretical framework of the study by utilizing previous research to enrich and inform my perspective. I refer to concepts and theories from the urban planning field which lend themselves as helpful lenses for approaching and analyzing the topic in this paper.

2.1. Rurality

The trend of urban growth and urbanization have always attracted more interest in academia and extensive research has been done on the role and form of cities (Friedmann, 1969), thus overshadowing our understanding of cultural, economic and social importance of rural areas, which tend to rank poorly by urban metrics (Guo et al., 2024). Nevertheless, this does not diminish their contribution to the economy and the significance they play in the lives of people that live there or indirectly benefit from them. For example, the Journal of Rural Studies has been studying present-day rural societies, their economies, cultures and lifestyles since 1985. Their area of interest spans from agricultural economy and biological sciences to social development, geography and political structures and governance of rural places. Moreover, in 2018 the United Nations Human Rights Council adopted a resolution regarding the Rights of Peasants and Other People Working in Rural Areas which recognizes significant contributions of rural areas, such as providing food for the rest of the world or conserving biodiversity, while also expressing concerns over disproportionate and unfair treatment these areas experience such as poverty, lack of incentives and economic diversity, low wages, difficulty accessing legal aid, lack of access to healthcare services, questionable quality of education, aging population and youth leaving for urban areas amongst many others (UN Council, 2018). The call for more comprehensive planning for the future of rural places is more pressing now than ever before as the rural population continues to decline (Ajilore & Willingham, 2020). Consequently, countries and even larger political units are putting together policies for long-term vision for rural areas. For example, the EU has put forward its vision for stronger, more connected, resilient and prosperous rural areas in a document called 'The long-term vision for the EU's rural areas: key achievements and ways forward' (European Commission, 2024).

The term 'rural' can have various definitions, which adds to the complexity of this research. There is no one universal definition of 'rural'. The term is usually locally determined, varies from place to place and is therefore somewhat ambiguous and relative. For example, in some cases, rural can mean country-like or rustic with an emphasis on agrarian lifestyle. According to the US Census Bureau, "rural is what is not urban—that is, after defining individual urban areas, rural is what is left" (Ratcliffe et al., 2016). Meanwhile, others might define rural based on population density or size. For instance, "in 2000, the Census Bureau expanded the classification to include two types of urban areas: urbanized areas and urban clusters. Urbanized areas are areas with 50,000 or more people. Urban clusters are areas with at least 2,500 but fewer than 50,000 people" and anything less than that is considered rural (ibid.). Another interpretation of rural is in terms of its remoteness and distance from the nearest bigger city or a town with social and cultural amenities. Yet in another case, rural could simply mean the periphery of a much larger denser area. Thus, the concept of rurality is locally and socially constructed. The reason for so many varied and ambiguous definitions of rurality depend on data collection methods, varying political or administrative purposes, changing settlement patterns and relativity of population size and other population criteria and land-use factors (Cromartie & Bucholtz, 2008).

According to the 2020 US Census Bureau, 80% of America's population resides in urban areas, whereas 20% comprises rural populations (Barrett, 2022). In Maine, 61.3% of the population was rural in 2010 (Lisa, 2019), meaning the majority of people lived in rural areas. Moreover, Maine is considered the most rural state in the nation with 50% of Maine's land area being almost completely uninhabited (Rural Health in Maine, n.d.). However, if rurality was measured by the highest percentage of land, Alaska would easily win in the US due to its size and small population. However, Alaskan residents tend to be more concentrated around the towns and villages, whereas in Maine, more people actually live outside of major towns and cities, thus constituting their rural nature.

Despite rapid global urbanization and predictions that two thirds of the global population will reside in urban areas by 2050, the relevance of rural areas has not diminished. In fact, rural communities experienced revival during of the pandemic (González-Leonardo et al., 2022). Maine especially because of its rural character saw an influx of people moving to the state

during the pandemic. Historically, “Maine’s failure to experience industrialization and urban growth is one of the characteristics that has made it attractive to tourists and summer residents from more industrialized states. Maine stayed rural when the rest of the country grew urban, stayed poor as the rest grew wealthier, and promoted itself to outsiders as a “vacationland,” or in other words, a two-week respite from real life” (Griswold, 2002). The state thus uses rurality to its advantage and continues to leverage it to form a strong cultural identity that visitors find attractive. Moreover, rural residents often oppose any extensive development that might make them look or feel more urban. This is due to several concerns, spanning from loss of rural character, increased traffic and strain on the infrastructure, environmental concerns, loss of agricultural land and raised property values. The ideas about development in rural areas vary even amongst rural residents based on their perceptions of what rural landscape should look like (Soini, et al, 2012). However, it is thanks to “the lowest population density... where simple inputs such as a Web site, a newsletter, or a mailing list can have considerable impact” (Griswold, 2002). The impacts of broadband and the influx of digital technology to rural areas in Maine are inevitable but the perceptions of locals on how the infrastructure development changes their lives for the better or worse matters and will be discussed later in the analysis section.

2.2. Liveable rural communities

In the field of anthropology, it is generally agreed upon that communities are defined by their emphasis on a place, although they can be virtual as well; they share a common set of values, norms, customs or lifestyles and as Bogardus, 1961 succinctly put it, “community is a social group with some degree of ‘we feeling’”. Moreover, Green & Haines. (2008) define “community as including three elements: (1) territory or place, (2) social organizations or institutions that provide regular interaction among residents, and (3) social interaction on matters concerning a common interest.” In this paper, the term therefore refers to a place-based group of residents who share a certain sense of identity and culture and social capital and trust are important aspects of their lives in a rural setting (Wiesinger, 2007).

Creating liveable rural communities takes a lot of effort. The process involves multiple different stakeholders and most importantly community members who collectively take action and seek to generate solutions for their common problems (UNDP, 2012). The process has also

been called community development which can be understood as a shared, planned efforts to increase the capacity of those who live in a certain area and strive to improve their own quality of life (Green & Haines, 2008). Community development therefore seeks to empower individuals or groups of people with the skills they need to effect change within their communities. However, “high levels of social and economic inequality present obstacles to development because the poor do not have the same opportunities to develop their capacity” (ibid.). The goal of development is also to reduce inequalities and bring everyone to the same playing field, which broadband, if distributed evenly has the potential to do.

In recent years, there have been shifts in how community development is perceived by both scholars and practitioners (Russell, 2022). In the field of planning, it is well known that development was historically done as a top-down approach at the behest of planning professionals, architect, engineers and large real estate developers who imposed their needs-based planning ideals driven by profit on neighborhoods and communities. But for decades now, both scholars such as Kretzmann & McKnight (1993) and other forward-thinking practitioners have been calling for a shift towards asset-based planning approach which comes from the ground up, is more time and place sensitive and allows each community to tailor responses to meet their own needs. Russell (2022) argues that “Asset-Based Community Development (ABCD) approaches are preferable Community Engagement practices, as they offer more authentic pathways toward community-centered population health and wellbeing”. Moreover, “all the historic evidence indicates that significant community development takes place only when local community people are committed to investing themselves and their resources in the effort” (Kretzmann & McKnight, 1993). My thesis is therefore not about collecting and analyzing data about problems or deficiencies as many previous social science researchers have done in order to identify community needs with the goal of solving them through deficiency-oriented policies and programs. Rather, it focuses on the assets of communities by highlighting the strengths that lie in bottom-up approach in which individuals’ capacities and skills are an integral toward a successful community development outcome (ibid.).

This begs the question of what makes a community liveable, especially in a rural setting? And who gets to determine what that means? Is it based on some scoring criteria created by planning agencies or the people themselves? Can it be collectively measured or is it a matter

of subjective individual opinion? The European Union claims that “the quality of life can be defined as the general well-being of people living in society. It is a broad concept that encompasses a number of dimensions, both objective factors (material resources, health, work status, living conditions and so on) and the subjective perceptions that people have (in other words, how they feel and view their own lives)” (Urban-rural Europe - quality of life in rural areas, n.d.). Cities are usually measured against quality criteria such as walkability (Forsyth, 2015), mobility (Larsen, 2017), housing standards, availability of health care, economy, education and environmental conditions and safety amongst many other things. People living in cities are generally thought of as having better access to a wider range of services as compared to those living in rural areas. According to Eurostat (2022) “often, this is simply a reflection of lower levels of demand, whereby the number of inhabitants in rural areas falls below the critical mass of people required to sustain the economic viability of certain services” (Urban-rural Europe - quality of life in rural areas, n.d.). On the other hand, liveability in rural areas “encompasses various aspects, including healthy living conditions, attractive surroundings, social cohesion and inclusion, affordable housing, functional roads and recreational opportunities” (Eriksson, 2023). Moreover, Eriksson (2023) goes on to explain that livability in rural areas “is linked to how local expertise guides ownership and governmental policies” with the aim of achieving “a desirable standard of living in the face of external factors, beyond an individual quality of life”.

However, people living in rural areas may need to drive further, pay more and wait longer to access basic human services such as healthcare, education, food or employment. This may in turn lead to more people leaving the rural areas in search of a better quality of life, which further leads to degrading quality and higher cost of services for those left behind. The impacts of depopulation on the rural quality of life have been identified and studied extensively around the world. For example, Fantechi et al. (2020) studied depopulation trends as a consequence of natural disasters in Italy; in Spain García-Gómez & Larraz (2020) explored depopulation of historical centers by locals as a result of gentrification caused by tourist economy, and Makkonen & Inkinen (2023) investigated the benchmark for vitality in shrinking rural regions in Finland. Makkonen & Inkinen (2023) found regions that were successfully able to retain their vitality despite declining population and based on these examples identified novel metrics on how to shrink smart.

The US is no stranger to these trends. “The changes in national demographic trends had significant implications for rural America. The rural population declined because more people moved out than moved in, and because diminishing rural births only minimally exceeded the rising number of deaths” (Johnson, 2022). Trask (2022) and many other researchers believe urbanization is the main cause of people leaving rural areas in pursuit of a better life and greater economic opportunities. Sadly, “a declining population commonly leads to a self-reinforcing vicious cycle of decreased regional competitiveness and attractiveness and a resultant lowered tax base, deteriorating infrastructure, decline in available services, etc. This loss of vitality hinders the ability of the region to provide for the basic needs of its residents and to facilitate their capacity to improve their lives” (Makkonen & Inkinen., 2023). Broadband is therefore proposed as a possible antidote to the decreasing quality of life with the potential to reinvigorate the vibrancy of rural areas. For example, The American Association of Retired Persons (AARP), a nonprofit, nonpartisan organization that empowers people as they age, identified “Increasing Digital Connections by expanding high-speed internet and enhancing digital literacy skills of residents” as one of the key-defining goals for creating liveable communities (About the 2024 AARP Community Challenge, 2024).

Moreover, I would argue that an important aspect of a liveable community is how well-grounded people are in a place. Despite facing many challenges, research shows that rural residents tend to have greater affective and evaluative place identity (Belanche, et al., 2021). “Place identity is described as ‘those dimensions of the self that define the individual's personal identity in relation to the physical environment by means of a complex pattern of conscious ideas, beliefs, preferences, feelings, values, goals and behavioral tendencies and skills relevant to this environment’”(ibid.). Everyone who has been to Maine knows that Mainers are extremely proud to be from Maine. It has even been documented that “Mainers have an unusually strong cultural regionalism, often referred to as “a sense of place” (Griswold, 2002, p.76). This strong sense of place can be attributed to the authenticity of shared human experience that is shaped by the geography, climate and available natural resources. “The history of human activities within this territory generates a shared way of looking at things, and this way of looking at things... becomes the regional voice. Thus, Maine culture reflects Mainers’ experience over time” (Griswold, 2002, p.77). But being a predominantly rural region with strong regional identity also means that an influx of resources usually has a bigger influence on

the way of life for people. It is therefore in this context that I hope to study how broadband reshapes and changes the rural coastal and island communities in Maine and in what ways it helps them become more liveable.

2.3. Smart governance for participatory planning

Generally, smart governance is a characteristic of smart cities but for the purposes of this thesis, I am mostly referring to the use of technology and innovation to facilitate and support enhanced decision-making, improve public services and democratic processes (Kaiser, 2024). The term 'smart governance' has not been used by small municipalities in Maine yet as only recently several components of smart governance outlined by Kaiser (2024) such as managing data privacy and security, smart healthcare, e-participation and e-transparency became relevant for communities their size. Even if at this point the idea of adopting smart governance is just an aspirational vision for the future, a utopia of some sort especially for the smallest of communities, the potentials of smart governance and digital technology for increasing municipal effectiveness and participatory planning are significant. Afterall, the objective of a utopia is to imagine "radical and seemingly unrealistic ideals about the possible future of a place" (Koning & van Dijk, 2021).

Many towns in rural Maine still don't even have a website, online payment systems or the technology to perform online governance. The smallest towns accept cash or checks for municipal fees and use cost-free social media for outbound communication. COVID-19 has certainly highlighted this inefficiency and pushed things further along, but change is happening very slowly due to limited staffing and funding amongst other things. For example, Maine has a long history of self-determination, which means towns are sometimes resistant to change and don't want to give up their rights and privileges to some big outside tech companies. However, in this paper I mostly discuss how technology is used as a tool to increase transparency and democracy for public benefit rather than consolidation and use by few technocrats. For small towns, smart governance could look like the use of mapping applications and platforms that allow for email communications, emergency alerts, event planning, waste management, utility monitoring, online payment processing, energy savings, safety or security improvements. Consequently, the use of these channels can drive public benefits in health, time, cost and jobs.

In addition, using smart governance and ICT (information and communication technology) to solicit opinions, concerns and feedback is just one way the government can interact with its constituents. It most importantly enables two-way communication between the residents and elected officials. After all, increasing civic engagement and public participation is a hallmark of any democratic planning system. Nevertheless, access to affordable and reliable broadband, devices and adequate literacy skills are necessary for both residents and elected officials to engage in smart governance. The desired outcome of any smart governance model should therefore be “more equal distribution of political power, a fairer distribution of resources, the decentralization of decision-making processes, the development of a wide and transparent exchange of knowledge and information, the establishment of collaborative partnerships, an emphasis on inter-institutional dialogue, and greater accountability” (Fanstein & DeFilippis, p.350-351, 2016). It is with the goal of improving the participatory planning experience by both municipal officials and residents via the use of smart governance that I analyze how broadband enables them to do so and how this transition has been perceived so far.

3. Methods

This chapter describes the methods used to collect data about people's perceptions of and experiences with broadband or lack thereof on certain islands and coastal communities in Maine. The methods include semi-structured interviews with residents, town officials and business owners; document analysis and my own experiences and ethnographic observations.

3.1. Position statement

Originally from Slovakia, I moved to Maine in 2018 to pursue my bachelor's degree in Geography/Anthropology. Living and working in Maine for several years allowed me to get to know and develop close connections with people, places and organizations in the state. This research was conducted during my term at the Island Institute as an American Connection Corps from August 2023-July 2024. The Island Institute is a community development non-profit located in Rockland, Maine. The Institute was founded in 1983 to ensure Maine's islands and coastal communities can thrive (Fig.4). This is reflected in their mission which states: "We boldly navigate climate and economic change with island and coastal communities to expand opportunities and deliver solutions" (Mission, n.d.). Their priorities revolve around marine economy, climate solutions and sustainable communities and their work spans from addressing impacts of ocean acidification, to supporting coastal businesses, increasing island energy efficiency, preserving working waterfronts, sustaining and supporting island school programs, leading aquaculture business development to spearheading the work on climate change adaptations and mitigation amongst many others.



Figure 4 - Island Journal, a yearly signature publication of the Island Institute celebrating island and coastal communities through stories, art, and poetry since 1984. Photograph by Island Institute

The Island Institute saw broadband as one of the critical components of ensuring that Maine’s year-round unbridged island communities remain sustainable and has played a pivotal role in expanding broadband to the island and coastal communities. It is one of the 13 organizations that are part of Maine Connectivity Authority’s Regional and Tribal Broadband Partners Program that focuses on expansion of affordability and reliability of the fiber to the home infrastructure (Broadband & Digital Equity, n.d.). Since 2015, the Island Institute helped communities navigate through the process of acquiring universal broadband, apply for federal funding and connected them with service providers. In 2023, they applied to host an American

Connection Corps to support their work, increase capacity with broadband initiatives and to advance digital equity and inclusion efforts in primarily in Hancock and Waldo Counties.

The American Connection Corps (ACC) is a program that connects people to places and possibilities in digitally disconnected communities across America (ACC, n.d.). It is a federally funded program that leverages the power of national service to expand people's economic opportunities, bridge their social network, and open them up to different perspectives (ibid.). I was hired as an American Connection Corps to collect stories of broadband's impact from island and coastal communities and help raise awareness around the digital equity issue. Throughout my term, I worked on several projects, from supporting broadband team in advancing digital equity efforts, to raising an awareness about the benefits of universal broadband for small rural towns through storytelling to working on a one room schools project by researching how COVID-19 impacted the quality of education at the smallest of schools in the US. I helped strengthen old and establish new connections and partnerships. I also wrote stories for the Island Institute's blog, co-wrote articles for the Maine Municipal Association magazine, attended national conferences and local public events and helped organize municipal workshops.

The data used in this thesis was produced for the Island Institute and the research project was designed by the Island Institute, specifically by Christa Thorpe who acted as my supervisor. Along with my co-worked Amber Blum who conducted most of the interviews with me, the three of us developed an interview guide (see Appendix 1). Although the interview guide was rarely used and continued to evolve throughout the process, it provided some structure and helped create an organic conversation flow while allowing for flexibility and a dynamic way of working. As a result, the research design can't be described as a scientific systematic method but rather an organic way of information gathering. As an Urban Planning master's student who is passionate about community development and someone who deeply cares about Maine, I found the intricacies and multidisciplinary nature of this topic fascinating and decided to write my thesis about it. It might seem paradoxical for a student of urban planning to study and explore rural communities. However, many of today's questions of energy, environment, growth and infrastructure have their answers precisely outside of the cities and the issues are often parallel or intrinsically intertwined. To ethically use the data, I asked the Institute if I could

use it for the purpose of my thesis in retrospect. They approved my request as long as I got a written consent from the participants. Consequently, in July 2024, via email, I reached out to 22 of the participants I wanted to quote in the thesis and obtained the permission from all of them. I also obtained a written release form from the Institute stating that the data will continue to be owned by Island Institute, but it will also be available to me for the purpose of the thesis beyond my term at the organization (see Appendix 2).

3.2. Participants and communities

To collect the data for my job and inevitably for this thesis, I was able to leverage Island Institute's long-standing partnerships and connections to reach people and schedule interviews. All interviews were voluntary in nature and participants received no compensation for participating in the study. They were informed of the purpose and scope of the study and there was a minimal risk of interview questions being political in nature. There was no direct benefit to the participants. The interviews took between 30-60 minutes on average and some of the interviews were recorded and transcribed. The interviews took place in-person, over the phone, or on Zoom. From the interviews I conducted for the Island Institute, I found 22 relevant for the thesis and obtained participants' consent retrospectively. This helped narrow down the selection of participants as well as geographic scope to 14 communities. While I visited most communities mentioned in this study, I have never been to Gouldsboro, and some I visited for personal purposes (Monhegan and Bath) (Fig.5).

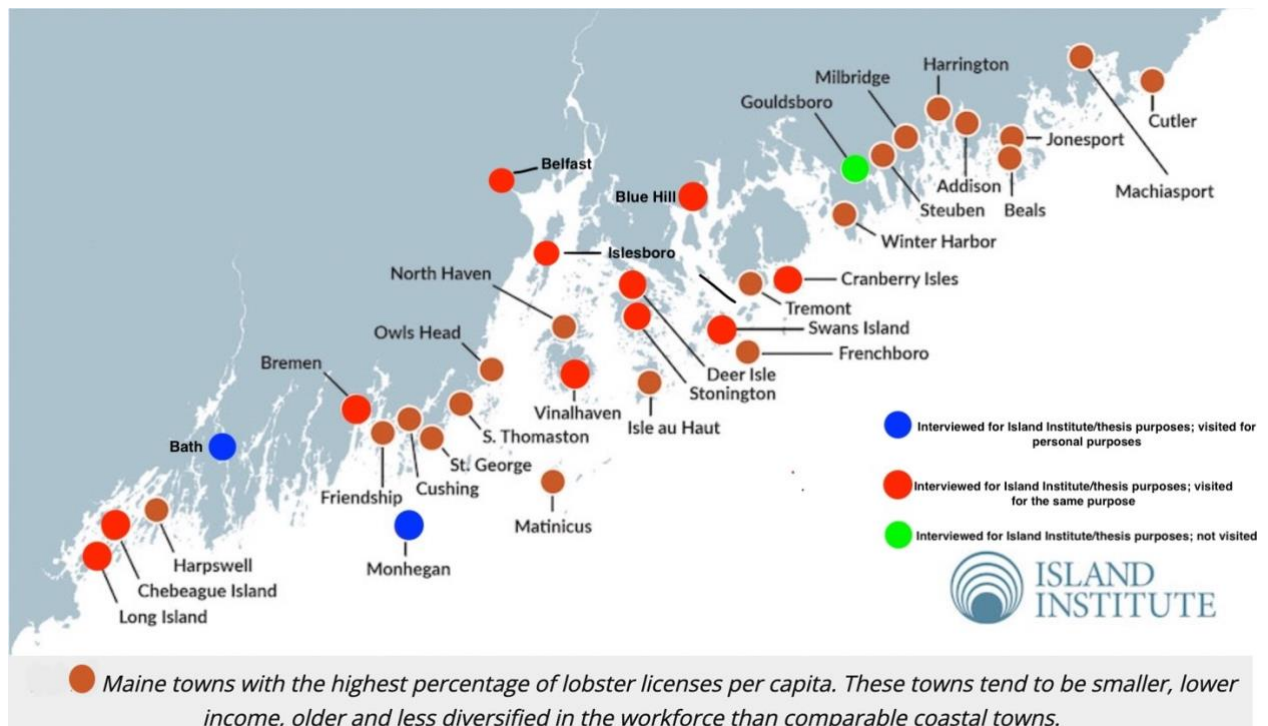


Figure 5 - Geographic scope of my paper. Map produced by the Island Institute and edited by the author

Due to the tiny size of some of these communities, this thesis focuses on multiple unbridged and bridged (Stonington and Deer Isle) year-round islands and several rural coastal communities to illustrate similarities and differences in their efforts to acquire broadband and their experiences with it. I specifically focused on communities in the three of Maine's coastal regions: Southern, Midcoast and Downeast Maine because they are major tourist draws but also due to their historical significance as working waterfronts (Fig.6). The selection of the islands and coastal communities depended on existing connections the Island Institute already had, time and scheduling limitation and availability of participants, but also the consent I was able to obtain in retrospect. As a result, the geographic scope is randomized. This study is not intended to be representative of all Maine islands and rural communities but is rather supposed to create a larger overview of what the year-round island and coastal communities are experiencing, in what ways their experiences are similar, how they differ in their approaches to using broadband for community development and what can we learn from it.

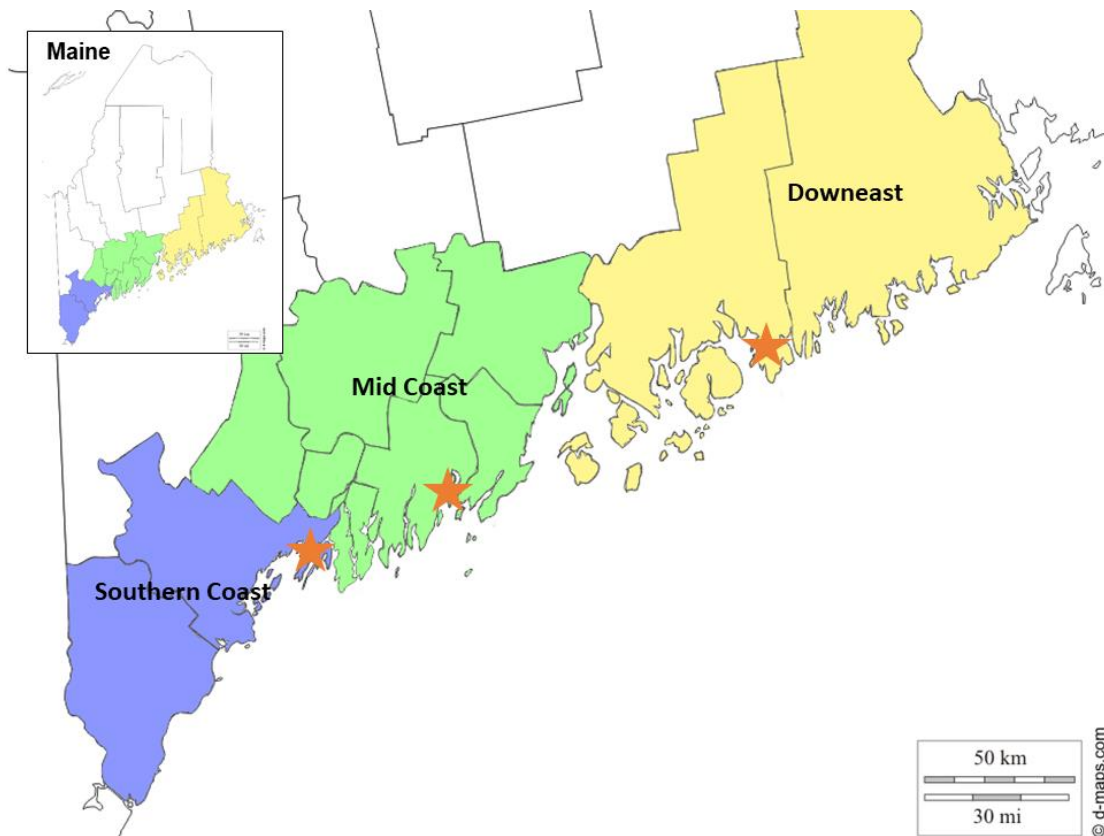


Figure 6 - A map of coastal regions in Maine: Southern, Midcoast and Downeast Maine. Map made by Kaitlyn Raffier for the Downeast Institute; edited by me with the permission of the author

3.3. Data collection methods

As the problem statement was developed in retrospect, upon reflection of methods used, I determined my approach most closely resembled ethnographic research, considering it relied on interviews and observations. Ethnographic research is a common form of data collection in the field of social science where researchers embed themselves in a community and record the behavior, habits and changes in the lives of people via observations or interviews. Immersing oneself in the field allows the researcher to gain valuable insight and get to know the area from a different perspective. I would also argue that the ethnographic methods often provide a more holistic image and a greater context of the issue at stake as this approach tends to look at societies more comprehensively.

The primary data in this thesis comes from the semi-structured interviews I conducted for the Institute. Semi-structured interviews allowed the participants to tell me about any area of their life they felt was affected by access to, or lack of, reliable and affordable connectivity and

take the conversation in a direction they felt most comfortable with. Some of the interviews took place virtually over Zoom or the phone, while others I conducted during in-person community visits. I also attended workshops and public events where I took notes and used these along with my observations to inform the discussion. While working at the Institute, I conducted around 50 interviews in 19 different communities with people from partner organizations, tribal leaders, committee members, volunteers, librarians, students, seniors, town officials, seasonal and year-round residents and business owners. The purpose of the interviews was to collect stories of impact that could be published on various internal (Island Institute's blog) and external platforms (such as the Maine Municipal Association magazine) and shared with relevant stakeholders at the state level such as the Maine Connectivity Authority (MCA) to inform the course of future policy.

Since MCA partially funds the broadband efforts at the Island Institute, they wanted to learn and share what broadband means for Maine's economy, changing demographics, and future opportunities and hired Island Institute to do so. The goal was to spread awareness around digital equity. Moreover, MCA was interested in understanding the impacts of broadband on the so-called covered populations, such as low-income individuals, veterans, seniors, incarcerated individuals, disabled people, individuals with language barriers, racial and ethnic minorities and those living in rural areas.

Many of the initial interviews were part of my listening tour. The purpose was to familiarize myself with the communities, establish relationships, gain people's trust and get the general lay of the land. As a result, some interviews ended up being merely information gathering conversations where I learned about another useful resource or gained a new connection that led me one step closer to finding the right person to talk to. These informal conversations helped paint a bigger picture of what life was like on the coast and shaped my perspective. Using storytelling as a method of collecting and publishing the data for the Institute allowed me to record and understand the impacts and changes that are happening to people on an individual but also community wide level. Little qualitative research has been done on this topic, and the value of my research therefore lies in verifying data by telling stories that are consistent across communities.

Moreover, by going to the individual communities and visiting people in their natural setting, I was able to observe people's daily routines and their interactions with the technology from the comfort of their homes. For example, I visited participant Brenda in her home and while we were talking, she was able to show me her set up and I was able to observe how she engages with the technology, and she could ask me question about the use of certain features. By immersing myself in the communities and living on an island myself (Peaks Island), I was also able to gain a different level of richness of experiences by firsthand witnessing the lack or unreliability of connectivity.

In October 2023, I attended a 'tech coffee hour' organized by Healthy Island Project, a non-profit organization, on Deer Isle. The coffee hour meetings started during COVID-19 to combat social isolation and loneliness amongst seniors living on the island. They meet weekly in a repurposed church building and get to talk about anything and everything. Seniors could also their devices and ask for help with any aspect of the technology they were struggling with. I attended one of the coffee hours with my colleague Amber Blum and we got to sit around the table with the seniors and talk to them about their experiences with digital technology, broadband expansion on the island and life in general.

In March 2024, I attended a Digital Communications workshop, an event co-organized by Island Institute and Hancock Planning Commission in Ellsworth Maine. The recording from the event is publicly available on YouTube and quotes from the session are used in this thesis to enrich the notes I took during the event. Researchers from the University of Maine, staff from Maine Municipal Association as well as town officials from Sullivan and Ellsworth were present as panelists.

In June 2024, I attended a community work session on Little Cranberries organized by the Island Institute for the National Renewable Energy Laboratory Conference. Impacts of broadband on the community were discussed and are mentioned in the analysis section. As this was a public meeting, I took notes and recorded my observations from random participants who for that reason remain anonymous in this thesis.

Lastly, document analysis of existing research papers and state policy publications were used to enhance the richness and validity of this study. By studying, examining and interpreting the information in other documents, namely the State of Maine Digital Equity Plan, news articles,

research papers and other publications, I learned about the different factors and considerations, uncovered new meanings and gained a much deeper understanding of the topic.

3.3.1. Limitations of the study

As any other research, this study has its own limitations that impacted the quality of my findings. My affiliation with the Island Institute, a community-development oriented organization, means I was coming at the topic with a certain angle and an agenda. Moreover, the fact that the data was primarily produced for them significantly influenced my research aim as well as the scope of the issue. Moreover, as I gathered the data for the Institute using research design I did not come up with myself, and the problem statement was constructed only in hindsight, I was not able to independently create my own research strategy. Had I designed the structure of this study myself beforehand, I could have more freely explored the topic, be more intentional with the site selection, amend the interview guide and focus my aim. Moreover, the weakness of my main method of inquiry, the semi-structured interviews, is that they often end up going off the topic and may not produce the strongest data. Similarly, the randomness and inconsistency of the study subjects and localities means little comparison or generalizations can be drawn.

3.3.2. Ethical considerations

The study subjects were informed about the purpose of the interviews beforehand, and they agreed to speak with me in my capacity as the American Connection Corps at the Island Institute. Later on, an email explaining the scope of my thesis was sent out to 22 participants and written consent was obtained from all participants who are quoted in this study. All participants agreed to have their first name stated in the thesis. All other personal information remained confidential to protect their privacy. Personal information will not be further used or distributed for future research studies.

4. Discussion

In this chapter I explore people's experiences with and local perceptions of broadband developments and the impacts adequate broadband availability, or lack thereof, has on the lives of people living on islands and in coastal communities in Maine. I analyze people's attitude towards digital technology and discuss broadband as a phenomenon within community development based on the interviews I conducted and my observations during public events and workshops. The following chapter is structured as follows; first I talk about the impacts of broadband on local economy, where I discuss the challenges and opportunities for marine economy, other non-marine small businesses, the culture of remote work and implications for the workforce; Then, I discuss the social impacts broadband has on the different aspects of quality of life that contribute to a social well-being of a community; and lastly, I discuss how broadband can be used to increase civic engagement and the role of municipalities have in using broadband as a community development tool.

4.1. Impacts on the Economy

4.1.1. Marine Economy – challenges and opportunities

In the context of Maine's predominantly seasonal economy focused on fishing and tourism, I seek to understand how changes to the economy brought about by broadband development and digital technology are perceived by locals, specifically those engaged in marine economy. From the time I spent in Maine, I came to learn that Coastal Maine is an area where generations of fishermen have lived and relied on the ocean to provide them with subsistence and livelihood (Fig.7). People from the fishing communities I visited taught me that living on the coast is not only a way to make a living, but also a way of life– people's lifestyle and culture are closely interwoven with the ocean and the resources it provides. Moreover, throughout my time in Maine, I learned that people pride themselves on being self-reliant and have a 'do-it-yourself' mentality, which values autonomy and independence.



Figure 7 - Vinalhaven Harbor: the second biggest lobster landing port in the state. Photograph by Author

There is a new 100% electronic harvester reporting system that went into effect in 2023 and is supposed to collect data on the footprint of the fishery and help inform future policy and sustainable management practices. In the past, the catch reporting was paper-based and was done by the dealers. Now the system is online and the burden of reporting falls on lobstermen, many of whom don't have an email or use a cell phone. I spoke with David, a 5th generation fisherman from Bremen, ME, a coastal community in Midcoast Maine. When asked about the new electronic reporting, he said there was "a lot of confusion amongst the older folks because it's just not their thing – they grew up old-school". To renew licenses, lobstermen need to submit all of their landings electronically, otherwise they lose access to fishing rights. The 2024 Portland Press Herald newspaper article highlighted the struggle many Maine lobstermen face to adapt to new electronic reporting rules due to what Neufeld thinks is low digital literacy skills (Neufeld, 2024). From what I was told, it is common for older fishermen to have their wives fill out the reporting as well as do bookkeeping and accounting. Many even use their wives' email addresses to create profiles, log into the Department of Marine Resources (DMR) portals, apply for licenses, or get important updates on the fishing regulations that are communicated via

email. While for some this is a lifestyle choice, for many fishermen, reporting is not an issue of low digital literacy skills or lack of connectivity. According to Neufeld (2024) some lobstermen are just defiant and may not want to follow another federal rule.

“For many, the issue is rather political. Lobstermen and fishermen have been historically known for their love of autonomy and freedom and any federal interference in their lifestyle feels like an encroachment into their privacy. McVane,a lobsterman, said he is worried that new reporting requirements will force him to give up competitive information about where and how he catches” (ibid.) (Fig.8).



Figure 8 - Creatively repurposed lobster shack outside of Bass Harbor. Photograph by Author

David told me most Maine lobstermen are not sharing data on where they fish – it stays in the family because they don’t want to give away their secrets. Fishermen lose part of their freedom and information they wish to keep to themselves with the new electronic reporting system.

“Alongside resentment about the government ‘tracking’ him, Coppersmith (another lobster fisherman) feels the reporting process is too confusing and time-consuming. “I just threw my hands up in frustration,” Coppersmith said. “I’m 67 years old, and I can barely run the new radios in the trucks. What’s supposed to take a few minutes or half an hour for some people could take four hours – you still don’t get it right” (Neufeld, 2024).

Although many lobstermen adapted for the most part, according to David “the transition to online has been terrible. DMR website is always down – it took them a while to figure it out. The reporting is not more efficient – it’s actually extra work”. Conversely, when it comes to other types of technology, such as navigation technology, fishermen had a much easier time adapting. As David told me, the level and quality of technology in the fishing industry has changed dramatically just within his lifetime and in many ways, it has made people’s lives easier and safer. “Everyone is adapting – ‘you would be foolish if you didn’t. The old timers will tell you ‘you young guys have it easy’” added David during our conversation. He thinks most fishermen adapted to the changing maritime technology without much convincing because they saw benefits such as more accurate data and increased safety, but that is not the case with other digital technology such as the online harvester reporting.

The lobster industry makes up a significant portion of Maine’s economy and contributes to the strong maritime culture along the coast. However, it is also highly volatile and “there are three key challenges threatening the future of this essential industry: climate change, regulations aimed at preserving the endangered right whale and increasing costs of doing business” (The Future of Lobster, n.d.). Transition to a more digital economy and the encroachment of more online services into an old-school industry just adds another strain to a sector that is already under a lot of stress. On the other hand, some fishermen see connectivity as necessary for their modern-day business. I’ve learned that municipalities, state, relevant organizations and telecommunication companies hope that adequate internet access and appropriate digital literacy skills could help the fishing industry thrive by allowing fishermen to stay connected with customers, do ecotourism, market their product online, allow fishermen to communicate with each other and attend important regional meetings. Broadband could also arm fishermen with expanded opportunities and help them transition more easily into another industry if need be. For example, some lobstermen have expanded their operations to

include aquaculture operations to earn extra income during winter months, an economic diversification prompted by the state. However, from my community visits to the islands, I also sensed a level of anxiety around the transition and a worry that the older fishermen who are unable to keep up with times might lose their livelihoods without a meaningful alternative.

Connectivity in Aquaculture – where technology drives efficiency

On the other hand, modern aquaculture operations are an industry that could not function without the internet. Springtide Seaweed, located in Gouldboro, farms seaweed using minimal equipment and gear thanks to the employment of state-of-the-art technology and reliable internet connection (Fig.9). They own the largest aquaculture farm in the lower 48 and provide online Zoom consultations to commercial and recreational farmers far beyond Maine. “As the largest producer of farmed kelp in the US, and with a 50-year history in wild seaweed harvesting, Maine is seen as a leader in the US seaweed economy”(Lench,2023).



Figure 9 - Springtide Seaweed kelp farm operations. Photograph provided by Spingtide Seaweed

Although seaweed farming is traditionally thought of as a labor-intensive industry that utilizes rudimentary and simple practices, the intersection of technology and sea farming could not be more pronounced. "A lot of people have the perception that being a seaweed farmer is easy," explained Springtide Seaweed Farm's Chief Operation Officer, Trey, "when in fact, it takes a lot of money, training, and experience." He explained to me that he would much rather hire someone with tech experience and basic Google Suite skills, over someone who has experience in sea farming. This skill preference is largely due to how big of a role 'The Internet of Things' plays in their daily operations. Automation and connectivity allow for leaner staffing and more efficient operations. Broadband-powered technology is used throughout their facilities to accomplish everything from controlling lights to data security. Monitoring equipment measures and reports pH level, pollution, and temperatures of all the tanks at the hatchery but also out in bay so the staff can make data driven decisions (Fig.10).



Figure 10 - Springtide's advanced water treatment system. Photograph provided by Springtide Seaweed

Productivity tools and efficiency-driven technology allow Springtide Seaweed to not only produce the highest yields but also make the biggest return on their investment. They mentioned that utilizing these tools uses up around 100 Gigabytes of data every day, requiring fast and reliable internet, which comes with its own challenges in Downeast Maine. He explains that DSL (digital subscriber line) was the only available option in the area for a while and was not sufficient to meet the needs of a larger facility such as theirs. As a result, Springtide Seaweed decided to purchase Starlink - a low-altitude satellite by SpaceX that provides a much more reliable connection.

“We rely on the internet every day for our business, and because of the poor quality of service in our Downeast area, we’ve had to switch to satellite internet. We require the internet for our business. When we had poor connection with our former service, we would switch to our cell phone services. Satellite has provided better connectivity but is more expensive” said to me in an email Sarah Redmond, the founder of Springtide Seaweed.

However, satellite signals can be affected by weather, cloud coverage and experience intermittent outages as it orbits the Earth. To ensure smooth workflow and prevent the loss of data, Springtide Seaweed decided to invest in hotspots that kick in when they lose the satellite connection for a couple of milliseconds. With so many redundancies and backups, their monthly internet subscription ends up being even more expensive than their electricity bill. For smaller businesses, this presents a financial burden and a real drawback. Despite broadband infrastructure expansion in other parts of the state, this area has not seen much improvement in the past 5 years, said Trey. He believes the government should subsidize Starlink subscriptions in areas where fiber build out is too pricey or difficult. He is of the opinion that investments in high-speed internet would incentivize more businesses to locate in the area.

Another seafood farming business that relies on a reliable network is Greenhead Lobster, a Stonington based family-owned lobster supplier. The business handles every step in-house, from dock to door, they work with lobstermen on selling live and processed lobster, both wholesale and retail. Greenhead Lobster relies on wireless apps and cloud-based systems to manage their supply chain and monitor their systems. With two different locations in Maine and one in New Hampshire, communication and sharing of up-to-date information about product availability, quality and quantity is crucial. The thermostats that monitor water quality,

temperature, salinity and pH operate fully online and need reliable internet to do inventory management.

On a cold January day, I Zoomed with Allison, Greenhead Lobster’s Marketing Specialist. She reflected on the unpredictability of broadband due to weather: “When everything limps along, people work in weird locations to find internet”. Despite having broadband, the town still experiences power outages which affect connectivity and disrupt workflow. The importance of connectivity for supply chain is also driven by consumer expectations. She said customers increasingly demand more information about traceability and sustainability of their seafood. Allison elucidated that the lack of standardization in tracing apps and the burden of the technology transition in the marine industry often falls on lobstermen who might not have the digital literacy skills or access to tech to do so.

A Maine based company that has been simplifying the seafood inventory management by using real-time data for receiving digital logs, sales orders, packing, and price management is BlueTrace. BlueTrace has been working with shellfish harvesters, growers, distributors, and dealers such as Greenhead Lobster all across the country to bring technology solutions to companies that must meet rising regulations and increased consumer demands for supply chain transparency. “We (BlueTrace) help bring them (customers) into the digital age” explained Chip, the CEO of BlueTrace during our Zoom call. He prides his company on their hard work to meet shellfish growers, seafood dealers, and wholesalers where they are at and take the guesswork and anxiety out of regulatory compliance. He admitted that he perhaps works with a specific subset of fairly digitally literate customers for whom using the technology is not a barrier and therefore can’t speak for the entire industry. This points to a huge variability in preparedness to adapt to the changing conditions and enhanced technology within the marine workforce.

Implications for the marine economy

While the electronic harvester reporting and the increased need to navigate governmental online systems have been met with frustration and resentment due to their lack of efficiency and benefit to the user, the general use of the internet and connectivity has been positively received by fishermen and aquaculturists who need it to run their operations, conduct inventory or stay connected to their customers. The perception of the broadband expansion

mainly depends on the necessity of use for work, cost and who instigates this change. For lobstermen, the intrusion of too many online requirements from the government is compounded by the lack of digital literacy skills especially amongst the older generation. If the new digital services and technology are going to continue being perceived as a threat to their way of life, fishermen might continue to resist putting it to use. However, if the user experience is improved and the system proves to be of resource or even benefit for the fishermen, their perspectives might change. When digital technology is imposed from higher up, it is not perceived as neutral, but rather as a form of control that disturbs their way of working, makes their knowledge and skills insufficient and threatens their sense of place identity. But when necessary for business or personal use, most desire faster and cheaper connectivity that is still lacking in certain parts of the coast. Perceptions amongst those involved in the marine economy therefore vary based on the amount of benefit one gets from using the technology and the number of obstacles one needs to overcome in order to truly take an advantage of increased connectivity. As a result, participatory involvement of people working in the marine economy will be necessary to ensure equal distribution of resources, information and collaborative partnerships with the relevant state agencies.

4.1.2. Non-marine small businesses

Stonington, ME – 44 North Coffee

Deer Isle (population 2,194¹) and Stonington (population 1,056²) are adjacent bridged communities known for their quintessential Maine scenes and rich fishing culture. This is where 44 North Coffee was founded 14 years ago. “One of the biggest draws was wanting to create a business that was open year-round as an integral part of the community” expressed Megan, co-founder of 44 North Coffee. She told me that due to community’s small size and rurality, small-town issues are accentuated here, but broadband has allowed them to combat some of

¹ U.S. Census Bureau. (2020b). RACE. Decennial Census, DEC Redistricting Data (PL 94-171), Table P1. [https://data.census.gov/table/DECENNIALPL2020.P1?q=Deer Isle town, Hancock County, Maine.](https://data.census.gov/table/DECENNIALPL2020.P1?q=Deer%20Isle%20town,%20Hancock%20County,%20Maine)

² U.S. Census Bureau. (2020c). RACE. Decennial Census, DEC Redistricting Data (PL 94-171), Table P1. [https://data.census.gov/table/DECENNIALPL2020.P1?q=Stonington town, Hancock County, Maine Populations and People.](https://data.census.gov/table/DECENNIALPL2020.P1?q=Stonington%20town,%20Hancock%20County,%20Maine%20Populations%20and%20People)

them by creating a new opportunity to connect. The business includes a small roaster, shipping, wholesale and two cafes: one year-round location on Deer Isle and one seasonal in Stonington. For the first eight years of their business, they did not offer wifi at the café, and even now, they offer wifi only at one of their two locations. This decision was somewhat intentional and until recently, somewhat a result of a lack of high-speed internet infrastructure. The intention and hope were that the absence of internet in the café would incite spontaneous conversation and connection, which can be good for community building and bridging the gap between seasonal and year-round folks that divides the community. That said, running a successful business without internet access these days is almost impossible. All of 44 North's employees and customers need the internet to work and live on the island, and by being in a place that offers that amenity, a stronger year-round population can be sustained, told me Megan.

She reflected on the recent broadband expansion in her town: "Having the internet has been great. We're much more accessible to the common customer who is going to come in and have certain expectations. People are more aware of us through social media." For example, by staying connected they are able to show seasonal folks and visitors what is happening on the island during the winter months.

"One of the biggest parts about having our website and social media online has been the connection with the community because we live in a beautiful place, a place that people idolize, a place that people want to be part of year-round even if they can't make it work for themselves. They want that sense of connection and having a strong internet presence has given us that avenue for connection between us and our customer base" Megan added.

Contemplating the pandemic, Megan said being able to sell to people from afar was a lifesaver and enabled them to become a profitable year-round business. "I think the biggest part is just telling our story and being connected to a community. Even though we wanted to root ourselves in a year-round brick and mortar cafe, we also realized the need to have access to our business for all the people that show up here in the summer, not just for sales, but also just for connection," said Megan. 44 North Coffee has undeniably become a community leader by using connectivity to collaborate with other businesses in the area, sharing awareness around important issues and creating an inviting space for residents (Fig.11). According to Megan, the hallmark of connectivity is "to feel that sense of community whether they're next

door or they live 10 states over. Everyone now has an opportunity to have more presence and to play a part”.

Broadband has given 44 North an opportunity to create a (virtual) community that represents the strong sense of community they strive to create on the island and wish to see in small, rural towns elsewhere. For a small business in a rural area that hires several employees and relies on online shopping and shipping to maintain a year-round business, having connectivity is a game changer. “As a business owner, I am grateful for our internet going down all this time. I am grateful for creating a sense of connection and community that extends beyond neighbor to neighbor. And we can really utilize that in the off season to continue sales at 44 North and have that connection” Megan added.



*Figure 11 - The inside (left image) and outside (right image) of 44 North Coffee shop location in Stonington.
Photograph by Author*

Little Cranberry Isles – Islesford Pottery

Little Cranberry Isles, also known as Islesford, has a population of around 160 year-round residents ³. Islesford was one of the first islands to decide to acquire community owned broadband in partnership with Axiom, a local ISP. I spoke with Marian, the owner of Islesford Pottery. She owns a summer home on the island and runs her small pottery shop (Fig.12). When she first opened her shop in 1989, the internet was very dicey, she told me. The only places that had internet on the island back in those days were the neighborhood house - a community meeting place, and the library. Cell phones weren't around, and she didn't have a landline in her shop for the first 11 years. The first internet on the island was in the form of dial up which allowed for access to a computer system via a phone line. This meant a person couldn't use a telephone at the same time as another person was using an email because it was all going through the same line.

Now with broadband on the island, she decided to get it for the cabin she rents but also for her house. As time progressed "people who rent wanted more and more to have the internet at their summer rental" reflects Marian. But because the subscription is quite expensive, she couldn't afford to pay for a second one at the pottery shop, so she continues to use her landline to run credit cards. She said she has a good cell phone reception at the shop but not her house, so she uses her phone as a hotspot as needed instead of paying for broadband twice. She runs online shop only from November until January when she lives in her primary house in Portland. In the summer, when she is on Islesford, she closes her online shop and focuses on retail. She doesn't want to bother with shipping since the cost of shipping and island logistics are simply too complicated, she told me.

As a result, Marian confessed that she is not using broadband for her business at all. "So in a weird way broadband here doesn't affect my business a whole lot because I don't have it and I already pay for it at my house and I don't need it, I have the landline to do credit card sales".

³ U.S. Census Bureau. (2020d). RACE. Decennial Census, DEC Redistricting Data (PL 94-171), Table P1. <https://data.census.gov/table/DECENNIALPL2020.P1?g=9700000US2304620>.

She admitted she likes to keep it simple, and she loves it that way. Like any other modern business, she uses Instagram and Facebook to promote her business, but when it comes to economic impacts of broadband or ability to grow her business, the newly installed broadband did not have an impact on the success of her shop. Nonetheless, Marian added that she is “thrilled to have the internet at my house, we must have it and we need it so I am very grateful for that”.

The example of Islesford pottery speaks for many other arts and crafts businesses, as well as the trades industries that pride themselves on being old-fashioned and laid back. These businesses often don’t rely heavily on shipping or online sales and can get by with their old ways of doing things. While a certain level of connectivity is necessary for communication, paying for a high-speed internet can be an overhead cost and a barrier for sole proprietors.



Figure 12 - Inside of Islesford pottery. Photograph by Author

Monhegan/Bath, ME – La Nef

Monhegan is a small, rocky island about 10 miles out in the ocean known for its high cliffs and rich artist community. The two primary economies are fishing and tourism, but visitors can also find lodging, gift shops and a brewery. Lobster traps line the unpaved roads that crisscross this tiny island, and most visitors get around by foot (Fig.13). With a population of 119⁴, the island celebrated the completion of its community-owned broadband project in 2024 after eight years of effort (Community Profiles, n.d.). Led by the community and powered by perseverance and partnerships, they view broadband as a tool to diversify their economy. “Monhegan needs broadband to survive out here. That’s the bottom line” said Monhegan broadband activist Jaye Morency (Stories of Impact: High-Speed Internet on Monhegan, 2024). La Nef Chocolate, a small-batch chocolate bars and confections maker, was founded on Monhegan in the summer of 2018, but they have since moved to Bath. They sell wholesale and source high quality ingredients to make their delights. The founders wanted to create a business that could sustain them year-round. When asked about the reasons for relocating and whether lack of broadband on Monhegan back then played any role in it, Dylan, the co-owner responded:

“Broadband did not have any influence on our decision to move to Bath from Monhegan. We tried to buy property on the island, but that didn't pan out, so we decided to move inshore, where many facets of living would be easier for us. (And it is.) We sell our products via an online store, and much of our communication with the world is via email, so internet is important, though I don't know if broadband specifically / high-speed is crucial for what we do. Our internet is definitely faster, but that feels more relevant in streaming movies than in our work life”.

⁴ U.S. Census Bureau. (2020e). RACE. Decennial Census, DEC Redistricting Data (PL 94-171), Table P1. [https://data.census.gov/table/DECENNIALPL2020.P1?q=Monhegan plantation, Lincoln County, Maine.](https://data.census.gov/table/DECENNIALPL2020.P1?q=Monhegan%20plantation,%20Lincoln%20County,%20Maine)

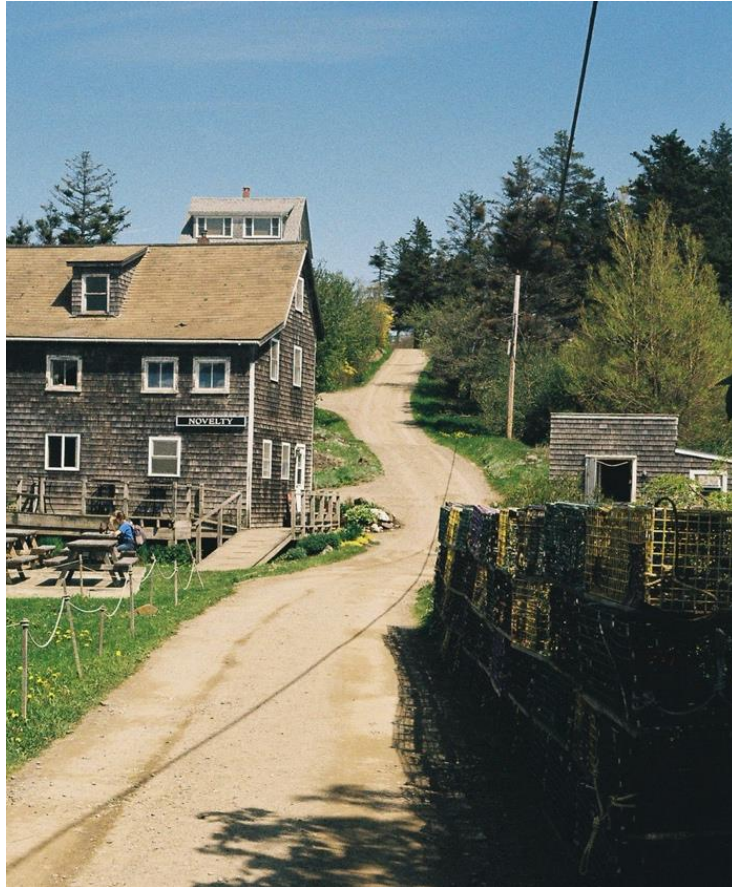


Figure 13 - Unpaved roads on Monhegan are often lined with lobster traps. Photograph by Author

The economic impacts of broadband on small businesses does not exist in a vacuum. Remote rural coastal communities but especially islands that are geographically separated from the mainland experience logistical barriers such as unreliable transportation, higher prices of shipping, shortages of resources and availability of materials. Moreover, many of the island businesses on find themselves facing a plethora of other pressing issues such as housing shortage and affordability, high energy cost and labor shortage. Easier access to markets or supplies can therefore be a bigger determinant than lack of broadband for the very small businesses that employ only a few employees. Moreover, the impacts of broadband on small businesses are also determined by the type of business. Where the internet is not used for production, the speed seems to matter less. Nevertheless, in a place that is shaped by seasonal economy, the internet is necessary for online business and communication. During the ribbon cutting ceremony, Monhegan residents expressed hopes that broadband will help sustain year-round businesses and population on the island and lead to business diversification (Stories of Impact: High-Speed Internet on Monhegan, 2024)

Vinalhaven - Wind Horse Art/ Sherry's kitchen

Vinalhaven is the largest of the Fox Islands. With a one-hour ferry ride from the mainland, the island is a home to about 1,279⁵ year-round residents. Vinalhaven does not have broadband but is instead serviced by multiple ISPs.

There is a newly opened café, Sherry's Kitchen, right on the Main Street. It is in a convenient location in a walking distance to the ferry and next to several other small businesses.

The owner reflects:

"As far as broadband...I live on a part of the island with great internet access, as well as the cafe. I know lots of folks on the north end have internet issues, but it has not impacted my business in any way. Maybe this summer when people are in need of internet? I use Spectrum both at home and at the cafe and do offer wifi. I can't tell you off the top of my head who has struggled with internet on the north end, but I know people have mentioned it".

However, not everybody on the island is so lucky. The further one gets away from the downtown, the worse the service gets, and the fewer, more expensive the other internet subscription options become. While there might be other options for people to choose from, some providers simply won't service certain areas, I was told. The owner of WindHorse Arts, a jewelry shop, Alison, is a passionate community member who has strong opinions about the broadband situation on the island.

"In a nutshell, I think that the lack of broadband will continue to put us at a disadvantage to attracting new and varied industries, and it will also become a problem with us being held hostage by one or two broadband providers, and then prices continuing to escalate. I've already noticed this with Spectrum. They jumped my service from \$60 to \$110 and they know I really don't have another choice" Alison wrote in an email.

⁵ U.S. Census Bureau. (2020f). RACE. Decennial Census, DEC Redistricting Data (PL 94-171), Table P1. [https://data.census.gov/table/DECENNIALPL2020.P1?q=Vinalhaven town, Knox County, Maine.](https://data.census.gov/table/DECENNIALPL2020.P1?q=Vinalhaven town, Knox County, Maine)

Implications for small island businesses

The findings from non-marine island businesses point to the mixed bag of attitudes small business owners have towards connectivity, or lack thereof. While some are frustrated by the lack of coverage and affordability, others are content with the status quo and get by. There are various reasons for this. Research shows that the internet can contribute to geographic inequality because it depends on factors that vary locally such as preferences or the availability of substitutes (Chris Forman et al., 2021). For example, on Vinalhaven, the opinions on the perceived benefits of universal broadband acquisition depended on the availability and affordability of alternatives as well people's interest in strengthening their community.

All businesses in this study illustrated that improved connectivity is necessary for communication and strengthening customer relations. However, while the business owners I talked to said that connectivity is necessary for running a business and having an online presence, the extent to which small businesses need high speed internet is not so straightforward. Some researchers argue that dependency on high-speed internet is determined by business sector and size and "improved broadband may or may not enhance prospects for entrepreneurship" (Strover et al., 2024). For businesses in sectors that do require higher speeds, relocating to or starting a business in an area that has a shaky connection would naturally make little sense (ibid). However, Strover et al.'s research on local economic dynamics in rural locations found that higher speeds are positively related to greater proprietorship in rural areas, aligning with the hopes of island residents (Strover et al., 2024).

Moreover, internet adequacy varies from community to community and if "there is broadband access, the quality of the service may not meet FCC broadband, or it may be highly variable in quality and reliability or expense or both" (ibid). My data about the impacts of broadband on small businesses in rural areas most closely aligns with Bai's findings that propose that "increased research on this topic only seems to have deepened the mystery, since evidence for both a significantly positive impact and non-significant, or even negative impact has been found" (Bai, 2017). My findings show that there is a desire for faster, cheaper and more reliable internet and residents expressed a lot of hope about the potential economic benefits broadband could bring, but evidence of positive impacts is inconsistent or lacking so far. Some "scholars...researched the industry specific impact of broadband and found that the

job-creation effect existed mainly in technology-concentrated industries and high-end service industries such as finance and insurance, education services and health care services” (Bai, 2017). While health care services, professional, scientific and technical services make up a significant proportion of Maine jobs, these jobs are usually concentrated in bigger towns and cities for several reasons. Moreover, “one should not forget that faster Internet, while creating new employment in some sectors, can also eliminate job opportunities in others, such as company management and art, recreation and entertainment” (Bai, 2017). Since most of the establishments on the islands are small mom and pop businesses that focus on hospitality, food services, arts and crafts, construction, carpentry and fishing, broadband might be a mixed bag for them. However, lack of broadband can also disadvantage communities hoping to attract new and varied industries. The necessity and use of high-speed internet for small businesses is complex and simple access is often good enough as proprietors find creative ways to obtain the connectivity they need, with a hope that improved and affordable connectivity will yield even better results.

Lastly, contrary to Green & Haines’ (2008) findings about low density reducing the opportunities for social interaction, making it more difficult to develop a sense of community, my material points to the opposite. From the interviews I conducted with the business owners I sensed an already existing strong sense of a community, the only difference was in how the business owners leveraged broadband to create an even stronger, or larger virtual community. For example, small businesses such as 44 North Coffee can be a driving force in community development efforts as they use connectivity for communicating their story with a broader (virtual) community and use it to strengthen a sense of place (Griswold, 2002). Even though at first, Megan hesitated to offer wifi at her coffee shop, people can now come to the coffee shop to use the internet and many of her customer who love the place want to stay connected to the coffee shop even though they don’t live in the community year-round. Thanks to broadband people now have the opportunity to stay connected and continue doing business with a larger customer base.

4.1.3. Remote work

On Swan’s Island, population 355 (Community Profiles, n.d.), I spoke with a remote worker Casey who moved to the island from Virginia with her husband. He works in live streaming, and she works for the government, which means she needs to use VPN for security purposes. Up until recently, Starlink was the only option, however it wasn’t good enough for her needs as it isn’t compatible with VPN. Starlink can experience intermittent outages, and Casey needs steady connection to conduct data management for the government. The island is currently in the process of fiber build out with parts of the island already connected (Fig.14).



Figure 14 - Broadband expansion development in action on Swan’s Island. Photograph by Author

Before fiber, Casey said trying to connect to the internet “felt like you were trying to start a lawn mower...like come on, come on”. The connectivity is much better now but Casey told me she notices the internet is impacted by the influx of summer residents resulting in slower

speeds. The internet is infrastructure and with increased numbers the demand rises as well, she explained. Despite the higher cost of internet on the island and the need for redundancies in case of power outages, she said the relatively cheap cost of living evens out with the more expensive internet. She estimates about 12 out of 300+ year-round residents are remote workers.

Part of the appeal of living on the island and working remotely for Casey is not being surrounded by other 9-5 workers as most of the people on the island are fishermen. “I love to hear about the different ways of living than mine” Casey elaborated. She said being part of a community that is so different from what she is used to adds a perspective. As for many others who decided to relocate to Maine, the point of moving here wasn’t because of how fast paced life is here, quite the opposite. “I’m able to legitimately unplug (here) in ways I couldn’t in Virginia” Casey noted. She told me that the cost of paying extra for reliable connectivity is well worth being part of the island community.

For those who do not have reliable internet at home, libraries prove to be a trustworthy anchor institution that fills in the gap. The librarians I spoke to on various islands told me they see an increased use of the space during the summer when visitors and seasonal residents who might not have internet at home come to the library to use their free wifi. Some libraries are even investing into building or expanding their remote workstations. For example, Swan’s Island library has a 3-season outdoor screened porch pictured in Fig.15 that is open 24/7 for people needing to connect beyond their business hours. Libraries have long been viewed as welcoming, safe gathering places capable of bridging the gap and strengthening social capital in communities (Kranich, 2001). Because libraries are public meeting places, sometimes also noted as ‘third places’, people can go there for free to use the internet which in turn makes libraries an even a stronger meeting place (Oldenburg, 1999).



Figure 15 - A gentleman uses Swan's Island library's screened outdoor porch to connect to free public wifi on his devices. Photograph by Author

Islesford residents, a community that recently got fiber, reflected on the positive effects remote work brings to their lives during my observations at a public event. When asked what has changed in their lives or what does it mean to have connectivity and what some of the results of broadband build out are, the residents responded:

- *"We had more people come over the pandemic. There were families that came and stayed for a month or a school year because they could work from home which they would never be able to do before."*
- *"My wife works from home, and we certainly wouldn't be here if it wasn't for that."*

- *“It certainly diversified the income availabilities for some families – it has certainly opened up other avenues for folks to be able to move out here and have a steady income.”*
- *“My neighbor - he runs a huge company that runs apps and he can stay all summer. Last year he stayed the whole winter.”*

Residents of Islesboro view broadband expansion as a positive contribution to the community, allowing them to expand their opportunities and enabling a more robust economy. Many people can now work from the island and stay longer in the summer or even throughout the winter. Whether reliable and affordable broadband attracted remote workers or more island residents took up remote work as a consequence of having good internet is not clear, but people expressed a positive attitude and were grateful for the opportunity. From my experience, it seems there is a particular socio-economic demographic group that would move to Maine regardless of internet access because they have the financial means to secure other alternatives and backup, such as Casey. COVID-19 certainly contributed to the shift toward normalizing remote work culture and this trend has become more common across the board with people expecting internet even in the more rural locations.

Implications for increased demand for digitally literate workforce

Broadband, being an enabling technology, is no longer just a want but ‘a need to have’ (Incitti, 2024). As remote work and online digital services become more prevalent in the future, the demand for faster and more affordable internet will increase as well. By the same token, as digitalization of jobs continues to grow, the need for a digitally literate workforce is going to increase even in some of the historically traditional industries.

In Maine, residents or would-be residents who seek to work or attend education programs remotely may not be able to do so without affordable and reliable internet and digital literacy and technological know-how. As a result, the state has been focusing much of its attention on the implementation of the newly adopted Digital Equity Plan that prioritizes digital literacy trainings along with broadband access and affordability to help close the digital divide (Digital Equity Initiatives, n.d.).

Since broadband only recently became available on some of the islands, the outcomes may take a few years to materialize. But according to Strover et al. (2024), “if people do not understand how to use or exploit Internet-based applications and capabilities for...(themselves), they certainly do not use or highly value the Internet”. It is true that faster broadband alone does not automatically generate more jobs or decrease unemployment (Bai, 2017) but it can lead to long-term diversification of the economy and creation of new opportunities. Whilst remote work is not for everyone, island residents have realized the potential of having broadband and the benefits it brings for the community as a whole. At the same time, a concern that as broadband and digitalization take over, they could replace people’s physical jobs with less meaningful work troubles some residents. This could help explain why some communities are more hesitant to invest into a utility that is expensive and could irreversibly change the character of their community.

4.2. Impacts on Social Aspects of a Community

4.2.1. Changes to local culture

I have learned that maintaining a year-round population on the islands is desirable but challenging. Keeping a small rural community alive without a school is nearly impossible and keeping schools open for a shrinking number of children is even harder. Without a school young families with children are more likely to move away in pursuit of better education and more opportunities. As a result, retaining young families without the option for remote work or education is particularly difficult. Some people on the islands said they are hopeful broadband will help retain people on the islands as well as attract new families to the area. “We had more people come over the pandemic. There were families that came and stayed for a month or a school year because they could work from home which they would never be able to do before” expressed Joanne, an Islesford resident.

As many seasonal residents can work or study remotely, they now come earlier around May and stay until October, told me people from both Chebeague and Long Islands. As a result, these islands now experience more robust community engagement and increased summer activity. Short-term vacationers also started expecting to have fast and reliable internet at their summer rentals. In order to remain competitive and meet the demand of the market, homeowners started acquiring high speed internet, even for some of the more rustic dwellings.

Marian, a summer resident of Islesford, owns her second home and a small cabin that she rents to short-term visitors. She reflects on the changes to renters’ expectations:

“as time progressed people who rent wanted more and more to have the internet at their summer rental – a long time ago people were psyched to not have that”. She saw this trend continue and “when that became a bigger thing like yeah we really need the internet to rent your house then we did purchase Axiom(ISP)”.

Maine has long been known as a vacationland and not that long ago, people came up to Maine to unplug, relax and enjoy nature. Having the internet seemed unnecessary or even unwanted, but as remote work became more common, things have changed. Maine saw an influx of out-of-staters moving to the state during COVID-19 and buying up properties, or

second homeowners relocating to Maine for longer periods or even permanently. Islanders tell me outsiders usually come from big cities like Boston or New York City and can afford to pay a much higher price for homes that locals can't beat, thus pricing out the younger generations that now can't afford to buy a home in their hometowns. Moreover, in certain communities, such as Stonington for example, the class difference is more pronounced and can cause tensions between locals and second homeowners who have different expectations, lifestyle choices, and ideas about services and community development. Moreover, when the summer population on the islands swells, the connectivity issue compounds for islands that already have limited internet. Although unclear whether people have been staying on the islands longer primarily due to availability of broadband or other factors, all inhabitants, whether permanent, semi-permanent or visitors are demanding better connectivity. One could only hypothesize about the positive economic and social contributions the seasonal population brings to the islands as they are able to stay longer and engage with the residents at the libraries or other meeting places that offer connectivity.

The implications of these findings are significant. Evidence points to a cultural shift in perceptions and lifestyle preferences amongst locals and visitors alike as more people desire fast internet even in areas previously thought of as technology-free safe havens. Thanks to the availability of broadband on the islands, visitors and part-time residents can now stay on the islands longer and contribute to creating a livelier community. Internet can therefore help reinforce the social capital of a community which is a crucial fabric of rural society (Wiesinger, 2007).

4.2.2. Education

During my visit to Belfast high school, I've learned that students nowadays complete most of their coursework online and begin using computers as early as second grade with textbooks mostly being available in digital format. Since so much education is done online, it is no surprise that access to a high-speed internet is a necessity to succeed academically. However, many families can't afford the cost of the internet, or their internet connection is not fast and reliable enough to do the job. Lucy, a student attending Islesboro High School, mentioned she had to use her dad's phone as a hotspot because of the lack of internet in her community. Her family relocated to Maine during the pandemic since education could be done from anywhere.

However, the transition to an area without good internet was not easy. “I had to go to the library or hardware store for free internet. I am familiar with having a really bad internet” noted Lucy. She talked about how she would have to explain to her teachers that she couldn’t join Zoom because she didn’t have the internet. Her teachers, curious to know why she didn’t have the internet, learned that it was because she was in Maine. Lucy also talked about how difficult it was for 2 adults working from home and a student to connect and use the internet at the same time. Sometimes, they had to drive to Belfast (the nearest bigger town) to connect to guest Wi-Fi because the speed at their house was just simply not sufficient for 3 internet users. She said since Islesboro got broadband, she has seen 200% improvement.

But for students that don’t have internet at home, attempting to complete school assignments is nearly impossible (Blum, 2024). One student from Belfast High School admitted that most nights she goes to McDonalds to use Wi-Fi because it’s more reliable. She says her siblings sometimes just don’t do their homework because they can’t drive (ibid). Other students at Belfast High School said they get stressed out when they can’t turn in their homework on time due to internet issues. For example, one student shared how hard it is to not be able to communicate with your teachers outside of school if you have certain questions or can’t make it to an exam due to internet issues. Another student commented that even Starlink can be unreliable for areas that are wooded. She therefore gets most of her schoolwork done at school because she never knows if the wifi at her house will work when she gets home. The added element of stress and planning and thinking ahead is something that many students without reliable internet have to endure.

For many adults, remote learning is the only option. “I completed my bachelor’s degree online through the University of Maine, and I never could have done that if it wasn’t online” expressed a resident from Cranberry Isles during a public event. Another resident living on Cranberry Isles mentioned that in order for her to keep her job at the high school she had to earn an associate’s degree, so she started taking classes online from the island while raising 3 young kids. Without the option for remote learning, she wouldn’t be able to obtain the necessary qualifications and keep her job. However, for young families limited educational opportunities and other logistical barriers on the islands might take precedence over the internet. For example, I have learned that one family from Cranberry Isles left because their

high school son missed too many days of schools this past winter due to the heavy storms and subsequent ferry cancellations.

For those that may not have the luxury of choice to relocate or upgrade their service, inadequate broadband poses serious inconvenience and limits the quality of education. The state of Maine has recognized this disparity and acknowledged it in its Digital Equity Plan. “Improving access to affordable, reliable high-speed internet to low-income families and racial and ethnically diverse households could improve the ability of these students to engage with education online and ensure that they have the digital skills and devices they need to fully access educational opportunities and successfully complete requirements “(Digital Equity Initiatives, n.d.). Moreover, “the digital divide in education often mirrors socioeconomic inequities...which disproportionately impacts rural, low-income and other marginalized communities” (The Digital Divide in Education: Navigating Learning Inequities, 2023).

My findings from the interviews are consistent with those of other researchers who also found that “students who lack access to digital resources and technology often struggle to keep up with their peers who have access to these resources, resulting in achievement gaps and limited opportunities for success” (Miah, 2024). This will in turn result in their inability to develop necessary digital literacy skills needed to succeed in the 21st century economy.

4.2.3. Telehealth

The shortage of resources and services, lack of opportunities or alternatives and transportation and infrastructure challenges in rural areas all have an impact on health. The scarcity of quality health services on the islands only exacerbates the issue. The potential for accessing telehealth and the reduced need for off-island trips can therefore be significant. The emergence and popularity of telehealth became more apparent during the pandemic when everyone found themselves confined to the quarters of their homes and medical services were highly sought after. Seniors I talked to during the coffee ‘tech’ hour on Deer Isle said that when the vaccines rolled out, they found themselves unable to book an appointment to get the vaccine or get the assistance they needed without help (Fig.16). A community cannot be sustainable or liveable if certain people feel disadvantaged or are left behind due to lack of access to resources to help themselves, but telehealth can connect doctors to patients and help reduce the gaps in time and distance.



Figure 16 - Coffee 'tech' hour hosted by Healthy Island project, a non-profit organization that works on addressing community health needs. Photograph by Author

For instance, with high-speed internet Brenda, a resident of Blue Hill community saw many improvements in her mental health. She was able to sign up for online therapy and has learned more about herself and her community by engaging online. She said it helps her combat social isolation and connect to mental health resources. For some seniors, technology can be intimidating or irrelevant for their daily life at first, but the convenience of telehealth services such as requesting a prescription refill online and the reduced number of trips to the doctor's office is hard to beat. Some Deer Isle seniors said they feel too old to start using the computer but most of them want to be able to at least use their phones or tablets to communicate with their families and make medical appointments.

It goes without saying that "just having an internet connection does not boost someone's health outcomes—but using the internet to access remote health care providers, services, and information can serve as a conduit to improved physical and mental health" (Tomer, et al., 2020). The pandemic spurred interest in and openness to telehealth and tailoring telehealth options and availability to meet the needs of rural residents can improve the options of quality healthcare (Kolluri et al., 2022). Access to technology and knowing how to use it proved to be

the biggest barrier to leveraging telehealth services especially for seniors on the islands but general interest in learning prevailed. Nevertheless, island residents also acknowledged that telehealth can only do so much in cases of emergencies or acute health issues where physical visits to the doctor's office are necessary.

4.2.4. Social connections

As I have learned from the people I talked to, being able to stay connected with friends and loved ones is especially important for those who live in remote rural locations. Now, thanks to fast internet, families can communicate without interruptions. "I do none of my work remote but to me the best thing about the internet capacity that we have now is the ability to connect with kids. I can see my grandkids every night" expressed an older gentleman on Little Cranberries Isle during my observation at a public event. He said his daughter calls him up when she gets tired and needs some rest so he can read his grandkids books over the phone. Another resident commented that his son lives in Cape Elizabeth, but he can also come up to the island and do the same thing there now. Others reiterated the sentiment that their children wouldn't come for as long if they didn't have the internet. This didn't used to be the case for islanders on Little Cranberry Isles a couple of years ago as the previous ISP supplied insufficient speeds and had limited coverage on the island. Now with broadband, people can seamlessly see and talk to their family members on video and not worry about slow speed, outages or interruptions. Many families now stay for weeks or even the whole summer because they can do their work from the island and spend more quality time with their families.

The importance of social connection with family members becomes particularly evident for older individuals who live on their own and don't have family nearby. The lack of social interaction and resulting loneliness was exacerbated by the pandemic for everyone, but for those who lacked reliable internet or the skills to use it, staying connected and informed was especially difficult. This sentiment was reiterated by Brenda, a retired low-income female who lives in a small coastal community of Blue Hill. She acknowledged feeling isolated and that without the internet she would feel completely cut off. "I don't think people should really have a choice. I think they should make it mandatory that they have to have internet 'cause it really is a lifesaving" said Brenda. She thinks that the internet has an enormous potential "to make your life like better if you use it the right way".

Marian, a resident from Islesford reflected on the fact that “the internet became more and more important in your life”. And with connectivity, the way people used to spend time changed as well. Marian didn’t use email for years but soon enough “that changed too. Pretty soon you had to order from Amazon. You had to have to have email. You had to have the internet, it’s sort of not an option anymore. So we were happy to get it”. From my experience, broadband can also contribute to a greater social cohesion and be used as a community development tool with a potential to overcome social isolation. For example, many islanders use Facebook and other social media outlets to organize events, workshops or share relevant information.

My participants informed me that having access to good internet is not only important but is a necessity nowadays. Moreover, there is “a growing need for higher bandwidth as Americans increasingly use the Internet and communications technologies in all aspects of their lives” (Tilson, 2015). Residents reported a positive attitude towards using broadband for social interactions as it enabled them to maintain relations with their friends and family who live far away. Their social life is enhanced thanks to the ability to stay connected and the ability “to develop personalized communities that are more diverse and less geographically bound” (Ang, 2022). However, while “expansion of regular internet use seems to be associated with lower levels of loneliness” for some, to what extent internet access and use actually contributes to combating loneliness is unclear. Some researchers suggest that “those already well connected will become more connected, while those who are not connected will become even more isolated from the rest of the world” (ibid.).

4.3. Impacts on Civic Engagement

4.3.1. Increased civic engagement

Broadband represents one of the most effective ways to address challenges associated with island life as connection can provide economic, educational, medical, and civic engagement benefits without the need for physical presence (Tilson, 2015). During my time at the Island Institute, I attended a number of public meetings such as the Municipal Digital Communications workshop co-hosted by Hancock County Planning Commission and a public discussion about the contributions of universal broadband on Little Cranberry Isles. My role there was to take notes as a participant and report back to the Island Institute staff on what I’ve learned. At these

events, I mostly sat and listened, but I also met with and talked off the record with a number of municipal officials and town volunteers who graciously shared with me their experiences, which are discussed later in this chapter.

“Civic engagement refers to the ways in which citizens participate in the life of a community in order to improve conditions for others or to help shape the community’s future” (Adler, R. Goggin J., 2005). Municipalities across Maine use connectivity to further strengthen cohesion in their communities, enhance community services and volunteering activities, reach their residents from afar and most importantly use it as a community development tool. As planning long-term success and livability of a community is municipal responsibility, navigating the digital space with the goal of creating a more welcoming, equitable and well-informed environment should be at the forefront of all civically engaged efforts to ensure better planning results. Municipalities in Maine enjoy the so-called ‘home rule’, which allows each municipality to govern itself in any way that is not denied to them by state or federal law, meaning each community has its own approach to how they exploit the benefits of broadband.

For example, the town of Long Island used online surveys and forms to collect feedback from their residents to inform future policy. In 2021, they established a committee to conduct a Comprehensive Plan study, which leveraged both in-person and online resources such as email, social media campaigns, online survey and website to collect feedback from residents. Online resources proved to be helpful in a few different ways. “In a small community like Long Island, there are often voices which are louder and more consistently involved than others. This survey provided the opportunity for all voices to be heard both equally and anonymously” (Town of Long Island 2022 Comprehensive Plan, 2022). Moreover, by using an online survey the committee was able to reach people who were not present on the island during the public comment period. Beth, Comprehensive Plan Committee volunteer, added that collecting the input from summer residents was just as important as they bring in valuable skills and expertise that year-round residents often lack. They also actively participate and volunteer for the town, adding enormous capacity to the municipal staff, which is oftentimes underqualified, understaffed and stretched too thin. With the improved connectivity the town was able to digitize and upload municipal records and maps in their database and make them available to the seasonal residents who can now continue to volunteer for the town during the off season.

Beth explained that involving seasonal residents is also important because the majority of the tax base comes from them.

In addition, COVID-19 accelerated the trend of conducting planning business online. During the Comprehensive Plan process on Long, “committee meetings were held monthly using the Zoom platform due to the pandemic “(Town of Long Island 2022 Comprehensive Plan, 2022). On Monhegan Island, the town also relies heavily “on the internet to do a lot of accounting, to do a lot of correspondence, to do Zoom meetings”, said the Broadband Committee Assessor (Stories of Impact: High-Speed Internet on Monhegan, 2024). Similarly, people on Little Cranberry Isles dittoed that broadband has been great for the planning office, which has been able to hold its meetings online.

During the Hancock County Planning Commission Workshop in Ellsworth in March of 2024, Sullivan’s town manager, Ray Weintrub, mentioned that thanks to communication with their constituents digitally and providing people with an opportunity to anonymously pitch in, they get greater community input that leads to better decision making and allows the town to keep up with the times (Fig.17) (HCPC, 2024). Matt Williams, Ellsworth’s City Planner explained how using connectivity for public engagement “let’s you touch base with a portion of the population that may not be comfortable walking into a city council meeting and standing at a microphone and talking” (HCPC, 2024). On the other hand, Ray pondered how broadband can be leveraged to engage those that normally wouldn’t use devices to get their news or submit feedback. “One of the obstacles we hear is ‘Well I only have a flip phone; how do I participate?’ How do you bring the world wide web to the world that doesn’t have the technology to connect from their home?” Ray added (HCPC, 2024). The way municipalities engage with their constituents is increasingly digital, yet not everyone has the luxury of owning appropriate technology, knows how to use it or has adequate internet access to participate. Municipal staff has to therefore think of creative ways of engaging everyone in their community and ensuring people feel heard and no one is left behind.



Figure 17 - Municipal Digital Communications Workshop co-organized by the Island Institute and the Hancock County Planning Commission in Ellsworth Maine. Photograph by Author

Many municipalities rely on volunteers to help with town efforts and unpaid committee members is how new initiatives are often brought to life. While this allows the residents to be empowered and take the matters into their own hands, their skills and expertise and level of dedication vary, which can also result in inefficient and prolonged processes and huge variabilities between towns. Nevertheless, engaging citizens in political matters that impact their lives through voting, surveys, outreach, public meetings or forums is necessary and regarded as the hallmark of participatory planning and as municipalities in Maine have shown,

their citizens are not afraid to take matters into their own hands. This aligns with Kretzmann & McKnight's (1993) argument that a successful community development can take place only when the local people are involved and invested.

While broadband can help diversify and expand the channels through which municipalities communicate with their constituents, social capital continues to be pivotal (Lavesque et al., 2024). According to Putnam (2001), life in a community with a stock of social capital is easier due to heightened sense of reciprocity and trust. Broadband can therefore be understood as a new form of social innovation which can spur the creation and implementation of social change. As the "dominant trend in contemporary planning is the need to open up planning processes to new voices and perspectives" (Nyseth et al, 2019, p.7)., access to broadband gives voices to the traditionally marginalized groups and enhances democratic robustness and can help strengthen the already strong sense of a community.

However, the way municipalities perceive using connectivity to foster civic engagement varies from community to community, based on their internet speed, size of the community, availability of resources and digital literacy skills of both residents and town officials. While broadband can offer diversification of civic engagement avenues and enhance municipal services, it is also an added responsibility for the municipal staff who has to manage data privacy and cyber threats (Duffy, 2024). My findings point to broadband's potential for creating equity, more even distribution of political power and resources and creating a more transparent democracy at the municipal level, aspects of successful governance identified by Fanstein & DeFilippis, 2016. However, my data also warn of the risks of widening the divide between citizens, further exacerbating the existing social and economic inequities where residents or even municipalities without the technological skills are left behind.

4.3.2. Role of municipalities

Municipalities have a responsibility towards their citizens and therefore play a role in advancing and promoting access and equity. In this section, I explore how municipalities use and promote the use of universal broadband access to bridge the digital divide in their communities in order to change people's perceptions and experiences with the digital technology.

Digital communications for resilience and emergencies

On Little Cranberry Isles, broadband acts as a primary emergency management system these days as they don't have cell phone service on many parts of the island. When power goes out, their broadband stays on.

"In essence broadband is our emergency system. That's our lifeline. So the fact that it doesn't go down when power goes down is really important. That's our 911, that is our emergency team letting us know where the trees are down, where we shouldn't go, where we should go" expressed Joanne during a public event on Little Cranberry.

Other towns are using broadband to increase their resiliency by documenting, monitoring and mapping the effects of recent extreme weather events on infrastructure, buildings and land use. The systematically documented information allows towns to make research driven decisions. For example, the town of Long Island collects shoreline data to create maps in ArcGIS. For them, climate resiliency is closely tied with broadband, especially in light of the more frequent and more severe storms caused by climate change (Fig.18), and residents routinely contribute to citizen science projects by uploading their observational data or photos which takes a lot of bandwidth.



Figure 18 - Devastation after the 2024 winter storms. Photograph by Author

One of the definitions of municipal resilience is “the ability of a municipality to withstand, respond to, and recover from stressors and adverse events” (Lavesque et al., 2021). Lavesque et al.’s (2021) research found that diversifying and expanding communication channels can help municipalities more resilient by being able to reach more people and get the message across more efficiently (ibid.). “Trying new things, particularly digital communications, will enable you to reach people that are generally not being engaged and that’s an incredibly important part of community decision making” expressed an advocacy staff Kate Dufour from Maine Municipal Association (HCPC, 2024).

As Beth, a town volunteer on Long, mentioned, broadband not only allows one to search for answers more quickly, but a person with GIS training can also help mitigate future risks. Having access to more accurate data allows towns like Long Island to access data faster and prepare for and respond to natural disasters in a timelier manner. Broadband therefore has the potential to advance the equity and resilience of a community by ensuring that all residents have access to the same information at the same time especially in the case of an emergency.

Acquiring universal broadband and advancing digital equity

Community appetite for universal broadband matters but it varies from island to island. Diversity exists for several reasons. For example, Peaks Island, which is part of the city of Portland, and has a population of about 900 year-round residents and has a surprisingly high number of internet access that is provided by multiple different providers (Tilson, 2015). Due to its proximity to the mainland and a large city with many amenities, as well as a fairly affluent and well-educated middle-class population, the desire or need for community-owned broadband is less acute. The ferry to the mainland runs once an hour and the island has a library, is fairly small and is densely populated. In a 2015 survey, Peaks Island residents expressed interest in faster connectivity, however, their willingness to pay more was lacking (Tilson, 2015). Peaks Island still does not have universal broadband, but most residents are content with their options.

On the other hand, the island of Vinalhaven, the largest of the Fox Islands, is more remote, also does not have universal broadband but the community is split in their attitudes towards universal broadband. The Fox Islands Broadband Task Force (volunteer-based group of community-driven individuals) put together a proposal due to poor internet access on some parts of the island and the town explored many different options, from privately owned broadband model to investor-owned model, public-private partnership to municipally owned broadband. Eventually, the town rejected all proposals, and the Broadband Task Force dissolved in May 2023. This left those who can't afford a better service with slower, more expensive internet options. Despite this, the town manager didn't express any concerns.

"I get the sense that people are making do with what is available between Consolidated Communications, Spectrum and Starlink satellite. I live in town, and we use Spectrum and have no complaints. People are generally content. Again, it's not something that I track, and people don't bring me any concerns about internet service. As I said, I don't have any statistics" - Vinalhaven Town Manager.

The lack of community-wide interest in acquiring broadband on Vinalhaven results from acceptance of status quo – most people are okay with what they have, and there aren't strong

enough community-oriented voices to advocate for those who are unable to secure better service.

Not too far from Vinalhaven lays the island of Islesboro which was one of the very first islands to get community-owned broadband. I spoke with Roger Heinen who served as the Broadband Committee chair on Islesboro. He helped establish a quasi-municipal, non-profit corporation that acted as a catalyst for acquiring universal broadband needed to attract families, jobs and a vibrant summer community to sustain the island community. When he got to the island in 1996, he said the internet was abysmal. “The future of rural communities was existentially bad if they can’t solve the internet problem” he said. In 2013 the selectboard on Islesboro got a letter from a young family who was leaving the island because they couldn’t afford the internet cost, which helped kick start the process of looking at what was available. They found out that there were areas that didn’t have any internet access, and many areas of the town were underserved. Roger told me many summer residents were merely throwing money at the problem but none of it really helped. Throughout the community outreach process, Roger learned that many residents believed that their internet access was fine, and they didn’t think they needed faster internet. The committee worked hard to help define what the internet was or could do for residents. “We had to convince people with their own arguments to get them on our side” he said. He did this by highlighting all the ways in which residents already use the internet on a daily basis without realizing it. The pandemic also helped change people’s attitude towards internet, making people realize the significance of it for rural communities. “No one was going to come solve our problem for us” Roger added. Consequently, “the leadership of the town mustered the will and intellectual horsepower to ensure their residents have accessible and reliable internet access” Roger explained. After years of diligent community outreach, engagement and conversations about the importance of universal access the town voters approved to fund the construction. Everybody on Islesboro now has the same internet access for the same price, which Roger believes is true equity.

As my findings indicate, municipal staff play a key role in presenting and advocating the benefits of the infrastructure and ensuring people have adequate access. Moreover, research in rural Kansas found that “managers are receptive to community demand when choosing whether to implement an MBN (Municipal Broadband Network), but also that their professional knowledge is a more significant factor in perceptions of MBNs than the perspective of citizens” (Koch, 2024). This is consistent with my results, which pointed to a

varied interest in and understanding of the universal broadband model by town officials and could help explain the variability between communities.

However, the goal of obtaining a community-owned network should not just be broadband expansion but increasing equity by bringing all citizens to the same playing field so they can empower themselves. The Digital Equity Act “specifically targets digital equity and inclusion, factors that go beyond broadband availability” (Strover et al., 2024). During my conversation with Peggy Shaffer, a former Executive Director of ConnectMaine Authority, she drew attention to the upcoming challenges with broadband such as ensuring true digital equity. In her opinion, digital equity means digital skills and affordability, not just broadband expansion and availability. She thinks we don’t talk about how broadband actually contributes to equity in a community enough because that is a much more complex piece of a puzzle to figure out. Navigating true equity is not just about ‘can they afford it?’ but also do they really know how to use it too, she added. “The Internet is increasingly embedded in all aspects of life. This means that Internet access and skills are essential in order for individuals and businesses to explore and use education, health and economic opportunities” (Strover et al., 2024). Recognizing the existing inequities, municipal staff have partnered with other stakeholders and anchor institutions such as libraries and schools to build on existing community’s strengths to achieve the vision of bridging the digital divide.

5. Conclusion

This study aimed to explore how the impacts of broadband infrastructure developments, or lack thereof, are perceived and experienced by residents living on the coast of Maine. Lack of broadband is something that people living on the remote islands and in rural coastal areas of Maine were used to and even preferred for decades. However, results indicate that connectivity is now an integral part of peoples' personal, economic and civic lives, and despite years of infrastructure expansion, many residents still face inadequate or unaffordable internet. Moreover, evidence from interviews with seasonal and year-round residents is consistent in that both desire fast, reliable and affordable internet to be able to stay connected to their families, loved ones and the larger community. In rural areas that are shaped by seasonal economy, connectivity used for communication was cited multiple times as key by both residents, towns and businesses who believed it was necessary to maintain liveable year-round communities. Residents on islands that adopted universal broadband enjoyed the expanded options of working from home which allowed seasonal residents and visitors to stay longer in these otherwise remote areas with limited services. The pandemic has played a role in increasing the need for connectivity as everything from education to health services and business went online, leaving residents without access to reliable or affordable internet vulnerable to these changes. Moreover, my findings suggest that while most residents recognize the benefits of connectivity for personal use, the need for high-speed internet by small businesses continues to be a mixed bag. Some residents worried that the lack of universal access will put their community at a disadvantage to attracting new industries and businesses and will lead to a gradual decline of their community. However, for small business owners that contribute to local and regional economy and rely on broadband primarily for communication with customers, cost can be a burden and the highest speeds are not always necessary depending on the size and type of business. Findings from the fishing community also indicate mixed perceptions towards changes increased connectivity brings into people's work and lives, with older fishermen resisting the online harvesting requirements, but generally wanting to use the internet to improve their business.

Lastly, my results indicate that the appetite for and attitudes towards acquiring universal broadband and using broadband as a community development tool varies across islands,

mostly depending on the municipal staffs' attitudes towards the infrastructure. Nevertheless, the communities that adopted universal broadband reflected positively on this development as they saw strengthened sense of a community and more robust civic engagement. For example, some municipalities now use connectivity to increase resiliency and equity in their communities with improved options for digital services, communication and emergency management. The impacts of the infrastructure investments and subsequent societal changes will take several years to fully materialize but residents I spoke to are hopeful that broadband will continue to be an enabler of opportunities and enhancer of resilience in their communities.

This paper adds to the existing knowledge of rural community development with evidence pointing to the strengths of locally driven development initiatives that can help reinforce a sense of community and place identity in rural residents. These findings suggest that state elected officials, agencies and relevant partner organizations should work with small rural communities on finding ways to further enable and enhance the potential that lies within and leverage the strengths to further their efforts by providing more capacity, funding and tailored solutions. At the municipal level, town officials should explore how to use connectivity and smart governance to increase equity through participatory planning and improved communications. Implications of this paper could therefore serve as a basis for further research that could investigate how individual communities are leveraging these infrastructure investments to achieve economic resiliency in natural resource-based economies threatened by climate change or explore effectiveness of other incentives and community development tools that contribute to creation and sustenance of liveable rural communities that face demographic shifts. Overall, this research highlights the significance of participatory planning in community development and underscores the importance of equitable infrastructure investments in rural resilience.

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Appendix

Appendix 1: Interview Guide

- Tell me about yourself, your business or connection to the Maine coast.
- Could you share any reflections on your experience of (not) having broadband in your community?

Digital Equity and Digital literacy skills

- What does digital equity mean to you? What would it look like in your community?
- What role do municipalities play in a successful deployment of the infrastructure and what other responsibilities do they have towards their constituents to ensure people benefit from it once it becomes available?
- Do the perceptions, hopes and dreams of the local people align with the State's Digital Equity Plan?

Local perceptions

- How is your community adapting to this new amenity and do the perceived benefits of the infrastructure expansion match/ correspond with the lived experience for the locals on the ground?
- What experiences/interactions do you have with broadband so far? What are some of your perceptions, and what are some of the challenges and opportunities you see?
- Do you feel like the expansion of broadband has an impact on the character of your community?

Quality of life

Target study subject: any community member/seasonal or year-round residents

- How do you think it will change the character of your community?
- What does broadband mean for Maine's economy, changing demographics and future opportunities for people living on the remote islands and in rural coastal communities?

Workforce

Seafood industry

Target study subject: people working in the seafood industry (i.e. lobstermen, co-ops, aquaculturist, small private businesses related to the seafood sector)

- How has technology changed throughout your career
- How would you rate your knowledge of technology and level of interaction with it
- What is your opinion on the changing federal regulations
- How is access to or lack thereof to broadband impact your daily life/job?
- If the industry doesn't survive, do you think people have the digital literacy skills are equipped to transition
- What do people like you need to smoothly transition?

Businesses

Target study subject: small business owners

- What role does broadband play in the success of your business? What parts of the business does broadband impact?
- What role have you seen broadband play in helping you and other coastal businesses innovate?

Education

Target study subject: students and teachers

- How has broadband or lack thereof affected your quality of education?
- Would you like to share any personal experiences or frustrations with the lack of internet and explain how it affected your education?

Appendix 2: Release Form

Organization: Island Institute, 386 Main St #3345, Rockland, ME 0484

Description:

Zuzana Duffy worked as an American Connection Corps service member with the Broadband team at Island Institute between September 2023 – July 2024. Her goal was to: Collect stories of broadband impact from island and coastal communities in Maine and share what broadband means for Maine’s economy, changing demographics, and future opportunities.

In this capacity at Island Institute, Zuzana conducted 50+ interviews in 19 communities with new or limited broadband infrastructure to assess the before and after impacts. Some of the interviews resulted in published communications on various internal and external platforms and were shared with partners and stakeholders to raise an awareness around the issue and advance digital equity efforts in the state. Participation in this research project was voluntary. The interviews took 30-60 minutes on average and some of the interviews were recorded and transcribed. The interviews took place in person, over the phone, and on Zoom. Participants received no compensation for participating in the study. There was a minimal risk of interview questions being political in nature. There was no direct benefit to the participants.

The purpose of this consent form is to permit Zuzana Duffy, a Nordic Urban Planning Studies student at the Arctic University of Norway (UiT), to use materials gathered during her work at the Island Institute, including graphics and publications credited to the Institute, to inform her thesis on the topic of ‘Broadband as a community development tool: Studying the impacts of broadband on coastal and island communities in Maine’. The data collected from the participants is stored and saved in a cloud-based Google Drive folder owned by Island Institute and shared to Zuzana Duffy’s personal Gmail account. Zuzana will obtain consent from subjects interviewed during her term at Island Institute to use notes and transcript material for the purpose of the master’s thesis. Personal information will not be used or distributed for future research studies.

In a case of research related inquiry, please contact Christa Thorpe, Senior Community Development Officer at the Island Institute at cthorpe@islandinstitute.org or Zuzana Duffy at zuz Duffy@gmail.com.

On behalf of the Island Institute, I Christa Thorpe have read this form and thereby authorize Zuzana Duffy to use relevant Island Institute material for the purpose of her master's thesis.

Signed:

A handwritten signature in black ink that reads "Christa Thorpe". The signature is written in a cursive style with a large, stylized initial 'C'.

Christa Thorpe, Senior Community Development Officer, Island Institute

October 25, 2024

