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# From Tank Trails to Technology Parks: the Impact of Base Redevelopment for New England

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**FROM TANK TRAILS TO TECHNOLOGY PARKS:  
THE IMPACT OF BASE REDEVELOPMENT FOR NEW ENGLAND**

A Dissertation Presented

by

BERND F. SCHLIEMANN

Submitted to the Graduate School of the  
University of Massachusetts Amherst in partial fulfillment  
of the requirements for the degree of

DOCTOR OF PHILOSOPHY

MAY 2012

Regional Planning

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## **DEDICATION**

This dissertation is dedicated to my beautiful wife Bianca for her endearing support of each of my professional and personal endeavors.

## **ACKNOWLEDGMENTS**

I wish to acknowledge the guidance and support of my committee. Each of you has helped me during different and crucial times of this research effort. Dean Mullin was particularly instrumental in the initial formulation of the research concept, Professor Ash provided frequent thoughtful guidance for my analysis, and Professor Renski offered keen insight into the research process and provided expert review of my work.

## **ABSTRACT**

### **FROM TANK TRAILS TO TECHNOLOGY PARKS: THE IMPACT OF BASE REDEVELOPMENT FOR NEW ENGLAND**

MAY 2012

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Why do some communities thrive after closure of a major employment center such as a military base, while others suffer for many years with long-term unemployment, decaying infrastructure, or other indicators of a weak economy? Through a mixed-methods approach, this paper examines a wide variety of community characteristics from past base closures, builds a model of the most relevant indicators of success or failure, and then offers redevelopment lessons to communities facing base redevelopment. This research incorporates a multivariate statistical analysis including panel regression and then a historical study of the five major BRAC closures in New England. While strong pre-existing economic and social conditions are indicative of successful recovery in many situations, there is no universal set of indicators that can predict success. Nonetheless, there are actions that communities can take to help navigate a military base redevelopment – these include establishing a strong leadership system, aggressively seeking federal and state funding, and orchestrating comprehensive planning that synchronizes market research with available infrastructure and opportunity.

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## CHAPTER 1

### INTRODUCTION

#### 1.1 Overview

Why do some communities thrive after closure of a major employment center such as a military base, while others suffer for many years with long-term unemployment, decaying infrastructure, or other indicators of a weak economy? This paper examines a wide variety of community characteristics from past base closures, builds a model of the most relevant indicators of success or failure, and then offers redevelopment lessons to communities facing base redevelopment. While strong pre-existing economic and social conditions are indicative of successful recovery in many situations, there is no universal set of indicators that can predict success. Nonetheless, there are actions that communities can take to help navigate a military base redevelopment – these include establishing a strong leadership system, aggressively seeking federal and state funding, and orchestrating comprehensive planning that synchronizes market research with available infrastructure and opportunity.

#### 1.2 History of Military Base Closings

Base closures are not a new phenomenon; the first base closure law in the United States was enacted in 1819 (Kelso, 2006). Both base construction and closure usually shadow perceived national threats or formal conflict. After the Civil War, the Army closed 119 posts that were no longer needed (Huebner, 1997). This cycle repeated itself throughout the 20<sup>th</sup> Century as military installations were continually

closed from the 1940's through the 1970s. Troop strength also varied significantly throughout military history. In the aftermath of World War I for instance, there were only 125,000 soldiers in the Army whereas this number increased to 8,200,000 during World War II (Thompson, 2002). Robert McNamara, the Secretary of Defense in the 1960s, orchestrated sixty major closures during his tenure and because of the extensive political and economic implications of base closings, a new process was needed (Global Security, 2011). More recent installation closures have followed the formal procedures outlined in Congressional legislation entitled the Base Realignment and Closure Act (BRAC) which guided the five major closures since 1977: 1988, 1991, 1993, 1995, and 2005; the original legislation was tailored to each of these successive BRAC closure rounds.

The Base Realignment and Closure (BRAC) commissions recommended closure of 97 bases in the four rounds of closure between 1988-1995 saving the federal government \$17 billion through fiscal year 2001 (Ichniowski, 2005). While this is an impressive savings nationally, local impacts to businesses, housing, and tax base were significant as a result of base closures. The military presence on bases, installations, depots, and armories serves as a local economic driver across the nation: the Army is represented in over 600 United States counties, whereas the Navy and Air Force combine for an additional 300 (Hooks, 2003).

Of the 4000 military bases open during World War II, only 481 were still open in 1993 (Warf, 1997). These numerous closures have not been proportionally spread across the nation. In the first four BRAC rounds, for instance, 35 of the 95 major base

closures occurred in the Northeast and Midwest (Kane, 2005). Additionally, New England and the Midwest have a relatively low proportion of the remaining active military installations and active duty soldiers – with a population that represents 21% of the nation, only 7.4% of the active duty force is garrisoned in New England.

### **1.3 Purpose, Study Objectives and Primary Hypothesis**

The purpose of this study is to identify the characteristics of communities that successfully recover after a base closure and extend this analysis to policy decisions made during the redevelopment process. This is particularly relevant as the Department of Defense is obliged to consider potential “community impacts” as one of several factors in identifying bases for closure (Wynne, 2005). More specifically this study seeks to:

- Determine appropriate economic and social measures of successful recovery after a military base closure.
- Understand the characteristics of communities facing military base closures and those recovering from them in order to better assess the resultant impacts.
- Develop a regression model to predict the economic impacts of future military base closures across the nation.
- Apply this model to bases closed by the 2005 BRAC commission; understand probable impacts and recovery timeline.
- Investigate five base closures in New England in order to understand the economic and social impacts on local communities and determine those redevelopment actions indicative of successful recovery.
- Provide policy guidance to federal, state, and local base redevelopment authorities to facilitate quick and efficient recovery following a base closure announcement.

A major issue in examining the process of base closure and recovery is whether communities recover from the base closure process through the normal workings of the competitive economy, or whether there are cases where government intervention is necessary to facilitate this recovery. I draw from several different theoretical schools to provide a foundation examining the process of community adjustment following a major negative economic shock – in this specific case represented by the closure of a major military facility. These include neoclassical decline and adjustment theory, cumulative causation, relevant agglomeration and cluster concepts, and emerging quality of place literature. The economic impacts to BRAC communities have been significant and understanding the theoretical underpinnings of the adjustment process will help explain why and when recovery has or has not occurred.

While the theoretical literature can help us understand the mechanics through which recovery may or may not be achieved, it is silent on the fundamental measurement question of what constitutes a successful and expeditious recovery, and of the appropriate time-span for its measure. It also tells us little about the effectiveness of specific actions taken (or not taken) by public officials. Interestingly, there have been a variety of redevelopment strategies for former military installations – everything from technology parks to conservation land – and the effectiveness of these different approaches somewhat depends on whether the desired outcome is of economic or social benefit, or both. Thus, I consider a broader set of outcome metrics to reflect a diversity of community goals and study individual closures to glean lessons applicable to base closure planning. I employ a mixed-methods approach to provide a

comprehensive assessment of the factors that impact community recovery in the wake of a major base closure, and by building on this knowledge, help communities and their planners facing future closures and other forms of acute economic shocks devise strategies to more effectively mitigate their negative impacts.

I first employ a variety of complementary descriptive and inferential statistical methods to test the influence of various community, military base, and proximity-based attributes on the change in county unemployment rates and per capita income before and several years after the base closure. My statistical analysis follows a program evaluation framework to measure the economic impacts of base closure against a comparison group of counties where bases remain active. I then estimate a series of fixed effects longitudinal regression models to predict community recovery from base closures as a function of numerous explanatory factors. I hypothesize that the strength of recovery following an economic shock is conditional upon a number of community, base, and proximity variables representing the both magnitude of the shock in relation to size of the community, as well as the underlying economic resiliency of the community as indicated by the educational attainment of its population, the amenities available which attract job-seekers, distances to nearby urban areas and access to transportation nodes, and the industrial diversity of the economy. I also hypothesize that other base-specific attributes, such as whether environmental remediation is required and the timeline of the base closure, are also related to more expeditious recovery.



The statistical analysis is balanced by a historical study of five closed bases in New England. Unfortunately, many of the characteristics associated with successful recover are largely beyond the immediate influence of policy – at least in the limited time horizons faced by planners and policy makers. The historical analysis addresses the more nuanced contextual, policy, and process-related factors that cannot be adequately quantified through a strictly quantitative approach. For this portion of the research, I include a review of the planning process, fiscal and managerial resources available for redevelopment, and the issues faced by the communities of five base closures.

#### **1.4 Research Significance and Relevance to Policy**

This research is intended to offer a deeper understanding of the BRAC impact on surrounding communities and the role of post-BRAC planning processes and policies in mitigating negative impacts. A number of existing studies examine the economic impacts of specific base closures on their host communities; however, lessons from these historical studies are difficult to generalize across different types of communities. The few econometric studies that exist offer some important conclusions (such as the average impact of base closures on county-level employment levels over time), but do not consider other measures of economic distress nor the role of planning and policy in the redevelopment process. Prior scholarly research does not evaluate actions taken to facilitate successful redevelopment that could be used in future redevelopment planning. This study extends base redevelopment literature by including additional indicators of economic recovery such as economic diversity and quality of place

amenities. Additionally, this dissertation offers a unique regional perspective and proposes key planning and policy measures that can mitigate lengthy recovery from base closures. Finally, this research may be generalized to communities facing other types of major closures: manufacturing plants, major retail businesses, and other significant employers. I argue that lessons offered through expert management of recovery from base closures can be extended to regional adjustment for other forms of economic shock such as plant closings and natural disasters.

The results from this work also have important implications for policy makers – particularly relevant will be the selection of bases for future closure rounds and the appropriation of funds to expedite recovery. Ideally, this will inform future BRAC commissions, federal and state funding agencies, communities facing and recovering from closures, and local redevelopment organizations. While reuse of any former federal or state property must be tailored towards the economic and other needs of the surrounding communities, the insight gained from this research suggests different strategies for the redevelopment of closed bases depending on the pre-closure conditions. The results could help influence federal policy used to identify and assist base closure communities and should help them to recover successfully.

### **1.5 Organization of the Study**

This research is organized into six chapters. Chapter Two summarizes the relevant theoretical literature on regional economic adjustment as well as previous empirical studies of the recovery process following military base closings in the United

States. My research methodology is detailed in Chapter Three for both the multivariate statistical analysis and historical study. Chapter Four reviews the results from the statistical analysis while Chapter Five reports the results of the historical study. Finally, my concluding remarks are offered as Chapter Six.

## **CHAPTER 2**

### **LITERATURE REVIEW**

#### **2.1 Key Literature and Concepts**

This chapter reviews the applicable theory and empirical research that informs the redevelopment process after an economic shock. The intent is to understand how communities recover, what variables encourage recovery, and relate them to the study of recovery from a military base closure. The first section of this chapter reviews economic base theory as a theoretical construct to understand how economic shock influences demand. The second section identifies the theoretical foundations for understanding community adjustment in the face of a severe economic shock. The third section reviews empirical research in support of the identified theories which helps to inform this research. The fourth summarizes the relatively meager scholarly information available on military base redevelopment. Lastly, the final section identifies how the summarized literature will be used to further the research in this dissertation.

#### **2.2 Economic Base Theory**

There are several economic development theories that are relevant for this research, but none as broad as economic base theory. Essentially, economic base theory extends the analysis developed by Hoyt in the 1930s when he developed a 12-step procedure for land-use planning in his role with the Federal Housing Administration to a theoretical construct of how regional economies grow (Isserman, 2000). “From a

methodological standpoint, the practice of economic base analysis has three defining characteristics: (1) its pragmatic blend of ratios and judgment, (2) its limited reliance on theory, and (3) its effective use of comparisons across places. Measurement, comparison, and extrapolation form the essence of most economic base analysis – with a good deal of professional judgment included, whether explicitly or implicitly (Isserman, 2000, p. 181).” The theory is predicated on an analysis of industries within a region that are segregated into basic and non-basic. Basic industries serve the export market and non-basic industries serve the internal needs of the region (Stimson et al., 2006). Through an analysis of the number of jobs in each category, one can surmise the economic health of a community as well as its potential for growth.

One of the most relevant concepts from economic base analysis to understanding the impact of a major base closure is the multiplier effect. A military facility can be viewed as part of the basic sector because it supports the nation’s defense. Employee salaries from basic industries are used to buy commodities from non-basic industries; this interjects money into the regional economy and spurs additional spending. Multiplier effects can be estimated for employment, income, and firm output (Malizia & Feser, 1999). The distinction between basic and non-basic activities was first used by Aurousseau in 1921 and Olmstead in 1927 (Alexander, 1954). Tiebout (1962) furthered the analysis while working for the Committee for Economic Development in the 1960s; he divided local sectors into those directly and indirectly supporting exports and used location quotients to help gauge the relative size of the local export market. Tiebout identifies local sales to local military bases as exports to

the federal government – a distinction that will be useful later. Alexander (1954) suggested a basic/non-basic ratio to compare cities with different proportions of basic to nonbasic activities and simplified basic activities as those that bring money into cities.

As with any theory, there are valid criticisms of economic base theory. It does not adequately balance exports with imports needed to support the basic industries and there are difficulties distinguishing basic from non-basic activities in a company with a vertical supply chain (Malizia & Feser, 1999). Most importantly for this research, the length of the adjustment period after an economic shock is not addressed as there is no concept of time. Despite its limitations, economic base theory helps to understand the non-basic activities that support military bases while they are open and are most negatively affected through closure. Local retail and service companies as well as the housing market are the largest sectors to suffer after the announcement of a closure. In addition, the migration of federal military and civilian employees directly impact the extent of local services – off-post school systems can lose a significant number of students for instance. Nonetheless, economic base theory provides a good foundation for understanding more integrated and dynamic models of regional growth and adjustment such as cumulative causation, agglomerations, and industry clusters (Isserman, 2000).

### **2.3 Regional Adjustment Theory**

Communities occasionally find themselves in the unfortunate situation of mitigating economic shocks due to recessions, major layoffs, plant and military base

closings, and other unfavorable predicaments. While there are many negative results, there are several relevant economic theories that can assist communities in understanding the recovery process. The following section summarizes the economic theories that serve as the framework of this dissertation. The neoclassical growth model is particularly relevant in describing the movement of wages and unemployment following an economic shock. Growth is considered a function of increases in capital, labor, and in more elaborate specifications, other factors of production such as land (Cortright, 2001). Whereas growth is long-term, adjustment is the intermediate process following a shock, and convergence occurs with diminishing returns to both capital and labor.

### **2.3.1 Neoclassical Growth**

As the most dominant economic theory within the economic development discipline, neoclassical growth theory is predicated on the assumption of constant returns to scale in primary factor inputs, such as capital and labor. Assuming government does not intervene and in the absence other market imperfections, an initial drop in regional wages and a rise in joblessness will eventually resolve itself and the regional economy will return to an equilibrium position of constant wage growth and even unemployment levels across regions (Malizia & Feser, 1999). Regions with relatively low wages will grow through the in-migration of workers and businesses; while excess workers would eventually leave, this in-migration will reduce regional wage disparity as equilibrium is achieved (McCombie, 1988).

Neoclassical theory has applications for regional growth and adjustment as long as certain assumptions hold. First, output growth varies across regions; this is because capital moves across regions differently as does changes in the labor force. Second, productivity and wages are assumed to grow at the same rate across regions. Third, through the self-correcting nature of the market, employee wages should eventually converge across regions. The lack of convergence is often attributed to continual government intervention. In reality, labor force migration and the movement of capital across regions is “sticky.” People are attached to place and capital is not easily transferred. Job seekers are also not always aware of opportunities in other regions and as unemployment rises, so do the costs of social services in depressed areas. The adjustment process therefore is impacted by a variety of personal, business, and government choices. For instance, adjustment could slow or reverse if new local environmental regulations dissuade businesses from relocating to an area with now stricter (and more costly) impact study and mitigation requirements. The issue of place attachment will be discussed later – so will the apparent incongruence that neoclassical growth theory suggests economies recover more successfully without government intervention.

While neoclassical theory provides some relevant insights into how economies grow, it does not identify how successful economies originate and mature (Cortright, 2001). This is somewhat due to the overly simplified role of technology and innovation on growth. This supply-side based theory purports that near term growth is dictated by the capital-labor ratio whereas long term growth is determined by exogenous factors



particularly knowledge-induced spillovers (Malizia & Feser, 1999). Neoclassical theory essentially disregards time and purports that equilibrium is simply achieved through a self-correcting process. Furthermore, neoclassical growth theory does not offer an explanation of the origins of migration (other than regional differences in wages) since it is based on an assumption of perfect worker knowledge; the problem is exasperated by the outmigration of younger and more educated workers following an economic shock (Massey, 1990). Since capital moves in the opposite direction of labor, Massey proceeds to question which comes first: growth or migration? The succeeding theory, cumulative causation, attempts to answer this outstanding issue. In addition, a combination of neoclassical and cumulative causation probably offers the best explanation of the recovery process.

### **2.3.2 Cumulative Causation**

This theory suggests that “In short, employment growth stimulates migration, which stimulates employment growth, which stimulates migration, revealing a macroeconomic process of cumulative causation (Massey, 1990, p. 15).” Related to post-Keynesian theory, the concept of cumulative causation represents the synergy between productivity growth, price competitiveness, export increases, and output growth (Malizia & Feser, 1999). When these factors work together, the impacts are exponential and migration incites employment growth. The work of Myrdal, Kaldor, and others did much to broaden the discussion of the more traditional neoclassical economic theory. Myrdal advanced “...the idea that migration induces changes in social

and economic structures that make additional migration likely” (Massey, 1990, pp. 4-5) whereas Kaldor emphasized the *importance of effective demand and export-led growth rather than deliberate import substitution* (Meardon, 2001, p. 529). “Their common idea was that as the domestic market expands, firms will find it profitable to produce such goods, or to produce in such a way, that will extend further profit opportunities to other firms, fueling the market’s continued and cumulative expansion” (Meardon, 2001, p. 529).

So through the concept of cumulative causation, we can envision that opportunities for growth can induce further investment and migration. Barring intervention, however, communities suffering economic decline are likely to continue to do so. Whereas neoclassical theory can help us understand the motivation for individuals and firms to migrate following an economic shock, cumulative causative reveals insight into how regions grow or decline through a combination of economic factors. Furthermore, there are many decisions that both businesses and individuals make regarding levels of production, wages, hiring of more flexible labor, and others that collectively contribute to the behavior of the regional market (Clark et al., 1986). These decisions as well as public policy will encourage or discourage the recovery process. Since the neoclassical perspective and cumulative causation cannot fully explain this process, additional theory must be explored – one or more that integrate knowledge creation, the advantages of geographical proximity to other firms, and the quality of place. The following theories are peripheral to the adjustment process, but

provide insight into the factors that induce growth and ultimately determine whether recovery from economic shock will succeed or fail.

### **2.3.3 New Growth Theory**

This theory suggests that knowledge creation is critical in the economic growth of industries and regions. Knowledge is the chief influence in continuous productivity improvements; it also is a significant multiplier for a region when considering its positive spillover effects. Romer (1990) advocates that growth is endogenous and that human capital is the primary determinant of growth. This theory advocates investment in knowledge creation to sustain growth and is consistent with Joseph Schumpeter's 1934 notion of "creative destruction" which describes business improvements as ultimately better for industry and consumers (Cortright, 2001). Schumpeter's concept is pertinent as recovery from economic shock affords an opportunity for the surrounding communities to influence a new economic direction for the region. To help create an environment of innovation, institutions, place, and tacit knowledge are instrumental (Cortright, 2001). More recent theories including those promoting the value of industry clusters and quality of place on innovation are closely tied to the importance and relevance of knowledge creation for economic growth. These are discussed in the next two sections.

## 2.4 Industry Clusters

Although not an explicit theory of regional growth or adjustment, recent research into industry clusters suggest their positive impact on economic development. The term industry clusters is typically associated with the work of Porter (1998) who suggests that regions are the primary competitive spatial unit in an increasingly global economy. Companies must build competitive advantage and diversify in order to compete in the national and global marketplace; the advantages of geographic location such as proximity to existing retail markets or access to key transportation nodes must be integrated and exploited to enhance a company's and cluster's relevance in the world economy (Porter, 1998). Unlike traditional neoclassical perspectives, the industry cluster framework recognizes the potential importance of policy and institutions in fostering a healthy regional economic climate. However, Porter's approach suggests that business and community partnerships, rather than government, are best suited to address urban redevelopment (1995).

Clusters emerge through *labor market pooling, supplier specialization, knowledge spillovers, entrepreneurship, path dependence and lock-in* (opportunities based on established corporate activities) *culture, and local demand* (Cortright, 2006). They are a powerful regional economic force and help to create knowledge and subsequent growth. While Porter has written a great deal about competitive advantage and the value of regional industry clusters in fostering economic diversity and strength, he also discusses the competitive location advantages of smaller spatial units (i.e. inner cities) as a foundation for successful economic revitalization. Porter believes that urban

areas offer the following competitive advantages over their suburban counterparts: strategic location, local market demand, integration with regional clusters, the availability of significant human resources (Porter, 1995).

Porter's concept of clusters, which allow for maximizing the advantages of location, human resources, and integration with the regional economy, further his argument that cities and regions must focus more on business development and less on social welfare (Porter, 1995). Companies must build competitive advantage and diversify in order to compete in the national and global marketplace. The advantages of geographic location such as proximity to existing retail markets or access to key transportation nodes must be integrated and exploited to enhance a company's and cluster's relevance in the world economy (Porter, 1998).

## **2.5 Quality of Place**

From the pure economic adjustment process itself to the factors that influence individual and firm migration, planners must understand the theoretical underpinnings of the factors that influence the movement of capital and labor so that they can cast their community in the best light to attract both. Today, many firms are making location decisions based on quality of place – an emerging theoretical and social construct – to help attract and retain employees. Particularly relevant in the knowledge and technology-based economy, business location decisions involve amenities consisting of the natural and built environment, civic traditions, as well as culture and recreation (Reilly & Renski, 2007). Also relevant are the long-term attributes of a region (its

harbors and airports for instance) that help to define its role in the regional economy (Braudel, 1984). Nonetheless, there is still some disagreement in the role that natural and cultural amenities play in economic prosperity. Blair and Premus (1987) provide four major results from their survey of quality of place literature: (1) economic factors (labor and other costs) are the most important in location decisions, (2) these are becoming less relevant, (3) technology has aided in “proximity to market” while “proximity to raw materials” is becoming less relevant, and finally, (4) taxes are becoming more relevant.

Florida is arguably the most influential scholar purporting the economic benefits by catering to the lifestyle preferences [what he calls] the creative class. “Studies of national growth find a clear connection between the economic success of nations and their human capital, as measured by the level of education (Florida, 2003, p. 7).” Florida made several notable conclusions: (1) the creative class is moving to creative centers (high-tech, innovation, with increasing population and employment), these centers are thriving due to desire of creative class to live there, looking for diversity and opportunities for creativity (Florida, 2003).

The preceding paragraphs have sought to weave together the relevant theories that inform the recovery process following an economic shock such as the closure of military installations. Neoclassical adjustment theory provides a solid basis for the natural migration of workers and resultant capital investment and relocations of firms in returning an affected community to a sustainable growth trajectory. Cumulative causative and the related agglomeration and cluster concepts advance the importance

of growth and productivity improvements. In essence, the recovery process for communities facing an economic shock such as a base closure is best explained by a compilation of all of these theories. As preexisting economic and social conditions vary greatly across communities, recovery planning must incorporate the endogenous and exogenous factors that can foster opportunity for all citizens. The next section highlights some of the empirical research surrounding the aforementioned theories relevant to military base redevelopment.

## **2.6 Empirical Research**

Although limited research exists on recovery from military base closures, there are published studies on broadly similar topics such as migration and other topics relevant to closures and recovery from them. This section outlines the existing research in general and in response to economic shocks; it has applicability to community recovery from BRAC closures while the subsequent section reviews base closure research.

Blanchard and Katz (1992) completed an analysis covering forty years of recovery to economic shocks across the United States; regions experienced successful recoveries at varied rates through high outmigration of workers and high in-migration of capital investment by new firms. While shocks inevitably force lower wages within a region, workers will find employment outside the region whereas firms outside the region will migrate to the region to take advantage of lower labor costs. They found that unemployment increases for five to seven years after an economic shock, but will then

return to normal rates. Blanchard and Katz also concluded that different regions of the country exhibited different levels of growth from 1950-1990. While the Sunbelt states have seen steady growth since 1947, the Northeast witnessed growth initially and has since seen a fairly steady decline in employment during the same period. Defense spending (on bases and contracts) and national growth of specific industries can help mitigate these negative regional employment trends (Blanchard & Katz, 1992).

Migration studies conclude that workers move for economic and other opportunities. Migrants are generally white, educated, and younger (Wertheimer, 1970). Power (1996) argues that people chose location first and then the economy grows – not the reverse. An interesting, but dated study of migration in the United Kingdom draws a comparison to worker migration in the United States and suggests that there is a higher migration for blue-collar than white-collar workers for job related reasons (Hughes & McCormick, 1989). Through the use of different statistical models (moving average, autoregressive, autoregressive integrated moving average), Clark et al. (1986) found that migration is more pronounced than anticipated and that the level of migration depends on whether a region is growing or declining. Using Canadian census data, Vanderkamp (1989) conducted a study to measure labor supply. He found: (1) in-migration was affected by average wages whereas out-migration was influenced more by the lack of social amenities and types of employment, (2) regions with lower wages have higher employment and growth, and (3) wages do adjust based on labor supply. These results indicate that neoclassical theory informs labor migration and its relevance



in the recovery from shock, but also suggest that wages are not the only relevant variable.

The results of these empirical studies provide evidence of some specific variables which positively influence both recovery and growth. Educational attainment, proximity to transportation nodes and existing clusters, availability of amenities, and migrant demographics are all worth considering when evaluating communities on their potential to recover from a shock.

## **2.7 Base Closure Process, Impacts, and Research**

Before highlighting existing base closure research, it is important to understand how modern base closure decisions are made through the BRAC process and what the impacts are to local communities facing closure of their military installations. While there is limited scholarly work on the topic of military base closures, the literature essentially can be segmented into two categories: case study based and econometric research. After introducing the BRAC process and community impacts of base closure, the following section offers examples of base redevelopment efforts and presents the results of the econometric analyses conducted on the impacts of BRAC closures on local communities. In addition to the theoretical foundation discussed previously, much of this base-specific research will inform the variables used to answer the research questions presented in the next chapter.

### **2.7.1 The BRAC Process**

The base closure process offers an opportunity for the community to engage in planning for reuse options. The BRAC process is mandated by the Defense Base Closure and Realignment Act of 1990. After considering the international threat situation, the Secretary of Defense determines the criteria for base closings and recommends a list of bases for closure. This list is then forwarded to an independent BRAC commission appointed by the President. The commission solicits input through regional public meetings and then provides their recommendation to the President who sends his recommendations to Congress for final approval. The President's recommendations cannot be modified by Congress. Bases can either be closed or realigned indicating a change in mission, personnel, or both. Communities form local redevelopment authorities (LRAs) to manage the transition of the base to civilian use. Bases must be closed within six years of the BRAC closure announcement (Department of the Army, 2006).

The Office of Economic Adjustment (OEA) was established by the Department of Defense (DOD) in 1961 to mitigate the negative impact of base closures. The OEA administers the Job-Guarantee, Property Disposal, and Economic Adjustment Programs all designed to provide assistance to workers and community redevelopment efforts (Stenberg & Rowley, 1993). As the scale and available property is significant, the aforementioned programs offered by the OEA are crucial in assisting local communities through the base closure process. After being approved by the OEA, LRAs balance political, economic, other interests of the affected community, hold real property, and

develop a comprehensive redevelopment plan (Wozniak, 1999). The work of the LRA is not simple as they must interact with multiple federal agencies including the OEA, EPA, and HUD (U.S. Army Corps of Engineers, 2009).

The BRAC commissions have established criteria for equitable closure decisions; for the most recent commission, there are four “military value” criteria including strategic mission of the installation and operational cost and four “other considerations” including cost savings and environmental impact (Wynne, 2005). Amongst the published criteria, “The economic impact on existing communities in the vicinity of military installations” is the sixth most important (Kane, 2005, p. 9). Ideally, the communities who lose bases have the potential to rejuvenate their economy fairly quickly; however, this is somewhat predicated on preexisting economic and social conditions amongst the members of the community. Redevelopment on former military bases and industrial locations can take many years and there are three impediments to resuming a community’s economic health: “(1) Poor location and existing infrastructure; (2) A legacy of externalities, including environmental damage and high wages; and (3) A community and local leadership that has become dependent on a single employer or industry” (Mayer & Greenberg, 2001, p204). While these concerns are worrisome, the GAO reports that unemployment rates are actually lower in almost two-thirds of communities which faced a BRAC closure (Crock, 1999).

The existing base infrastructure usually consists of office buildings, housing complexes, athletic facilities, golf courses, roads, and vast open areas that may have considerable value for redevelopment or recreational space. These facilities often are in

need of modernization or brownfield remediation before they can be put to private sector use. The installation's real property is first offered to sister DOD agencies then other federal agencies before it is made available to the local community. This is the time when the Department of Housing and Urban Development and other stakeholders have an opportunity to address social imbalances based on the unavailability of low income housing as well as the needs of the homeless in the area, disparate poverty rates, and unemployment among different populations (U.S. Department of Housing and Urban Development, 2006). While former base land after a BRAC closure was originally intended to be sold to local communities, it has been frequently transferred at no cost because of economic redevelopment concerns for those communities facing closure (Siehl & Knight, 1996).

### **2.7.2 Impacts of Base Closings**

The economic and social impacts of a major base closure are, in many respects, similar to the adjustment process that follows the closure of a major manufacturing branch plant or other large-scale employer. The exodus of base employees (and their federal salaries) and a reduction in local direct spending from the base also has negative indirect effects on area retailers, consumer services, and other businesses that primarily serve the local population. Mass out-migration leads to increased housing and commercial property vacancies, reducing a community's tax base and increasing the fiscal burden for those that stay. The remaining residents and businesses must still support the largely fixed costs of schools, infrastructure, and other local public services.

Additionally, the loss of human capital can negatively impact the future of the community losing a base. Federal employees, military members, retirees, and spouses offer not only purchasing power, but enhance the social fabric and community culture.

Bases are often well integrated into the economic and social fabric of nearby towns or cities. In some instances, these facilities may have even been built before the community developed around them. The largest installations can support 50,000 military personnel in addition to civilian employees and military families. When a base closes, military personnel and their families are reassigned to other installations typically in a gradual phase-down of base operations. Some civilian employees (particularly federal employees with special training and skills) are transferred to other facilities, while others are simply laid off. Base communities are also home to many military retirees – who retire as young as age thirty-eight after twenty years of service. The retirees generally stay after bases close although communities will likely not attract new military retirees once on base retail and medical services no longer exist. Furthermore, retirees buy more local goods and services than young families and their impact is more significant: they spend federal Social Security and medicare dollars as well as private retirement income (Power, 1996).

Military installations also offer some unique characteristics that may mitigate some of the negative consequences of the closure. Although initially severe, the negative economic impacts from many major base closures tend to be rather short-lived. According to a 2005 Government Accounting Office (GAO) report, one-half of the communities who faced a base closure announced in the 1990s witnessed per capita

income growth several years after the closure (Roberts, 2005). Unlike a major plant closure where many local workers are dislocated and require re-employment and social assistance, the bulk of the base personnel leave the region following a closure – accelerating what neoclassical economists consider the relief-valve aspect of out-migration. Similarly, military spouses often leave in-demand professional jobs (such as nursing and teaching) that then become available to other members of the community. In some cases, these spousal vacancies just remain unfilled – curtailing the need to lay off additional employees in response to truncated demand. The bases themselves also offer limited retail shopping (food and durable goods) at a discount to military members, their families, and retirees. Therefore, the negative impact for local retail and services are typically less than they would be for a population without on-base opportunities for consumption. As suggested in the preceding paragraph, retirees shift some of their consumption to off-base retailers after closure. Finally, military bases typically have few local supply-chain relationships; contracts for services and supplies are generally managed at the national level resulting in lower downward multiplier effects when the base closes (Hooks, 2003).

Direct job losses resulting from military base closures are usually substantial. Although not nearly as disastrous as anticipated before the actual closings, almost 400,000 military and civilian jobs have been lost as a result of ninety-seven BRAC closures from 1988 through 1998 (Poppert & Herzog, 2003). Since military jobs are transferred to other installations, it is primarily the loss of civilian jobs that negatively impacts the local economy. DOD reviewed the ninety-seven bases closed in the 1960s

and 1970s; by 1993, 171,000 new jobs at companies located on the former bases replaced the 87,600 lost civilian jobs (Spiegel, 1997). The DOD reports that few federal employees lose their livelihood when bases close – 76% retire or continue to work for the federal government and new jobs replacing 60% of lost federal jobs are created within two years of base closures. Interestingly, employment and population rates remained stable even after the closure of Castle Air Force Base in California (Bradshaw, 1999).

Total and type of employment of the closing installation relative to the surrounding community will clearly make a difference in the time and options available for recovery. Based on an analysis from 1972-1994, military facilities dedicated to science and technology fared much better than other installations (Hooks, 2003). Urban base closures also seem to fare the better; more than twice as many jobs have been added to urban communities than to rural communities that suffered a base closure (Stenberg & Rowley, 1993). Atkinson (1993) finds that small and remote communities often are not able to recover jobs after a closure. This is due to the lack of economic diversity within a small community as well as the relative size of the installation. “In general, the more military-dependent a community (prime and sub-contractors) and the more military-specific the task carried out at that site, the smaller the probability of conversion to some other form of economic activity (Brauer & Marlin, 1992, p. 160).”

Impacts to the local housing and retail sectors can also be significant. There is generally insufficient family housing available on a military installation so the local real estate market is heavily reliant on the demand of the military for housing. With the

closure of a base, however, there is often an opportunity for the development of relatively affordable housing using the large stocks of former military housing (Bradshaw, 1999).

Military and civilian workforces are consumers of local products and services. Active and retired military populations rely heavily on the retail amenities available on the installation, while the civilian population is not afforded access to commissaries and exchanges. Military members and their families do frequent off-post retail and services, and the consumer demand for these establishments invariably changes once a base closes; the impact on retail will thus have a negative multiplier effect.

The property available for reuse is typically substantial when a base is closed. While the redevelopment options are numerous, the land transfer process is lengthy (it typically takes five to six years), bureaucratic (National League of Cities, 1998), and often wrought with environmental remediation problems and delays. Most of the closed bases on the Environmental Protection Agency's (EPA) Superfund list have been on the list for at least fifteen years (*Pollution Engineering*, 2005). Although environmental cleanup and lengthy property reuse processes have a considerable impact the time it takes to revitalize closed facilities, contracts for environmental cleanup at closed bases often replace lost civilian construction jobs on a military installation (Bradshaw, 1999). In addition and as previously mentioned, the federal government often retains former military property for a variety of reasons. A 1988 GAO report outlined that only 31% of property available due to base closings was transferred for nonfederal uses (National League of Cities, 1998). For example, programs such as the Federal Lands to Parks



Program provided park land for Bangor, Maine using twenty-six acres of the former Dow Air Force Base (Kelly & Cornelssen, 1996).

Former Army, Navy, and Air Force facilities also generally offer some appealing attributes for redevelopment. Army locations generally offer excellent transportation access which provides exceptional potential for major industrial and distribution centers. Navy bases are often located on the waterfront enabling redevelopment of prime real estate for residential and maritime reuse. Finally, Air Force installations typically offer major airfields which can be converted to civilian regional airports. While further research is required to draw any conclusions about successful conversion based on the type of military installation, these generalizations offer potential reuse concepts.

### **2.7.3 Econometric Studies**

The existing quantitative literature on economic recovery following military base closures is extremely limited, with a few key exceptions. These econometric studies establish the scholarly precedent and provide the cornerstone for the statistical component of this dissertation. Hooker and Knetter (2001) study the impact of military base closures on county level income and employment. Using a national database covering years 1969-1996, they found that the negative impact on county per capita income was minor even though there was significant job loss among, primarily, military personnel. They conclude that the outmigration of relatively low-paying military jobs and the resulting employment growth after closure helped to mitigate any predicted per capita income decline and there was no appreciable negative impact on civilian

employment levels. Consistent with neoclassical theory, they found that migration had a significant role in the adjustment process and it contributed to a favorable employment to population ratio. However, they also contend that federal aid and the selection of closures for economically stronger counties resulted in less severe impacts than were predicted.

Another extensive analysis of base closures was completed by Poppert and Herzog (2003). They developed a database of all U.S. counties spanning twenty years from 1978-1997 to investigate the effect of closure on county employment and compare outcomes and the adjustment process for counties where bases were closed. The authors considered a variety of variables to explain post-closure private nonfarm employment levels in affected counties: available acres for redevelopment, community optimism, federal relief, state energy prices, private wage rate, federal transfer payments for maintenance and education, labor market and demographic conditions, and the regional industry mix. Poppert and Herzog concluded that, in general, BRAC closures are not as disastrous as predicted again noting the importance of federal aid provided to help balance the loss of jobs. Additionally and as a result of gains and losses from BRAC and non-BRAC personnel decisions, there was a net positive effect on community employment. Poppert and Herzog found the following variables to be significant when modeling yearly changes in private nonfarm county employment three years after the BRAC announcement: presence of military, employment gain, employment loss, available base property, wage rate, education assistance, nonmanufacturing employment, coefficient of specialization, and agricultural

employment. Finally, the research introduced the importance of existing transportation infrastructure for civilian reuse opportunities as well as the “uniqueness of local economies.”

Krizan (1998) and Warf (1997) also conducted econometric analysis of BRAC-related economic impacts. Krizan investigated the impact of California base closures on private business from 1989-1996, modeling net employment growth as a function of age of business, distance from base, and ratio of military to local workforce. He found that even though more businesses closed and less new business opened after a closure, employment opportunities were improved; primarily due to the retail market capturing the spending of military retirees who formerly shopped on the installation (1998). Warf (1997) used input-output analysis to measure economic impacts of closures across states suffering BRAC closures in 1988, 1991, and 1993. He included location quotients to estimate sub-contracting leakage, prime contracts for closed bases, and other variables in his model. Warf determined that industries most negatively affected by base closures were construction, personal and repair services, miscellaneous manufacturing, fabricated metals, wholesale/retail trade, and educational services. Furthermore, closures were “largely a coastal phenomenon” (Warf, 1997, p. 559) and had the most severe consequences for blue-collar workers -- this is consistent with the previous discussion regarding migration.

Additionally, a study of base closures in California affirms the economic importance of military retiree spending for local merchants and the negative impact of base closings on local housing and construction (Bradshaw, 1993). Through an input-

output analysis, Bradshaw also suggests multiplier and leakage effects of base jobs and considers the ongoing healthcare privatization by the DOD to be a boon for local economies. Unlike authors of most econometric studies, Bradshaw (1993) offers several suggestions for redevelopment planning: (1) the importance of the military base employment civilian to military ratio, (2) to remain positive about potential redevelopment opportunities, and (3) the need to change military and federal redevelopment regulations including those related to environmental remediation funding (1993).

## **2.8 Case Studies**

The bulk of the case study literature profiles successful examples of base reuse and recovery, with few examples of unsuccessful redevelopments following closure. There are many case studies of former military communities that are now thriving as civilian economies. As an example, the residents of Atwater, California struggled with the closure announcement of Castle Air Force Base in 1991 after the Mack Truck plant closure devastated the community almost two decades earlier (Atwater, 2007; Bradshaw, 1999). However, the community actually witnessed growth in population, labor, retail sales, housing and school enrollments and only minor increases in unemployment and housing vacancies. There are several reasons for these apparent discrepancies. Local jobs once held by military spouses became available for the former base civilian workforce and many were successful in finding employment opportunities elsewhere. Military personnel were simply transferred to another base. An anticipated

surplus of housing caused housing values to decline initially, but the local housing industry witnessed a 25% increase in new home sales by the time the base officially closed (Bradshaw, 1999).

Predictions were also dire when the closure of Charleston Naval Base in South Carolina was announced; yet, a committee of stakeholders was quickly assembled to help guide the transformation of the former naval base. Strong political leadership brought 1,000 federal jobs to the area. With the help of private jobs that account for more than two-thirds of the employment on the former installation, there are now 500 more civilian jobs than when the base closed in 1996. Successful business development activities, tax incentives, and the natural and historical appeal of the area have attracted ninety-nine new companies (mostly manufacturing and distribution) to the region with more than \$2.2 billion in capital investment resulting in ten thousand jobs. Just up the coast, the redevelopment timeline of the former Myrtle Beach Air Force Base was much longer as the community debated for ten years before a consensus was reached on the reuse of this parcel (Jacobson, 2000).

The transformation of the former Boston Naval Yard in Chelsea, Massachusetts into the Charlestown Navy Yard is also considered a successful redevelopment. After 174 years of service, the Boston Naval Yard officially closed on July 2, 1974. Fortunately, the Boston Redevelopment Authority (BRA) had already planned for its redevelopment, as it had been the subject of previous base closure plans. The base had a proud history of ship building – providing thirty-nine wooden naval ships from 1813-1869 and contributing an additional 141 ships during World War II when its employment peaked

at 50,000. The Boston Naval Yard was placed on the National Register of Historic Places in the 1960s, and when it closed a decade later, it left 5,000 former employees without jobs (Gordon, 1999).

Many options for reuse were considered, including a shipyard and industrial park, before its current mixed-use plan was adopted, encouraging the development of offices, retail, housing, a hotel, an art college, and museums. From the outset, retaining its historic maritime character was central to redevelopment planning particularly as creative reuse was required for its historical buildings. To enhance the naval theme, the USS Constitution, originally built in Boston, has been displayed prominently since the base closed. Fraught with political problems, a volatile real estate market, and slow construction efforts, the focused BRA was able to keep the effort moving forward. With the help of the former Speaker of House and U.S. Representative from Charlestown, the BRA secured \$11 million in state and federal grants. The redevelopment was ultimately successful due to proper phasing, sufficient public and private funding, and perseverance (Gordon, 1999).

Redevelopment success stories offer many useful suggestions for planners and policy makers on “how to do things right”; however, the lack of attention to failures presents an overly optimistic view of the prospects for recovery. There are several notable examples of communities that have and continue to struggle with base redevelopment. For instance, Glaslow Air Force Base in Montana was closed in 1968 and eventually sold to Boeing in 1993 after several failed redevelopment attempts including a military retirement community and industrial park. Roswell, New Mexico is

still struggling after the closure of Walker Air Force Base in 1967 (Garcia, 1996). As noted previously, urban communities have recovered faster and more dramatically when their bases closed, while rural communities have more often struggled – such as when an Army depot closed in Carroll County, Illinois, the area became a “ghost town” (Roberts, 2005).

The case study literature suggests a number of base, community and policy variables that should be considered when developing a conceptual model of the impacts of closure on base communities (Dardia et al., 1996). Some of the key base characteristics include the number of military living off-base, the ratio of military to civilian personnel on base prior to closure, the number of military spouses who are either working on base or in the community, the number of base workers who are retired military, and for the potential adaptability of facilities. Community characteristics include the percentage of population accounted for by base, the percentage of school enrollment from military children, the number of retired military in community, proximity to urban areas, and political unity. Specific community characteristics must also be considered relative to the broader economic environment. As stressed by Dardia et al., “In addition to these static qualities of bases and communities, the impact of any economic shock such as a base closure depends on the underlying strength of the local economy as well as the business cycle at the time of the closure (1996, p. 7).”

## **2.9 Applicability to Dissertation Research**

While the above discussion outlined some of the relevant research and associated theoretical framework for BRAC closures, there are some gaps in the existing literature. The available research on military base closings is predominately qualitative, dominated by case studies that focus on success stories and opportunities for base redevelopment. Nonetheless, the preceding literature review informs the economic and social indicators that may help predict the likelihood of a successful recovery. Through an analysis of both successful and unsuccessful redevelopment efforts, my research provides a comprehensive regional analysis of the impacts of base closures over a period of almost thirty-five years. To begin, the economic theories previously discussed and their relevance to the redevelopment of military base closures are summarized next; they form the foundation for both my quantitative and qualitative analyses.

Neoclassical theory addresses the regional adjustment process in the aftermath of an economic shock such as a military base closure. A major influence of the regions reaching economic equilibrium is the migration of the displaced workforce – incidentally, migration also facilitates the economic synergy captured by cumulative causation. Equilibrium reached through the adjustment process is accelerated through the relocation of military members and spouses to other installations. This leaves some suddenly vacant jobs and facilitates recovery (presumably some service and retail positions will be eliminated due to decreased demand). The migration of base employees is at least partially artificial as all of the military employees are transferred to



another installation while a portion of the civilian employees are offered positions elsewhere. Nonetheless, firms from outside the region have an opportunity to take advantage of depressed wages, available labor, and usually ample undeveloped property; perhaps this is why many base redevelopment plans include industrial parks.

While neoclassical economic theory discounts the necessity of government intervention to address economic shortfalls, a review of empirical studies suggests that state and local leadership as well as significant federal and state funding are major factors in the redevelopment of bases. Successful redevelopment of BRAC bases will inevitably rely on the outcome of a planning process that is not only mandated, but supported financially by the federal government.

The consideration of existing and potential clusters is particularly relevant for LRAs charged with base redevelopment because it encourages them to think holistically and strategically when engaged in base redevelopment. While primarily charged with guiding “behind the fence” redevelopment activities, such as grants for road and water infrastructure improvements, cluster theory suggests that effective individual development decisions must also consider the broader regional economic context, such as existing regional industrial specializations including downstream suppliers and access to raw materials.

Military installations also have similar defining characteristics: most have rail access, Navy bases are typically located on the shore, Air Force bases and many Army posts have airfields, and Army posts are generally supported by excellent road networks and highway access to facilitate quick deployments. These physical characteristics and

others can encourage and even constrain redevelopment opportunities. The econometric models and case studies developed later in this paper will consider these transportation-related characteristics.

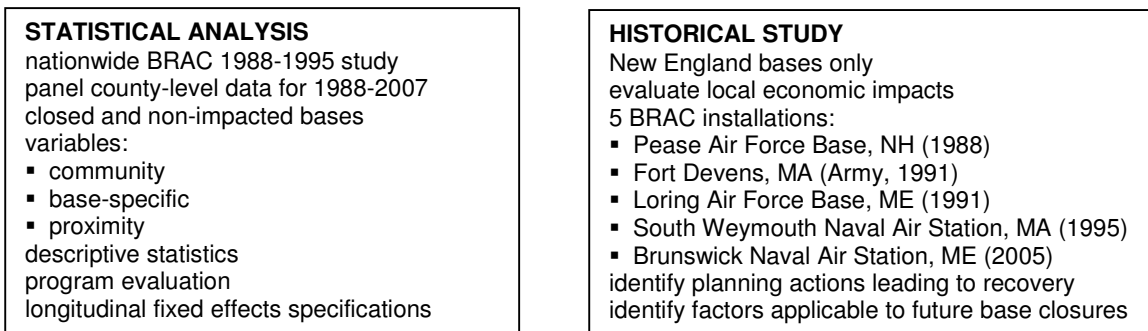
Related to the existing infrastructure, business location decisions are often guided by the locations of existing industry clusters and increasingly by quality of life considerations. While there are some installations in or nearby to urban areas (where many clusters originated), most were intentionally sited outside these areas to ensure sufficient training parcels were available. Additionally and consistent with the movement of business to the south and west, the footprint of military bases elsewhere is eroding. Although the Washington, D.C. area has seen significant growth (because it is where major contracts originate and decisions are made), bases are well distributed except in the Northeast and Midwest (often called the “Rust Belt”), and government contractors are primarily located in the Northeast and on the west coast (Markusen, 1991).

Finally, my research will build upon the limited existing econometric and case studies available. While there is little apparent applicability of base closure research to other forms of redevelopment, I hope to convince the reader of its relevance to other forms of economic shock.

**CHAPTER 3**  
**RESEARCH METHODS**

**3.1 Overview**

This dissertation incorporates a mixed methods approach containing both quantitative and qualitative elements, as summarized in Figure 3.1. Building upon my review of regional adjustment theory and past studies, I identify the factors that are most relevant for understanding the community adjustment following a base closure in order to build a novel national database of community and base characteristics covering all major military bases (both open and closed) during the past twenty years. I then incorporate these factors into multivariate statistical models of regional adjustment using a fixed effects regression modeling approach. While generally exploratory in nature, these statistical models can help predict the likelihood of successful base redevelopment from pre-existing economic measures, such as distance to transportation centers or the educational attainment level of the county population. This, in turn, may help policy makers decide which communities to target for future closures or realignments in order to mitigate the potentially devastating effects.



**Figure 3.1: Overview of Mixed-Methods Approach**

While the results from the statistical modeling are valuable in helping to identify and understand the factors impacting post-closure redevelopment; they provide little guidance in helping planners understand the decisions and action they can take to influence a successful reuse. Airport proximity and age distribution of the local population, for instance, are factors that are clearly beyond the short-term control of policy makers. As not all of the factors relevant to redevelopment are purely quantitative in nature, I supplement my econometric modeling with a historical study of closed bases and the long-term effects on their communities through a document review and interviews. Of particular interest, is the level of public participation, leadership, and financial incentives available for base redevelopment. The target region for my historical analysis is New England – a region that has a storied military past yet seen most of its bases closed. Of the twenty active military bases in New England at the close of World War II, ten closed before the BRAC process was initiated in 1988, and six closed as part of the BRAC process. Of the four active military installations that remain, only the naval training center in Newport, Rhode Island employs more military than federal civilian employees and none of the four have a tactical mission to protect the United States or its interests. Ideally, this historical review of closed New England bases will also help validate the predictive national model and provide additional insight into the redevelopment process, economic considerations, and resultant effects of base closures.

### 3.2 Statistical Analysis Framework

This section outlines the methodology I used to generate the results summarized in Chapter 4. This statistical analysis incorporates a quasi-experimental approach in order to build and validate an econometric model of regional adjustment. I first generate descriptive statistics for each of the independent and dependent variables. I segregate counties affected by BRAC and those counties not affected. I then compare all counties impacted by a base closure with those not impacted to discern any differences in preexisting economic and other conditions. I analyze per capita income, base employment, and the other variables for all counties with military installations prior to the first BRAC closure in 1988. This provides a base year comparison for all counties studied and alleviates any national economic trend or other issues with comparing impacted and non-impacted counties in different years and after closure announcements. I will discuss the potential impacts of base closure announcements later in this chapter.

Using the vernacular of a program evaluation framework, I denote the *treatment* as the closure of the military base, the *unit* is the county where the base is located, and the *outcomes* are the indicators of economic recovery (discussed in the next section). I paired counties with bases that were closed under one of the BRAC rounds from 1991 to 1995 with comparable counties having bases that were not closed throughout the BRAC process; this is depicted in Figure 3.2. More specifically I paired open and closed base counties with similar per capita income, county population, and base employment measured during the year of the BRAC announcement. The comparison group also

excludes counties with military facilities that were closed during later BRAC rounds, as these future closures would influence the long-term measurement of impacts. I then calculated per capita income and unemployment rate statistical means for each of the county pairs for all years prior to the announcement, found the comparison county average, and then did the same for the years after the announcement. Lastly, I completed difference of means tests to determine whether a statistical difference existed between closed and paired open means.

Counties with a BRAC closure:	$O_1 O_2 O_3 X O_4 O_5 O_6 \dots O_{20}$
Comparison county group:	$O_1 O_2 O_3 O_4 O_5 O_6 \dots O_{20}$

**Figure 3.2: Quasi-Experimental Design**

The purpose of the program evaluation exercise is to estimate both the average short- and long-term treatment effect of the closure of a military base. However, it does little to explain whether or why some communities seem to be more capable of recovery compared to others. There are certainly other factors impacting the outcome other than the one treatment, such as educational attainment, age distribution, and other factors can certainly impact county level unemployment rates. I estimate a series multivariate longitudinal fixed and random effects models to investigate the individual contributions of these, and other, variables on county level economic recovery.

In the multivariate models, I represent community recovery (i.e. the dependent variable) by both the county unemployment rate and per capita income. The unemployment rate is a common and reliable indicator of regional economic health, which is also highly sensitive to changes in local economic conditions – thus it is a better

short-term impact indicator. Conversely, per capita income provides a better indicator of long-term impacts to communities as a result of base closure. For the longitudinal fixed-effects approach, I use controls for cross-county variation in unemployment rate and per capita income, and thus estimate the influence of the independent variables on the within-county change in unemployment rates and per capita income over time. Similarly, the random effects model estimates the impact of the same independent variables on the between-county change in unemployment rates and per capita income over time. In their study of BRAC communities, Hooker and Knetter (2001) used employment levels (in essence, the complement to unemployment rate) and per capita income to measure the effect of base closures on economic health.

### **3.2.1 Independent Variables**

The independent variables selected for inclusion in the econometric specification all have precedence either in the regional adjustment theory and/or past case and econometric studies of base closure. The variables are summarized in Table 3.1. The independent variables are classified as either county specific (i.e., community-level), base specific, or proximity-based. Most are hypothesized to have a negative association with unemployment—for example, an increase in the level of regional economic diversity is associated with lower unemployment and thus a stronger recovery. All other presumed relationships, positive or negative, with each of the dependent variables (unemployment rate and per capita income) are identified in Table 3.2.

**Table 3.1: Base Redevelopment Variables**

<u>Variable Name</u>	<u>Brief Description</u>	<u>Precedent Studies</u>
<b>dependent:</b>		
<i>per capita income</i>	annual per capita personal income in dollars	Hooker & Knetter (2001)
<i>unemployment rate</i>	percent county unemployment rate	Hooker & Knetter (2001)
<b>county specific:</b>		
<i>art establishments</i>	number of art establishments in county	Florida (2003)
<i>economic diversity</i>	measure of industry variety	Poppert & Herzog (2003)
<i>education establishments</i>	number of educational establishments in county	Florida (2003)
<i>educational attainment</i>	years attended school including college	Romer (1990), Florida (2003)
<i>owner-occupied housing</i>	percent of housing occupied by home owner	Florida (2003)
<i>population over age 65</i>	percent of county residents sixty-five years or older	Bradshaw (1999)
<b>base specific:</b>		
<i>announce</i>	year of BRAC closure announcement	Poppert & Herzog (2003)
<i>base civilian employment</i>	number of base civilian employees	Poppert & Herzog (2003)
<i>base military employment</i>	number of base military civilian employees	Poppert & Herzog (2003)
<i>base total employment</i>	number of base military and civilian employees	Poppert & Herzog (2003)
<i>close</i>	year of base closure	Poppert & Herzog (2003)
<i>base to county population</i>	percent of base employment to county population	Poppert & Herzog (2003)
<i>superfund</i>	indicates whether base is on EPA's superfund list	Bradshaw (1999)
<b>proximity:</b>		
<i>airport distance</i>	miles from base to nearest airport	Porter (1995)
<i>city distance</i>	miles from base to nearest urban area	Porter (1995)
<i>port distance</i>	miles from base to nearest sea or inland port	Porter (1995)

The number of *arts* and *educational services* are considered primary sources of attraction for the creative class (Florida, 2003) and are more likely to exist in large numbers within urban areas. *Industrial diversity* is included because I believe a more diverse local economy should be better able to withstand and recover from economic shock. Poppert and Herzog (2003) included a coefficient of specialization – a related measure indicating the degree of industry concentration within counties. Drawing from New Growth theory, I include *educational attainment* under the assumption that the well-educated facilitate redevelopment after base closure by injecting new technology and businesses into old installations. Lastly, *population percentage over age 65* is based on the neoclassical thought of migration – retirees are less likely to seek employment



and potentially stimulate the economy through their pensions as Bradshaw (1999) suggests of the military retiree population.

**Table 3.2: Presumed Relationships between Variables**

<i>independent variable</i>	Unemployment	Per Capita Income
<i>art establishments</i>	negative	positive
<i>economic diversity</i>	negative	positive
<i>education establishments</i>	negative	positive
<i>educational attainment</i>	negative	positive
<i>owner-occupied housing</i>	negative	positive
<i>population over age 65</i>	negative	positive
<i>announce</i>	positive	negative
<i>base to county population</i>	positive	negative
<i>superfund</i>	positive	negative
<i>airport distance</i>	negative	positive
<i>city distance</i>	negative	positive
<i>port distance</i>	negative	positive

Accurate measurement of the timing of impacts is an important consideration in developing an empirical model. The period from the initial BRAC closure announcement to economic recovery may take up to a decade or longer—if at all. In addition, communities will begin to feel the economic impacts of an impending closure years before the last military or civilian employee leaves the installation and the keys are transferred to the LRA. This is because the transfer of people, equipment, and missions are not instantaneous – the process begins as early as a year or so after the BRAC announcement and is typically phased-in over several years.

This transfer process has an impact on local housing, retail, schools, and other industries almost as soon as it begins. The official closure of the installation, on the other hand, can occur years after the announcement and years after the bulk of military

personnel and equipment have moved to other installations. I have found that most bases scale down operations and most LRAs begin planning well before closures are official. The specific closure timeline of each base directly impacts its respective local per capita income, unemployment, migration, business closings, vacant homes, and other indicators used to measure economic health.

I use a binary variable to identify counties with bases identified for closure or recovering from a closure. *Announce*, *base employment*, and *close* can be used interchangeably to indicate a base closure. Both *announce* and *close* are binary variables and designated a value of one in the year they were designated for closure by BRAC (*announce*) and the year they were later closed (*close*). Military, civilian, and total base employment gives a scale of jobs available on the installation by year and can change significantly during pre-closure drawdowns or other base realignments due to BRAC, call-up of reserve units during war, or internal service mission changes (e.g., deactivation of an Army division or fielding of major new aircraft for the Air Force).

Therefore, I decided to develop specifications using the *announce* variable to distinguish open from closed bases instead of *close* or *employment*. This is a better measure than *close* since personnel and equipment drawdown and associated economic impacts occur well before official base closing. *Announce* is a dummy variable where a base identified for closure is designated as one and remains one after the announcement; it equals zero before the BRAC announcement of its closure or if it never is designated for closure.

The proximity variables measure distance (in miles) from military installations to the nearest city, airport, and port. Consistent with Porter's research on the competitive advantages of urban areas (1995), the advantages of transportation infrastructure (Braudel, 1984), and other work, I elected to include these variables to support the potential benefit of geography in facilitating economic redevelopment after a base closure. Furthermore, I included both distance to interstate highways and to rail lines from military bases in my database. Neither variable was statistically significant in any of the initial regression models I developed and therefore were not included in final versions of the database and the model specifications in this paper.

Finally, the presence of environmental contamination and the associated remediation can have significant impact on the base reuse timeline and number of construction jobs required for clean-up for counties facing base closures (Bradshaw, 1999) and is therefore included in my study. The *superfund* variable is also a binary variable; a value of one indicates a base on the EPA superfund list.

I also considered other variables as candidate explanatory factors in the regression models, but did not include them in the final specification. County *death* and *crime rates* could offer some indicators consistent with quality of place literature; however, they are also a probable consequence of an economic shock rather than an attraction for a migrating populations looking for a better quality of life. Related to quality of life amenities, the *voting rates* during past presidential elections were also originally included in model specifications. They are also not included in the final specifications as they are a better indicator of social capital (not identified in precedent

literature) rather than quality of place. I originally also included *median house values*, but it was highly correlated with *per capita income* and therefore is not included in any final specification.

Several other relevant variables were also not included because I was unable to attain comparable data for every military installation. Unfortunately this includes many of the most interesting process variables and planning metrics such as time to develop the reuse plan, LRA planning and decision timelines, or dollars invested by federal, state, and local governments for redevelopment are not readily available. The OEA has purposely decided not to collect this data fearing that a direct comparison of closed base communities may result in a negative reaction by elected politicians (MacKinnon, 2005). The inability to quantitatively measure these critical factors provides further justification for supplementing the statistical modeling with a historical study of specific bases.

### **3.2.2 Study Database**

To facilitate the statistical analysis, I constructed a complete county-level longitudinal dataset for the 382 counties in the continental United States that had active military installations for the years of 1988-2007. The database includes facilities that were either closed or remained active during subsequent BRAC rounds, permitting me to incorporate a quasi-experimental framework into a multiple regression framework. Counties with facilities that were closed serve as the experimental (or treatment) group, those that did not experience a closure provide a comparison group.

The aforementioned variables were compiled from numerous secondary sources, such as the U.S. Census Bureau (primarily the USA Counties database), U.S. Bureau of Economic Analysis Regional Economic Information System, Department of Defense M02 Distribution of Personnel by State and Selected Locations reports, and GAO reports. I used GIS to compute the values for each of the proximity variables: the distance from each military installation to its nearest urban area with a population over 50,000 (consistent with the Census Bureau's definition of an urbanized area) as well as the distance to its nearest airport and port. The Federal Information Processing Standards (FIPS) code served as the primary key in my relational database and I used both the [www.zipinfo.com](http://www.zipinfo.com) and United States Postal System ([www.usps.com](http://www.usps.com)) websites to identify the county in which numerous installations are located.

Before generating the statistics and models presented in the next chapter, I had to modify the database in a variety of ways. First and most importantly, was the need to aggregate all base specific-variables to the county level. While the primary unit of analysis is the county, many counties have multiple bases. I started with 624 individual bases but ended with only 382 counties with bases – this gives an indication as to the concentration of our military facilities. For example, San Diego, California's military community had 103,955 federal employees in 2005 – the highest level of any county in the 20 year span of the database. By contrast San Antonio, Texas started with the greatest number of base-related civilians employees in 1989 (31,367) but lost nearly one-half this amount (15,759) by 2002. These numbers give an indication of the scale and volatility of military and civilian employment across the country. Furthermore,

several counties had multiple base closings in the same years or during more than one BRAC round. In these cases, I used the first closure to determine the first year the announce binary variable would have a value of one; thus additional or subsequent closings were not treated separately.

Secondly, I included only installations in the dataset with a workforce totaling more than 300 military and civilians. This is consistent with the DOD's definition of a major base as well as Poppert and Herzog's econometric study (2003). Since longitudinal data would not normally be able to distinguish between small and closed bases, I eliminated this concern by limiting the database to larger installations (total base employment over 300). Finally, bases in Hawaii and Alaska were not included in the database due the unique geography of each state. This comprehensive dataset was then analyzed to identify similarities in successful and unsuccessful base redevelopments.

I include fixed effects in my longitudinal regression models to reduce the likelihood of omitted variable bias. Since several of the proximity and other variables are constant over time, there is no impact to the time-series change in each of the dependent variables (Stock & Watson, 2007). By controlling for between-county variation, the fixed effects model only measures the within-county variation, although sample variability does increase (Allison, 2005). However, I do present random effects models as well since I consider several time-invariant variables that are excluded from the fixed effects regression models. It is also important to note, that I did develop numerous regression models using other measures of base closure including the

variables close as well as civilian, military, and total employment. None of these models offered promising statistical results.

### **3.3 Historical Study**

Once the nationwide analysis of BRAC and non-BRAC communities is complete, the research converges to a historical comparative analysis of a subset of closed bases in New England. According to Yin (2009), historical studies are appropriate when the research questions ask how or why. This approach is particularly well-suited to identify and analyze redevelopment strategies adopted by LRAs where the intent is to understand how redevelopment was orchestrated and why some communities recovered faster. While similar to the case study, a historical study does not generally include direct observations and interviews. As all but one closure announcement were made approximately fifteen years ago or longer, it is impractical to seek the relevant redevelopment authorities to conduct interviews. There are also limits to taking a purely econometric approach for addressing the issue of military base closures. For one, many of the significant economic variables in the models are broad characteristics of places. Identifying these characteristics might be of value to the federal government whose goal may be to target places for closure where impacts are minimal. However, they are likely to be of only limited value to a community navigating a base closure – other than to let them know whether they might embrace the closure as an opportunity or brace for a massive shock. Some of the most policy-relevant attributes (such as

community leadership) cannot be easily quantified. Therefore, it is crucial to complement the quantitative analysis through a more detailed set of historical studies.

Per Yin, analysis, a well-designed historical study should (1) attend to all the evidence, (2) address all major rival interpretations, (3) address the most significant aspect of the case [historical] study, and (4) incorporate the author's expert knowledge (2009, pp160-161). There are invariably contentious issues surrounding redevelopment plans for closed military installations. The intent of this dissertation is to document these issues and glean the resultant impacts so the lessons can be applied to future closings. It is crucial to seek sufficient detail from each study throughout the planning and implementation phases for each installation. I conducted site visits for information not publicly available (reuse plans, etc.) and email or phone conversations to learn resolutions to issues, clarify information, and update printed information.

There are also many well-known criticisms of the historical studies, and case-study based analysis more generally: particularly that they often lack rigor, are heavily dependent upon the interpretation of the analyst, and suffer from limited external validity leading to false conclusions that are not applicable to the larger population (Yin, 2009). This research tries to mitigate these external validity concerns by framing the historical study within a broader mixed-methods approach—looking for consistencies between the quantitative and qualitative evidence.

To ensure internal validity of the data, both numerical and not, Creswell recommends the following data analysis and validation procedures: (1) data transformation, (2) explore outliers, (3) instrument development (get themes and



statements from participants, validate with a large sample), (4) examine multiple levels, and (5) create a matrix (Creswell, 2009). While I use a large sample for the multivariate statistical analysis, it is not appropriate for the more detailed historical study. In essence, I follow a sequential explanatory strategy "...characterized by the collection and analysis of qualitative data in a second phase that builds on the results of the initial quantitative results (Creswell, 2009, p. 211)." Through the study of several base closures, I was able to discern the most important elements affecting the economic recovery for the respective local community. Consistent with the literature review, I expect that proximity to urban areas and transportation nodes will expedite recovery. However, I also sought other conditions not addressed in the multivariate analysis that encouraged recovery for the selected bases and surrounding communities.

In the historical study portion of the dissertation, I examine the five closed military installations from New England. This covers all of the major New England installations closed through the BRAC process. I also include a review of the pre-BRAC closure of the Westover Air Force Base to provide a longer-term perspective for understanding recovery length and lasting impacts of regional base closures.

The basis for studying only New England base closures is largely pragmatic and may limit the external validity of my study. However, there are benefits to narrowing my scope to a single region of study—namely in terms of greater internal validity. Focusing on a single region affords an opportunity to control for broader regional social and economic conditions that might otherwise confound the results. New England is a mature geographical and relatively homogenous region in terms of race, industry mix,

and global position. For the most part, manufacturing and the military have left New England and public officials have sought to replace them with other business sectors such as health and education. While defense contracts remain, 80% of the region’s installations have closed since World War II (see Table 3.3) and the military force structure shifted to southern and western states. This region is essentially devoid of a military presence except in the reserves – an interesting social, economic, and historical phenomenon. Manufacturing also moved south and west before it moved overseas. In any case, New England’s economic maturity relative to the rest of the country offers a good benchmark for what other regions could expect in the future in terms of future military downsizing and continued off-shoring of business.

**Table 3.3: Closed and Open Bases in New England**

<u>state</u>	<u>pre-BRAC closures</u>	<u>BRAC closures</u>	<u>open bases</u>
Connecticut	1	1	1
Maine	2	2	0
Massachusetts	5	2	1
New Hampshire	0	1	1
Rhode Island	1	0	1
Vermont	1	0	0
total:	10	6	4

Thus, I chose New England because it offers a closed, relatively homogenous, and mature region for studying what policy decisions were made and what happened. At the same time, there are New England installations of differencing characteristics, such as branch of military service, levels of state support, time period of closure, and rural, suburban, and urban contexts. Additionally, closed bases within New England also represent a variety of plausible reuse options such as available land for redevelopment,

need for brownfield remediation, the extent and quality of existing military facility infrastructure, and so forth. Specifically, the planning decisions of interest include leadership, decision-making process and speed, type of reuse, whether redevelopment planning used research of industry clusters and other competitive advantages, citizen participation, federal and state support, number and type of grant applications, and tenacity of the decision-making authority in overcoming environmental and other obstacles to redevelopment. I believe all these variables have an impact on successful recovery from a base closure, but are sensitive to the economic and social conditions at the time of closure.

After identifying the New England bases considered for study, I conducted a detailed review of historical and other relevant documents in order to identify the issues, impacts, and lessons from these closures. The historical study design consists of a review of newspaper articles for the selected bases; as well as available planning and meeting documents completed by LRAs state and local planning entities, and planning consultants; reuse plans; LRA websites; and scholarly papers.

The composition of the LRAs, planning process used, timeline, decisions, and results are of utmost interest. Additionally, a brief history and the economic impact of the installation prior to closure, the level of public participation in the redevelopment planning process, and level of state and federal financial support are relevant to the study. Answers to the following questions are sought during the research process for each installation:

How soon after the BRAC announcement did the LRA form?

What type of support was offered by the county, region, and state?

Who assumed a leadership role in the redevelopment process?

How were impediments to redevelopment resolved? By whom?

How was the community involved in the reuse process?

What type of research was involved in the reuse decision-making?

What redevelopment strategies were adopted? What were the results?

Were specific industries targeted to aid in job creation on the former installation?

What marketing was used to attract these industries? Was it effective?

What unsuccessful strategies were attempted? What were the results?

What job creation activities were adopted?

This review provides the background necessary to conduct interviews of planners and local officials who participated in the redevelopment process – particularly to provide information not found in the document review. I conduct informal interviews with available LRA leadership or planners if information is otherwise not available in the resources identified above. Lessons learned are captured and then generalized to other installations with similar attributes. From this analysis, a set of policy decisions are offered to help communities effectively redevelop a closed military base.

### **3.4 Threats to Validity**

Although the mixed-methods approach used in this research mitigates the threats to both internal and external validity, they still exist. The quantitative study uses a national

database which provides a basis for extending the results across all United States communities facing or having faced a base closure while the historical study offers insight into the more qualitative variables not captured in the longitudinal database used in the statistical analysis. The largest threat to internal validity is sample selection bias because of the manner in which bases are selected for closure by the BRAC commissions. The largest threat to external validity is the ability to extend this research from the relatively mature northeast to less developed regions.

While the BRAC commissions were guided by eight selection criteria, the sixth on the list was community economic impact; it follows military readiness criterion and cost savings and it precedes community ability to support realigned military forces and mission as well as environmental remediation and other impacts. Thus, the possibility exists that BRAC commissions selected only communities that could sustain the economic impacts of base closures and could lead to sample selection bias. If this occurred, I expect the impact of a base closure announcement would reduce the scale of the independent variable coefficients. Based on a review of the closed installations, it appears that installations in both affluent and less-affluent areas were closed. Furthermore, I was able to find suitable pairs for the program evaluation based on the base employment and surrounding per capita income; this suggests that a reasonable cross-section of bases were closed and remain open.

A second threat to the internal validity of my research is the quality and availability of data which could generate omitted variable bias and errors in variable bias (Stock & Watson, 2007). First of all, the proximity variables (distance to cities, airports,

and ports) do not distinguish between those cities with strong economies (e.g., San Francisco) with weak ones (e.g., Detroit). In addition, all airports and ports do not have the capacity for large airplanes and large ships. My database does not distinguish different categories of transportation nodes and an Air Force base that could facilitate international travel has different redevelopment options than a small Army installation that can only accommodate small fixed wing planes. There are similar issues with the number of arts and educational services in each county. Also, several planning variables (e.g., LRA planning timelines) are not available and other variables (e.g., installation size) are not available for all bases. To mitigate these concerns, I used panel data and a fixed effects model for several specifications.

Finally, the selection of only New England bases threatens the external validity of this research to the less developed and emerging southeastern and southwestern economies. In general, the northeast is largely unionized and has less available land for redevelopment. This makes it more likely that companies already operating in the northeast will relocate within the same region once property for potential business expansions becomes available. Due to the perception of an unfriendly business climate in the northeast due to a unionized labor force and strict regulation, business are less likely to relocate to the northeast, however. Regardless of this perception, there is less available land for redevelopment in New England than in other regions of the country – this makes the reuse and the jobs created here more important. Whereas a county in the south or west may be able to “mothball” a former military installation, there is an urgent need to redevelop a similar installation in the northeast or Midwest and replace

its lost employment. While the multivariate statistical analysis considers the complete set of national base closures, the historical study research may not apply directly to all regions of the country due to redevelopment options and other factors (e.g., state financial incentives) that differ across these regions. Nonetheless, redevelopment in mature areas of the country are arguably the most difficult so the lessons offered by this historical study is more extendable than base reuse in growing and thriving regions.

The next chapter reports the results of the statistical analysis outlined previously; the historical study is presented in the succeeding chapter. The final chapter ties together the quantitative and qualitative results and offers conclusions for this research while suggesting actions for planners of base closures as well as further research.

## CHAPTER 4

### STATISTICAL ANALYSIS

#### 4.1 Overview

The analysis presented in this chapter showcases the several multivariate statistical approaches outlined in the preceding chapter. This investigation can help inform the recovery process by identifying variables that are statistically associated with timely recovery. I use two indicators of economic health: unemployment rate and per capita income. These indicators serve as the dependent variables and represent extensions of the theoretical foundations of the adjustment process discussed in Chapter Two. Following the initial economic shock of a base closure, I surmise that a decline in unemployment and an increase in per capita income signal successful economic recovery. Selected independent variables are measured prior to the BRAC announcement to avoid possible circular influences between changing conditions in the independent variables and outcome measures.

This analysis extends previous studies using a panel data approach with a complete longitudinal dataset of all major base closings over the past twenty years compared against a set of major bases that remained open. The following sections outline a descriptive analysis of the longitudinal database, a program evaluation of base closure impacts, and lastly a panel regression on the two dependent variables.



## 4.2 Multivariate Descriptive Statistics

Table 4.1 enumerates the statistical means of those variables described in the previous chapter for impacted counties by BRAC round, total impacted counties, and those not impacted by a base closure. I calculated these means for 1988 only – the year of the first BRAC announcement and before the effects of any BRAC closure were felt. Per capita income<sup>1</sup> in 1988 was generally higher for counties with closing bases during the first three rounds (over \$28,000) relative to non-impacted bases (\$25,067) as well as bases closed during the last two BRAC rounds (\$25,754 and \$27,605). This suggests that the wealthier counties in the former rounds could be better able to recover from closures, and that the BRAC commissions selected bases for closure in economically strong counties in order to mitigate the effects of base closures. While this is consistent with the decision criteria for BRAC commissions (Wynne, 2005), it may lead to a significant bias in the results of the per capita income regression model I present later in this chapter. Since per capita income is higher for impacted counties, I expect that base closures may encourage both short- and long-term increases in per capita income since non-impacted counties have a lower initial per capita income. This likely direction of bias is inconsistent with the literature and my predicted relationship between per capita income and base closures.

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<sup>1</sup> Per capita income was adjusted to real 2007 dollars using the consumer price index conversion data found on the Bureau of Labor Statistics website, [www.bls.gov](http://www.bls.gov).

There is a similar issue with county unemployment. Unemployment for base closure counties in 1990 (data was not available for 1988 and 1989) was lower for all BRAC rounds relative to non-impacted counties (5.73%) except for the 1991 closures (6.19%). Interestingly, the unemployment rate in 1990 was lowest for the 1988 BRAC closures. With the exception of the unemployment rate for the 1991 closures, these statistics again support the BRAC commissions' intent to minimize the impact to base communities by selecting counties with strong economic indicators (Kane 2005). However, this can again generate counterintuitive regression results where base closures can suggest a decrease the county unemployment rate.

From the descriptive statistics, we see that the 1988 BRAC commission selected installations closer to and in urban areas (13.41 miles). This is substantiated by the relatively large amount of education establishments (330) and art establishments (510) found in more densely populated areas; both numbers are significantly larger than non-impacted counties (94 and 117 respectively). While the BRAC 1991 closures tend to be further from urban areas (average distance to cities is 31.64 miles), education (339) and arts services (648) remain high; this indicates the large number of suburban installations in this BRAC round. In general, closed bases are closer to urban areas (airports and ports as well) and their education and arts amenities. In 1988 and relative to counties without base closings, closed bases counties were also more economically diverse, had and older population and lower owner-occupied housing rates, and benefitted from higher educational attainment – all consistent with urban areas.

**Table 4.1: Descriptive Statistics for Impacted (by Base Closure) and Non-impacted Counties in 1988\***

	BRAC 1988 counties (n = 16)	BRAC 1991 counties (n = 24)	BRAC 1993 counties (n = 33)	BRAC 1995 counties (n = 20)	BRAC 2005 counties (n = 26)	total impacted counties (n = 119)	non- impacted counties (n = 263)
<i>per capita income (\$)</i>	29,156	28,287	28,361	26,725	25,754	27,605	25,067
<i>unemployment rate (%)</i>	4.99	6.19	5.45	5.54	5.57	5.58	5.73
<i>art establishments (#)</i>	510	648	185	215	206	327	119
<i>economic diversity (proportion)</i>	0.9674	0.9614	0.9625	0.9649	0.9570	0.9621	0.9553
<i>education establishments (#)</i>	330	339	166	199	179	227	94
<i>educational attainment (%)</i>	22.33	16.50	15.43	17.88	17.23	17.23	16.38
<i>owner-occupied housing (%)</i>	56.64	63.23	63.70	64.35	64.52	62.94	66.07
<i>population over age 65 (%)</i>	10.64	10.60	10.50	10.93	10.48	10.52	10.39
<i>base civilian employment (#)</i>	4,344	3,798	4,033	4,509	2,266	3,721	1,546
<i>base military employment (#)</i>	5,363	7,496	3,570	3,382	1,898	4,206	2,752
<i>base total employment (#)</i>	9,707	11,294	7,603	7,892	4,164	7,928	4,298
<i>base to county population (ratio)</i>	0.0147	0.0475	0.0315	0.0239	0.0263	0.0301	0.0401
<i>superfund (dummy)</i>	0.94	0.96	0.76	1.00	0.77	0.87	0.60
<i>airport distance (miles)</i>	12.30	15.25	10.69	13.99	11.38	12.82	14.04
<i>city distance (miles)</i>	13.41	31.64	20.99	13.86.	16.64	20.10	26.01
<i>port distance (miles)</i>	58.51	98.94	47.42	74.23	77.40	72.23	81.35

\*unemployment rate only is calculated using 1990 data

Large bases were targeted for closure particularly during the first two BRAC rounds. While the average base total employment for non-impacted counties (4,298) is lower than impacted counties (7,928), the base employment for 1988 and 1991 BRAC closures was substantially higher (9,707 and 11,294 respectively) than successive rounds. Once the larger bases were designated for closure and significant cost savings achieved by closing them, the subsequent BRAC rounds sought more moderate sized closings; this is most notable in the downward trend in base military employment. The 2005 BRAC commission closed smaller installations based on total employment in poorer areas relative to non-impacted bases and fairly similar characteristics otherwise. Finally, it is important to note that the percentage of closed bases declared EPA superfund sites are considerably higher for each BRAC round compared to open bases (87% compared to 60%). This invariably affects the redevelopment timeline and associated costs for closed military installations.

Now that the larger bases in wealthier counties are closed, I expect that future base closures will be more detrimental to the economy of local communities. The counties not impacted by a BRAC closure have weaker economic indicators according to the statistics provided in Table 4.1. With the exception of the percentage of owner-occupied housing, proportion of superfund sites, and proximity to airports, the averages for impacted counties favor redevelopment. Thus, I expect recovery time will be longer in any future rounds of base closings.

### 4.3 Comparison of Communities with Open and Closed Bases

After evaluating the descriptive statistics of base closure communities and those not faced with a closure, I evaluated the impact of closure on the county unemployment rate and per capita income. This evaluation is restricted to BRAC closures in 1991, 1993, and 1995 because sufficient data prior to 1988 and after 2005 is not available; as a result seventy-seven bases were considered. I matched these closed base counties with open base counties exhibiting comparable per capita income, county population, and base employment during the year of the BRAC announcement. The pool of open base counties did not include counties facing future base closures or counties already paired with closed base counties. I measured the post treatment (base closure) effects for each county pair at five years after the closure announcement. Descriptive statistics were generated for each BRAC year for both closed bases and respective open base pairs. The means and differences are provided in Table 4.2. Pre-BRAC columns indicate average values prior to the respective base closure announcement (during the year of the BRAC announcement) while post-BRAC columns indicate averages five years after the closure announcement. I then show difference of means *t*-tests results for both variables to determine whether significant differences before and after treatment exist.

The pre-BRAC *t*-tests for both unemployment (1.19) and per capita income (0.93) indicate that a statistical difference before the closure announcements between the treatment group (closed base counties) and control group (open base counties) does not exist. This supports the proper selection of my control group. I conducted a

difference-in-difference *t*-test to take into account any pre-BRAC bias in the data or the selection of the pairs.

The results presented in Table 4.2 are mixed. First of all, there is not always a significant difference in the closed and open base counties after treatment. The *t*-test results for unemployment rates are not statistically different before treatment (1.19) or after treatment (0.06). In fact, the unemployment rates virtually converged in the five year period after the closure announcement regardless of the BRAC year (1991, 1993, or 1995). This suggests that base closures had little impact on the unemployment rate. Unemployment actually declined more for counties with closed or closing bases than for counties with bases that remained open (a decline of 1.83 and 1.45 respectively). This result is inconsistent with the belief that unemployment increases after a base closure. Furthermore, the difference-in-difference *t*-test results (-1.70) indicate that before and after comparisons between the treatment and control groups are statistically different at the 10% level. This implies that base closure does have an effect on the county unemployment rate: the rate shows a greater decline in counties with closures than without. Of course, the proportion of jobs relative to the population size of the county is not considered here, but I will control for this variable in the panel regression results section of this chapter. I also tested the impact of base closures after ten years on unemployment; the results were consistent with those after five years.

The results on per capita incomes support those of county unemployment rate. Closed base communities had a higher per capita income prior to the BRAC announcement and showed more improvement relative to open base communities

after the recovery process. There is a statistically significant difference in the post-BRAC per capita income between closed and open base counties as indicated by the *t*-test result (2.77). It is possible that relatively meager military pay contributed to the larger difference (and improvement) in per capita income for those communities that faced a base closure (Hooker & Knetter, 2001). However, because both the unemployment rate and per capita income improve more in the same period for closed base counties than those remaining open, the results indicate that base closures actually encourage a stronger economy.

**Table 4.2: Program Evaluation for 1991, 1993, and 1995 BRAC Closures**

<b>Unemployment Rate</b>	<u>closed base</u>	<u>open base</u>	<u>difference</u>	<u>t-test</u>
pre-BRAC	6.68	6.28	0.40	1.19
post-BRAC	4.85	4.83	0.02	0.06
difference	-1.83	-1.45	-0.38	-1.70
<b>Per Capita Income</b>	<u>closed base</u>	<u>open base</u>	<u>difference</u>	<u>t-test</u>
pre-BRAC	28265	27359	906	0.93
post-BRAC	32688	29204	3484	2.77
difference	4423	1845	2578	2.43

As with unemployment, I also found the difference-in-difference *t*-test results (2.43) indicate that before and after comparisons between the treatment and control groups are statistically different. They were not statistically different, however, when I compared the county per capita income ten years after closure announcements to the announcement years. This suggests initial per capita income gains and then convergence.

Although not expected, these results are consistent. While I expected per capita income to improve in the long-term after a base closure, I expected it to suffer initially.

Similarly, I expected unemployment to increase following a base closure announcement due to the immediate impact to surrounding retail and housing. I found no negative impact as a result of base closure announcements and no discernible trend differences between the post treatment averages after either five or ten years. On the contrary, base closures improve both county unemployment and per capita income. It is possible that varying conditions amongst counties faced with base closures (time from announcement to closure, extent of environmental remediation, redevelopment timeline, and other conditions) shape the individual reuse opportunities and make it difficult to predict comparable economic indicator results in all cases. Next, I attempt to use panel data to develop both fixed and random effects regression models. This analysis will substantiate my results thus far and attempt to determine pre-existing conditions that contribute to successful base redevelopment.

#### **4.4 Results Using Longitudinal Data**

I developed several regression models for this dissertation. I use both panel regression with and without fixed effects to measure the impact of the independent variables on county per capita income and unemployment rate. This section outlines the model specifications for each as well as the regression results using the longitudinal database of base closures built for this research.



#### 4.4.1 Model Specifications

For the panel regression, I use two complementary models: the first for county unemployment rate and the second for county per capita income. Each model incorporates the independent variables summarized previously and discussed more extensively in the previous chapter. The fixed effects model takes the form of  $Y_{it} = \beta_0 + \beta_1 X_{it} + \beta_2 Z_i + u_{it}$ , where the  $Z_i$  represents the omitted variables that can impact the dependent variable (Stock & Watson, 2007). I begin with a fixed effects model since it is well-suited to compensate for the inherent omitted variable bias when predicting macroeconomic indicators like unemployment and per capita income. However, many of the county measures I use vary little over time and are consequently dropped from a fixed effects model which seeks variation. To generate a model which incorporates some of the variables proposed by the theoretical constructs outlined in Chapter Two, I also use a random effects model which considers variables that are relatively time-invariant.

The time-variant variables for both specifications are *announce*, *diversity*, *educational attainment*, *population over age 65*, and *owner-occupied housing*. Time-invariant variables are *art establishments*, *education establishments*, *superfund*, *airport distance*, *city distance*, and *port distance*. I anticipated that *per capita income* would have a positive relationship with *art establishments*, *economic diversity*, *education establishments*, *educational attainment*, *age over 65*, *home ownership*, *airport distance*, *city distance*, and *port distance* as each offers advantages for economic development

(and the attraction of businesses) and negative relationships with the other variables. The opposite relationships would hold for *unemployment*.

#### 4.4.2 Panel Regression Results

Using the variables and the longitudinal dataset described in the previous chapter, I developed several regression models for each measure of community recovery: unemployment rate and per capita income. Because of the number of time-invariant independent variables, I used both fixed and random effects regression with the panel data. I first regressed the dependent variables on the following independent variables: *announce* and *base to county population*; this controls for unemployment rate changes or significant per capita growth based on base closure announcements and the relative size of the installation. Second, I added independent variables to the model by category (county, base, and proximity) while retaining those that were statistically significant at the 0.10 level. Lastly, I checked the models for multicollinearity.

The fixed effects model for *unemployment* produced some unexpected yet consistent results. Regardless of the particular model specification, a BRAC announcement has a negative impact on the change in county *unemployment*. In other words, the county employment rate actually improved following the announcement of a military base closure. I also introduced a variable, *timing of impact*, which permits linear changes over time of BRAC announcements on county unemployment. This produced similar regression results – a negative coefficient. In addition, I added binary variables to delineate the short, medium, and long-term impacts of closure announcements on

the county unemployment rate. I varied the timeframes (e.g., 1-4 years following closure announcement for a short-term impact) and regardless of timeframe used, I also generated negative coefficients for each of these variables. I summarized the results of the different closure announcement variables in Table 4.3.

**Table 4.3: Fixed Effects Models for County Unemployment Rate**

Independent Variable	<i>timing of impact</i>		<i>varied impact</i>	
	<i>b</i>	<i>p-value</i>	<i>b</i>	<i>p-value</i>
<i>announce</i>	-0.83	0.000	-	-
<i>timing of impact</i>	-0.08	0.000	-	-
<i>short-term impact</i>	-	-	-0.74	0.000
<i>medium-term impact</i>	-	-	-1.88	0.000
<i>long-term impact</i>	-	-	-1.54	0.000
<i>within r<sup>2</sup></i>	0.0502		0.0593	

*Note:  $\alpha < 0.10$*

While the fixed effects model is appropriate for mitigating omitted variable bias, it does not permit the inclusion of time-invariant factors into the model specification. As such, I then used a random effects model since I have several time-invariant variables (particularly the proximity variables). The specification measuring the change in the unemployment rate using a random effects model has similar results. Both *announce* and *base to county population* are significant at the 0.10 level in this specification; however, there is still an unexpected negative relationship between both control variables and the dependent variable. This suggests that counties facing a base closure actually see a negative change (-1.19) in the unemployment rate as a result of the announcement and the ratio of base to county population (-3.30).

Once I controlled for *announce* and *base to county population*, I incrementally introduced the independent variables identified by the base, county, and proximity categories as well as the interaction terms I generated with *announce* and each of the other independent variables. While *announce* remained negative, a few of the time-invariant variables are now significant. The coefficients of *superfund* (0.83), *airport distance* (0.01), and *announce-base to county population interaction* (3.89) are all positive in the random effects model (note that airport distance is technically not significant at the 0.10 level). I anticipated the results of both *superfund* and the *announce-base to county population interaction*; they respectively suggest that changes to county unemployment are positive from contaminated bases (presumably due to longer redevelopment timelines) and for relatively larger closed installations. While not significant at the 0.10 level, I expected that bases nearer to airports would have a negative, rather than positive, impact on the change to unemployment. The single significant time-variant variable is *educational attainment*; the negative coefficient (-0.10) is expected indicating that increases in the average years of schooling in a county lead to lower unemployment rates. Furthermore, I introduced each of the other base, county, and proximity independent variables and their corresponding interactions with *announce* – I removed the variables not in the final model because they were either insignificant or contributed greatly to multicollinearity. In the final unemployment model, the coefficient of determination indicates that 20.89% of the between variation for the unemployment rate can be explained by the independent variables summarized in Table 4.4.

**Table 4.4: Random Effects Model for County Unemployment Rate**

Independent Variable	<i>b</i>	<i>p-value</i>
<i>announce</i>	-1.19	0.000
<i>base to county population</i>	-3.30	0.039
<i>interaction term (announce with base to county population)</i>	3.89	0.022
<i>population over age 65</i>	-	-
<i>educational attainment</i>	-0.10	0.000
<i>superfund</i>	0.83	0.000
<i>airport distance</i>	0.01	0.130
<i>city distance</i>	-	-
<i>between <math>r^2</math></i>	0.2089	

Note:  $\alpha < 0.10$

I used the same methodology for the per capita income model. I first developed fixed effects models with *announce*, the timing of impact, and the short-, medium-, and long-term impact binary variables. In each case, I found positive coefficients indicating that all variants of the *announce* variable generated positive changes in per capita income. Thus, the per capita income model fixed effects specification offers similar unexpected results relative to the unemployment model. Hooker and Knetter (2001) find that low military salaries have a negative impact on per capita income. Thus, once base employees relocate, the impact on per capita income is positive. My regression results substantiate this finding. The fixed effects results for per capita income are provided in Table 4.5.

**Table 4.5: Fixed Effects Models for Per Capita Income**

Independent Variable	<i>timing of impact</i>		<i>varied impact</i>	
	<i>b</i>	<i>p-value</i>	<i>b</i>	<i>p-value</i>
<i>announce</i>	622.53	0.153	-	-
<i>timing of impact</i>	410.15	0.000	-	-
<i>short-term impact</i>	-	-	2041.97	0.000
<i>medium-term impact</i>	-	-	3001.69	0.000
<i>long-term impact</i>	-	-	5350.57	0.000
<i>within r<sup>2</sup></i>	0.0354		0.0285	

*Note:  $\alpha < 0.10$*

I also generated panel regression results using a random effects model. The results in Table 4.6 are somewhat similar to the fixed effects model. I found *base to county population*, *an interaction term between announce and base to county population*, *educational attainment*, *population over age 65*, *superfund*, and *city distance* to be statistically significant after finding evidence of high multicollinearity when including interactions and the remaining county, base, and proximity variables. Similar to the results of the random effects unemployment model, the sole interaction term suggests that larger base closures can have a negative impact (decrease) on per capita income. With the exception of *superfund*, I found that all the coefficients were consistently opposite from those in the unemployment model; this is logical based on the suspected inverse relationship between unemployment and per capita income. The between coefficient of correlation is improved (41.25%) to that of the unemployment specification (20.89%).

**Table 4.6: Random Effects Model for County Per Capita Income**

Independent Variable	<i>b</i>	<i>p-value</i>
<i>announce</i>	1739.21	0.000
<i>base to county population</i>	9778.40	0.003
<i>interaction term (announce with base to county population)</i>	-7963.65	0.117
<i>population over age 65</i>	318.67	0.000
<i>educational attainment</i>	562.20	0.000
<i>superfund</i>	1399.13	0.004
<i>airport distance</i>	-	-
<i>city distance</i>	-6.67	0.069
<i>between <math>r^2</math></i>	0.4125	

Note:  $\alpha < 0.10$

In addition to the results for econometric specifications just discussed, I attempted many different variants. These include models where *per capita income*, *unemployment*, and *economic diversity* were controlled by *base employment* and *close*. Base civilian, military, and total employment numbers offer a similar measure of closed bases where federal employment drops significantly throughout the period after the BRAC announcement; however, the specification is difficult to interpret as there is no measure of whether bases are actually open or closed. For related reasons, I used the variable *announce* instead of *close*. *Announce* offers an alternate specification to both *close* and *employment*, but can be more telling due to the personnel and equipment drawdown and associated economic impacts that invariably occur well before official closing. The results of these other specifications were inconsistent relative to those using *announce*. Overall, however, the panel regression results lacked the consistency with the economic development theory I summarized in the literature review.

The results of the comparison of communities with open and closed bases outlined in section 4.3 and the panel regression are unanticipated, yet similar. Both analyses suggest that base closures have an improved impact on county unemployment and per capita income. In reconsidering the literature, I believe that the explanation may lie in the migration that occurs after a base closure announcement and which acts as a relief valve to balance the impact of the economic shock. This migration is both “artificial” through the reassignment of military personnel, their families, and DOD civilians and “natural” as local workers seek jobs elsewhere. It also supports the neoclassical viewpoint of the self-correcting nature of regional economies through the migration of capital and labor. Regardless, this migration helps to counter the negative impacts to unemployment particularly for the local retail and housing markets after a closure. It could also explain why there is no adverse impact on the county unemployment rate following a closure announcement. The county unemployment rate is also a less sensitive measure of economic health than county non-farm employment used by Poppert and Herzog (2003). Finally and as mentioned previously, the positive impact of closures on county per capita income can be explained by the low wages earned by military personnel (Hooker & Knetter, 2001).

#### **4.5 Applicability to Planning**

Military base closures certainly have an economic impact on their communities even as the extent of these impacts vary across different regions and types of communities. While the statistical analysis suggests that base closures improve both



the county unemployment rate and per capita income, I think the results warrant further study. The preceding multivariate analysis suggests that there is no “one size fits all” set of indicators and impacts for communities facing a closure. I believe there are two reasons for this. First, base closures may have more of a local effect that is not felt through unemployment rates across widespread and populous counties. Geography clearly has a role for employment of displaced workers, the local retail industry, and nearby housing. Perhaps the dependent variables selected – per capita income and unemployment rate – and use of counties as the geographic unit of measurement may provide too much of a macro view. Additionally, the positive coefficient for *unemployment* and negative one for *per capita income* of the interaction term (*announce* interacted with *base to county population*) support more investigation into the relative economic impact of installations to their surrounding communities (not necessarily counties).

Second, the timing of the base closure will impact the local retail, housing, and other markets. While the BRAC legislation mandates closures within six years of announcements, some bases close earlier (or later) and the drawdown period can be quite varied across installations: the relocation of a significant portion of a closing base’s military employment can occur within a year of the closure announcement. Thus, a base that is still open may provide a diminished impact on the local economy well before it is officially closed.

The results warrant a different approach to the study of base closures. Perhaps more local data would offer a better perspective of economic impact, but it is difficult to

attain it for the sheer number of installations that comprise the bases closed by the BRAC process and those remaining. More logically, a case study approach offers more detailed information about redevelopment. While this approach was originally intended to complement a multivariate statistical analysis, it will now serve as the cornerstone of my research. The following chapter will provide insight into the issues, timeline, and planning considerations relative to military base closings. This insight and particularly its applicability to planning cannot be ascertained through a database that lacks the specificity of local economic indicators.

## CHAPTER 5

### HISTORICAL STUDY

#### **5.1 National Base Closure Overview**

The previous chapter identified those base, community, and proximity variables indicative of successful recovery – these are variables over which planners and policy makers exert little or no control. This is the limitation of the previous quantitative analysis. The following historical study compensates for this and will offer lessons that planners can adopt. In essence, this chapter will offer a microscopic look into the history, impact, process, results, and lessons of each of the New England BRAC base closures. These studies will offer insight and rationale for different planning and policy decisions.

The GAO (2002) reports that there are several factors which encourage economic recovery from base closures. These include a strong national economy, diversified local economy, regional economic trends, natural and labor resources, redevelopment leadership and teamwork, public confidence, government assistance, and the reuse of existing base property (GAO, 2002). There is also plenty of advice for communities facing base closures; these include conducting market research, determining market niches, and promoting the community (Frieden & Baxter, 2000). In most cases, community leaders should not waste time contesting the base closure decision, but rather commence with post-closure planning since closures provide a unique economic development opportunity often with cumbersome reuse rules and

major environmental cleanup requirements (Bradshaw, 1999). Community leaders should consider contesting the closure decision if the installation is vital to the local economy or satisfies a strategic purpose perhaps overlooked by the BRAC committee.

A report from the Federal Reserve Bank of Boston adds that “...successful redevelopment strategies share three critical features: partnerships; creativity and flexibility; and persistence (Owens, 2006).” Additionally, a Massachusetts Institute of Technology report offers the following lessons for communities facing base redevelopment: use consultants, engage an experienced outsider, assemble internal expertise, use local networks, take early action, mobilize state resources, streamline the approval process, improve base appearance, incorporate effective problem-solving, be patient, and plan for the long haul (Frieden & Baxter, 2000).

## **5.2 New England Base Closure Overview**

During the Vietnam War era, then Secretary of Defense, Robert McNamara initiated the realignment or closure of 954 bases – a process that lasted sixteen years and included the closure of the historic Springfield Armory in downtown Springfield, Massachusetts (Poppert, 2001). In fact, 70 major installations closed between 1960–1977 (Garcia, 1996) including seven in the six-state New England region as noted in Table 5.1.

**Table 5.1: Status of New England Military Bases**

<u>Pre-BRAC Closures</u>	<u>Community</u>	<u>State</u>	<u>Military Service</u>	<u>Announcement</u>
<i>Fort Ethan Allen</i>	Jericho	VT	Army	1944
<i>Bradley Field</i>	Windsor Locks	CT	Army	1946
<i>Presque Isle Air Force Base</i>	Presque Isle	ME	Air Force	1961
<i>Dow Air Force Base</i>	Bangor	ME	Air Force	1968
<i>Springfield Armory</i>	Springfield	MA	Army	1968
<i>Otis Air Force Base</i>	Bourne	MA	Air Force	1972
<i>Quonset Point Naval Air Station</i>	North Kingston	RI	Navy	1973
<i>Westover Air Force Base</i>	Chicopee	MA	Air Force	1973
<i>Boston Naval Yard</i>	Boston	MA	Navy	1974
<i>Chelsea Naval Hospital</i>	Chelsea	MA	Navy	1974
<u>BRAC Closures</u>	<u>Community</u>	<u>State</u>	<u>Military Service</u>	<u>Announcement</u>
<i>Pease Air Force Base</i>	Portsmouth	NH	Air Force	1988
<i>Army Material Technology Lab</i>	Watertown	MA	Army	1988
<i>Fort Devens</i>	Ayer	MA	Army	1991
<i>Loring Air Force Base</i>	Limestone	ME	Air Force	1991
<i>South Weymouth Naval Air Station</i>	South Weymouth	MA	Navy	1995
<i>Stratford Army Engine Plant</i>	Stratford	CT	Army Civilian	1995
<i>Brunswick Naval Air Station</i>	Brunswick	ME	Navy	2005
<u>Active Bases</u>	<u>Community</u>	<u>State</u>	<u>Military Service</u>	
<i>Hanscom Air Force Base</i>	Bedford	MA	Air Force	
<i>New London Naval Submarine Base</i>	New London	CT	Navy	
<i>Newport Naval Station</i>	Newport	RI	Navy	
<i>Portsmouth Naval Shipyard</i>	Portsmouth	NH	Navy	

Since 1977, seven more New England military posts have closed while only four active duty installations remain today. The four that remain are not considered tactical or warfighting bases: Newport Naval Station exists primarily to train senior naval officers, New London Naval Submarine Base and Portsmouth Naval Shipyard provide shipbuilding and high level logistic support, and Hanscom Air Force Base serves intelligence and research needs. Both New London Naval Submarine Base and Portsmouth Naval Shipyard were on the BRAC 2005 closure list, but after significant

lobbying, they were subsequently removed for economic and mission-related reasons. Had these facilities remained on the 2005 BRAC closure list, 14,500 of the 29,000 estimated lost jobs across America would have been from New England (Viser, 2005). Table 5.1 summarizes the status of former and current military installations across New England.

Many of the “principles” of base redevelopment suggested in the first section of this chapter have been validated across the country. Planners must realize that base redevelopment is a massive and time consuming effort. Base transformations can take decades – such as the redevelopment of Westover Air Force Base located in the City of Chicopee, Massachusetts. A short summary of the redevelopment process for this base will provide a historical context for the BRAC closures that followed almost twenty years later. In addition, this pre-BRAC example permits an understanding of the extended and incremental duration typical of many closures.

As an active duty base, Westover was once one of the largest installations in the United States (Westover Yesterday, 2006); the installation occupied 4,717 acres, provided 10,000 jobs, housed 30,000 residents, and generated \$14.4 million in revenue annually. There were eighty-two miles of road, ten miles of railroad track, thirty-two aircraft hangers, an 18-hole golf course, three schools, and a ninety-five bed hospital on the base prior to its deactivation (Moore & Hands, date unknown). In the spring of 1973 the Department of Defense announced a partial deactivation of Westover and roughly half (2,300 acres) of the installation was declared surplus (CE Maguire, 1976). The economic transformation of the former active duty Air Force installation ensued and is

still ongoing. The success of this effort was predicated on the fact that former areas of the base could provide significant parcels of industrial land, that its location provided an excellent transportation network, and that full customs clearance at the adjacent airport could facilitate domestic and international trade (PVPC, 1995).

The reuse planning for Westover involved a host of state agencies and private consultants. A comprehensive regional economic development effort was accomplished through a network of the Board of Directors of the Western Massachusetts Economic Development Commission, the Westover Metropolitan Development Corporation, Westmass Area Development Corporation, and economic development professionals from the various municipalities where the industrial parks are now located (B. Nicholas, personal communication, October 18-20, 2006). Westover Metropolitan Airport is currently managed under a joint use (shared military and civilian) agreement with the DOD and the Westover Metropolitan Development Corporation; it is a regional civilian airport operated on the ninety-one acres of 'surplused' property that became available in 1974 (Westover Metropolitan Airport, 2006). Jeanne Kidwell, former Director of Community Development for the City of Chicopee, believes that the successful reuse of Westover can be attributed to the cooperation of the many constituencies involved in the economic redevelopment of the base (J. Kidwell, personal communication, October 11, 2006).

In 1976 CE Maguire, Inc. provided a plan to develop what is now called Airpark East (in the town of Ludlow) and Airpark West (in Chicopee). The consulting firm envisioned a 20-year comprehensive redevelopment plan (CE Maguire, 1976). The plan

was long-range with a phased development. It suggested twelve policy issues including reducing unemployment, increasing the tax base, complementing and enhancing the regional economy, providing for minimum public expenditure, and conducting extensive marketing. The plan also included an existing demographic, land, and utility study. The results of a 120-company survey indicated most (80%) company moves occurred within the region and CE Maguire, Inc. compiled an opportunity analysis for the reuse planners (CE Maguire, 1976). As the plan recommended, the development of Westover's surplus land was executed in phases. After the state established the WMDC, it purchased parcels of land disposed of by the GSA. Airparks East and West were developed as light industrial parks. The reuse of Westover required infrastructure investment to align the former base with the needs of these industrial parks (J. Kidwell, personal communication, October 11, 2006).

In 1985 consultants Lane, Frenchman and Associates recommended a mixed use scenario to develop what is now called Airpark North and the Ridgewood Village Condominiums (Crane & Smith, 1985). The company considered green space, transportation, and zoning issues. This phase of the redevelopment established some important goals: increased local tax base, jobs growth, limited municipal capital exposure, return on investment, reinforcement of Airpark West, and the integration of local (civilian) and federal (military) development activities. The plan also considered industrial land absorption (150-200 acres per year), transportation access, labor availability (skill and cost), land and site development costs, and market demand (Westover Metropolitan Development Corporation, 1989). Airpark North was



developed in 1989. WMDC now owns and manages 1,300 acres of the original 2,500 acres of Westover Air Force Base's 'surplused' property (A. Blair, personal communication, October 24, 2006).

Westover Air Force Base is now called Westover Air Reserve Base. It is the largest U.S. Air Force Reserve facility with approximately 2,500 reservists assigned to the 439<sup>th</sup> Airlift Wing. The installation also supports over 4,000 Army, Marine Corps, and Navy reservists as well as National Guard soldiers on monthly drill weekends (Chicopee, 2006). Additionally, Airpark West (207 acres), Airpark North (83 acres), and Airpark East (155 acres in Ludlow) are home to sixty-five businesses with 3,824 employees. While there was a substantial neighborhood transition from military-oriented businesses to those of the general population, local retail and service business owners rely on employees of the business parks for their economic vitality (B. Nicholas, personal communication, October 18-20, 2006).

### **5.3 Selection of Bases for Historical Study**

Of the seven New England BRAC closures listed in Table 5.1, this historical study reviews and analyzes the five largest: Pease Air Force Base, Fort Devens, Loring Air Force Base, South Weymouth Naval Air Station, and Brunswick Naval Air Station. Both the Army Material Technology Lab in Watertown, Massachusetts and the Stratford Army Engine Plant in Connecticut were small urban installations employing mainly Department of Defense civilians. The Watertown facility was earmarked for closure in 1988 – the first BRAC round. While twelve acres of abandoned former GSA property

remain undeveloped, portions of the former cannon ball production arsenal have been parceled out to the City of Watertown for historic preservation, the Massachusetts Department of Conservation and Recreation, and Harvard University which owns the “Arsenal on the Charles” complex including offices, health club, restaurants, and the Arsenal Center for the Arts (Siegel, 2006). Both former installations required extensive environmental remediation, but Stratford is still yet to be redeveloped. No jobs have been created, the cleanup schedule inhibited redevelopment, and no “clear and consistent” plans had been conceived prior to property transfer from the United States Army (Owens, 2006). The five bases in this study also faced environmental and other location-specific issues which will be detailed subsequently.

Table 5.2 profiles some basic demographic and housing characteristics of the counties where the case study bases are located. The clear majority of these counties reflect older and more heavily white populations. While the statistics below compare favorably to the national average overall, they are also indicative of New England’s maturity – demographically and industrially. Aroostook County seems to be the most problematic; both per capita income and educational attainment (strong indicators of current and potential economic strength) lag not only the other counties, but the nation. This data gives some insight into the redevelopment issues identified in the succeeding historical studies; for instance, low educational attainment limits opportunities for recruiting high technology companies to industrial parks on former installations.

**Table 5.2: County Data – U.S. Census 5-Year Estimates, 2005-2009**

county: base	total population	GED or higher (%)	BS or higher (%)	per capita income (\$)	age 65 & over (%)	white (%)	vacant housing units (%)
<b><u>Maine</u></b>							
Aroostook: Loring AFB	71,974	82.7	15.7	19,379	17.9	96.0	22.3
Cumberland: Brunswick NAS	276,227	92.8	38.3	30,159	13.7	93.7	14.0
<b><u>Massachusetts</u></b>							
Middlesex: Fort Devens	1,480,260	91.3	48.4	39,322	12.8	83.0	5.5
Norfolk: South Weymouth NAS	657,506	93.0	46.9	41,510	14.1	84.9	4.6
<b><u>New Hampshire</u></b>							
Rockingham: Pease AFB	296,680	93.0	36.0	35,016	11.7	95.8	8.2
<b><u>United States</u></b>							
		84.6	27.5	27,041	12.6	74.5	11.8

source: US Census

#### 5.4 Historical Studies of New England BRAC Closures

Each of the five studies below is similarly organized. Following a brief history and discussion of economic impact prior to closure, I summarize the redevelopment process, reuse plan, and redevelopment results and then identify the planning lessons. This format permits a detailed study of each base beginning with the base mission before closure through the results of its transformation to civilian use. I identify planning lessons based on the structure of the reuse planning committees, leadership during the redevelopment effort, the timing of varied reuse actions, and the financial resources applied to the process. After lessons are summarized for each installation, a comparison of the five bases is offered in the succeeding section and is intended to offer guidelines for planners of future military base redevelopment efforts.

#### **5.4.1 Pease Air Force Base**

This installation is located in Portsmouth, New Hampshire near the Maine border. Pease was constructed in the 1930s when it originally served as regional civilian airport. The U.S. Navy used the airfield during World War II and it officially opened as an Air Force Base in 1956 (Patriot Ledger, 2000a). Strategically important during the Cold War, the former base was home to a B-52 bomber fleet serving as a key element of the nation's nuclear defense system (National Public Radio, 2005). Pease Air Force Base later housed FB-111 fighter-bombers and KC-135A aerial refueling tankers with 4,666 military personnel and their families (Pease International, 2010). According to a published Air Force report, the base had an economic impact of \$307 million for the region during fiscal year 1989 which included \$101 million in salaries and support for over 2000 jobs in Portsmouth area (McGrath, 1990).

Pease was the first base closed under the BRAC process so many of the lessons learned by communities facing a closure today were not available for the Portsmouth community (Miller, 2001). The BRAC announcement generated fears of economic devastation for Portsmouth, but that did not happen (National Public Radio, 2005). When Pease Air Force Base closed, Portsmouth schools lost about 25% of their student population, closed four schools, and laid off 100 teachers. In addition to significant impacts for local retail, the City of Portsmouth lost an estimated \$1 million per day in revenue (Files, 1993; National Public Radio, 1993). Many employees at the former base, accepted early retirement offers since no re-training programs were available at the time (National Public Radio, 1993).

Table 5.3 summarizes the redevelopment timeline of the former Pease Air Force Base. The state-appointed Pease Redevelopment Commission began planning for reuse only months following the BRAC closure announcement. The commission hired Bechtel Corporation to serve as planning consultants and formed six citizen advisory committees for each of following areas: aviation, environmental remediation, economic, governmental affairs, natural resources, and existing facilities. The guiding principles for the initial nine month planning process were “job creation, environmental quality, fiscal responsibility, and economic viability” and included numerous meetings with citizens, appointed committees, and government. The State of New Hampshire created the Pease Development Authority on June 1, 1990 to execute the reuse plan. This authority is authorized to market, accept title, and develop the former base while holding a \$250 million bonding capacity (Pease International, 2010).

**Table 5.3: Pease Air Force Base Redevelopment Timeline**

<u>Date</u>	<u>Milestone Event</u>
December 1988	<i>closure announcement</i>
April 1989	<i>Pease Redevelopment Commission formed</i>
June 1990	<i>Pease Development Authority formed by state</i>
August 1990	<i>reuse plan published</i>
March 1991	<i>base closes</i>
April 1992	<i>initial property transfer via public benefit transfer</i>
August 1992	<i>1100 acres transferred for wildlife refuge</i>
June 1997	<i>last property transfer via public benefit transfer</i>

source: Pease International Tradeport

The Pease Development Authority, which excluded politicians from serving on its board, focused the reuse effort on private sector development. The cornerstone of the reuse plan was a “regional hub civilian airport with adjacent corporate, industrial, and

research park” (Frieden and Baxter, 2000). George Jones served as chairman of Pease Redevelopment Commission before being elected executive director of the Pease Development Authority – this fostered strong continuity in leadership (Fahey, 1990). In addition, one of the authority’s talented staff members, Brian Hamel, would later leave his marketing director position (and prior director of finance and administration) to lead the Loring Air Force redevelopment in Maine (Miller, 1994a). There were plenty of issues for and criticisms of the authority and its executive director however. The most contentious issue is a recurring one – who controls the redevelopment? Since the Pease Development Authority included only two local representatives (compared to four on the Pease Redevelopment Commission), local control of the reuse was perceived to have dissipated. The authority was accused of closed door deals and hiring an ill-fated marketing firm without checking references (Jonsson 1990; Miller 1991, 1995; *The Union Leader*, 1990). There were also complaints about slow land transfer process from the Air Force (Tibbetts, 1990) and the method of land transfer. The communities of Newington and Portsmouth desired an economic conveyance transfer<sup>2</sup> instead of the public benefit transfer<sup>3</sup> that would give the Federal Aviation Administration oversight of airport operations (Miller, 1994b, 1994c); the Pease Development Authority

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<sup>2</sup> “This authority gave the DoD the ability to transfer property to LRAs, for consideration at or below estimated fair market value, to spur economic development and job creation.” No-Cost Economic Development Conveyance (EDC) Policy Guidance memorandum, page 1, accessed on Office of Economic Adjustment website, [www.oea.gov](http://www.oea.gov), on May 23, 2011.

<sup>3</sup> “General categories of public benefit conveyances under the Federal Property and Administrative Services Act of 1949 include those for historic monuments, education, public health, parks and recreation, maritime commerce, and non-Federal correctional facilities. In addition, conveyances of property to support public airport uses under 49 U.S.C. §§ 47151-47153, and wildlife conservation under U.S.C. §667b-d, are considered equivalent to public benefit conveyances for the purposes of this policy memorandum.” No-Cost Economic Development Conveyance (EDC) Policy Guidance memorandum, pages 2-3, accessed on Office of Economic Adjustment website, [www.oea.gov](http://www.oea.gov), on May 23, 2011.

reconsidered their support of the public benefit transfer after public opposition (Miller 1994d).

The Pease Redevelopment Commission selected consulting firm Bechtel Corporation to author the reuse plan (Hart, 1989a). Bechtel planners noted the state tax structure and the proximity to existing high tech firms as major advantages to redeveloping this base (Hart, 1989b). While the public rebuked the idea of a major passenger airport like Logan, Pease had a notable supply of existing industrial buildings (many of the other building were dilapidated) and airport land which was at a premium in New Hampshire (DiStatso, 1990). Ultimately, 230 acres were allotted to the state Air National Guard, 1,095 acres for a wildlife refuge, 2,305 acres for the international airport, and the approximately 600 remaining acres for economic development (GAO, 1995).

The reuse plan consisted of two documents and three phases. Phase I (Preferred Development Concept) provided a comprehensive overview of potential land use: (1) aviation facilities with evaluation for reuse potential through market research and existing hazardous waste sites, (2) a high tech industrial center including traffic mitigation concerns, and (3) commercial / tourism including an infrastructure inventory and evaluation of existing military buildings, runway, wastewater treatment, and utilities. The Preferred Development Concept also included a traffic circulation plan, financing and marketing plans, and identification of redevelopment impacts including aviation noise, wetlands impacts, and traffic (Bechtel, 1990a). The Phase II/III (Action) plan recommended the following land use allocation: aviation (1045 acres) including

airfield and related development; non-aviation (845 acres) including development (light industrial, commercial, office, golf course, future use; wetlands (500 acres); wildlife (1100 acres); military (220 acres); and roads and open space (545 acres). The action plan included a three phase demolition plan through 20 years; employment forecast (predicts former installation up to 12,474 employees in 20 years); detailed airport design including 18 passenger gates; facilities and infrastructure plan: water, wastewater, utilities; traffic management; and even outlines management functions through the different phases of development (Bechtel, 1990b). In 1995, the Pease Development Authority updated the 1990 plan to adjust for improved market conditions in the early 1990's. This update identified opportunities and constraints, ongoing planning issues, and offered a preferred development plan for the Authority (Vanasse Hangen Brustlin, 1995).

Throughout the redevelopment process, the Pease Development Authority was able to secure state and federal funding to accelerate the transformation of the installation. New Hampshire loaned \$23 million for operations in early 1990's and made \$54 million in loan guarantees (Miller, 2001; Patriot Ledger, 2000b). In addition to the \$71 million in federal grants (summarized later for each historical study) Pease received, the federal government made significant additional investments for reuse of the existing military airport. The FAA and EDA have awarded \$29 million through the Military Airport Program and the FAA recently designated another \$6.3 million for airport upgrades and continued conversion to civilian use (Carahasen, 2006; Pease International, 2010).



New Hampshire has offered financial incentives to encourage business development. These include loans and guarantees, tax exempt financing, import/export loans, low interest loans, customized employee training, tax credits, job grants, and lease with option to purchase (Pease International, 2010). The state's efforts have been instrumental in economic recovery from closure although Portsmouth's potential tax base suffered since almost 50% of Pease became tax-exempt (National Public Radio, 1993). The Pease Development Authority itself spent \$50 million to secure anchor tenants (Celltech Biologics and Business Express) offering no-cost rent and other enticements (Files, 1993). According to tenant Redhook Ale Brewery, state tax incentives and the lack of organized labor was important in attracting them. The \$30 million in state backed loans were also instrumental in Celltech Biologics' decision to build at Pease (Miller, 1995).

By 1993 the results had not met expectations. "The new Pease has meant 1,000 new jobs, but they cost \$50,000 each. Bitter fights have erupted, with local interests accusing the state of robbing them of control of the land (Files, 1993, p. A18)." By 1997, however, Pease International Tradeport boasted sixty-seven companies and 1,800 employees (Spiegel, 1997). The last military housing was razed in February 2008 to make room for additional business development (Pease International, 2010; Turbide, 2007). Efforts at Pease are still ongoing. Fortunately Pease's location favored a successful redevelopment; it offers easy highway access, is only fifty miles from Boston, and had a skilled and available workforce (Sharp, 2005).

The most contentious issue has been the reuse of the airport on the former installation. Although millions have been spent on renovations and a new passenger terminal, the airport is only 50% developed. Current passenger carriers include SkyBus, Allegiant Air, and Pan Am Clipper Connection while both United Express Airlines and Business Express abandoned the facility (Miller, 1995; Swymer 2007). Pease Development Authority needs to attract a large commercial carrier although the current population does not support such a demand (M. Stowell, personal communication, July 30, 2010). Pan American commercial, cargo Emery Worldwide, Seacoast Air Cargo, BAX Global, and private as well as corporate planes also use the airfield at Pease (Patriot Ledger, 2000b). One reason why the air traffic has floundered has been spirited competition from the nearby airport in Manchester which has benefited from the spillover of heavy traffic at Logan International Airport in Boston (Kenny, 1998).

The results for the redevelopment effort at the former Pease Air Force Base are impressive. “The Pease International Tradeport leads the nation in civilian job creation, when measured against 71 military bases closed by the Department of Defense since 1990...” (Miller, 2001, p. A12). The tradeport is now nearly fully developed. There are 220 companies, 6 education-related businesses, 6,800 employees earning \$500 million in wages annually, and approximately 90% of the existing office space is filled (Pease International, 2010; Swymer, 2007). Except for the eleven acre plot sold to the federal government a few years ago for fair market value, companies do not own the property at Pease, rather they lease land parcels for thirty years (the approximate life span of buildings) while renovated military building leases are shorter (M. Stowell, personal

communication, July 30, 2010). Of the 4,100 acres at Pease, 1,500 acres now comprise the airport district and 1,100 acres are now the Great Bay National Wildlife Refuge (Environmental Protection Agency, 2006; Patriot Ledger, 2000b).

The redevelopment of Pease Air Force Base has been cited extensively as a successful example to military installation reuse – particularly given the impressive civilian job figures outlined above. There are some lessons that can certainly be applied to future base closings. First, state leadership was quick and strong. The actions taken by the State of New Hampshire in establishing the planning and implementation agencies for the redevelopment were timely and helped to jumpstart the long-range planning needed for a complicated initiative. The state also made \$50 million in state bonds available for redevelopment; this debt was recently paid by the Pease Development Authority (M. Stowell, personal communication, July 30, 2010). In spite of the numerous bureaucratic issues faced by all military base reuse efforts, the continuity afforded through the appointment of George Jones (the leader of both the Pease Redevelopment Committee and then the Pease Development Authority) was instrumental in keeping the redevelopment moving forward. Unfortunately, strong leadership exerted by the state means less control over redevelopment by local communities. The reuse of South Weymouth Naval Air Station, discussed later, offers some insight into the compromise that local control has over timely redevelopment.

Furthermore, Ross Gittrell, Professor of Management at the University of New Hampshire, claims that the political independence of the Pease Development Authority was critical to the redevelopment efforts as were good planning and patience (National

Public Radio, 2005). The planning process was thorough, yet succinct, and certainly fostered success (Poon, 1994). However, there were some factors specific to Portsmouth that encouraged redevelopment: its location and the economy of the 1990's. At least some of the Pease's success can be attributed to the strength of the regional economy during the redevelopment (Miller, 1999). Not far from the Boston metropolitan area, this region was experiencing unprecedented growth due to the information technology boom of the 1990's. Brian Hamel, former Pease Development Authority staff member, stated that "...Pease was in a perfect location for development (Sharp, 2005)." Planners have seen the benefits of geography for economic development throughout history.

#### **5.4.2 Fort Devens**

The former Army post in Ayer, Massachusetts has witnessed quick redevelopment through planning and other factors; it now serves as a thriving industrial park outside of the Boston metropolitan area. Fort Devens was built in 1917 during World War I (Lindsay, 2006). The land for the Army post was originally taken from the towns of Ayer, Shirley, Lancaster, and Harvard (G. Garber, personal communication, October, 16, 2006). While it served as the home to many different Army units, the post encompassed seven square miles, provided 8,000 jobs (Lindsay, 2006), and housed 15,000 residents (Sasaki Associates, 2006). There was an airfield, a hospital (Sasaki Associates, 2006) and an 18-hole golf course (MassDevelopment, 2006) when the post closed in 1996. Furthermore, the location of Fort Devens offered an excellent

transportation network (Sasaki Associates, 2006) and access to the high technology businesses in the Boston metropolitan area.

While the former post had vast economic potential, the impact of closure was significant. Surrounding retail businesses saw a reduction in sales, new construction halted, housing prices suffered by as much as thirty percent, and up to sixty-five percent of apartments became vacant (Esposito, 2005).

Fort Devens is now called Devens Reserve Forces Training Area; numerous units from the region (Reserve, National Guard, and the Massachusetts State Police) use the ranges and open space to conduct training – most of which is in Lancaster (Manning, 2009a). A portion of the original main post serves as a garrison to some active duty Army soldiers and accommodates a strong Army and Marine Corps Reserve presence. The old Army hospital now serves as the Devens Federal Medical Center and serves the minimum security prison located on the old post (Sasaki Associates, 2006). An industrial park covers 4,400 acres and houses eighty companies (*Devens Town Plan on Hold, Approvals Fall Short*, 2006) with 4,200 employees (Lindsay, 2006).

As in the case of the Westover redevelopment, there were multiple state agencies involved with the redevelopment of Devens. It started with Chapter 498, a law passed by the state legislature, which established the Devens Enterprise Commission in 1993. This commission was conceived as the entity that would act as the ‘town government’ throughout the reuse. Additionally, Chapter 498 outlined goals for Devens and designated the post as an Economic Target Area and Economic Opportunity Area offering tax deductions, credits and abatements, and other economic incentives to

businesses (Chapter 498, 2006). The three towns surrounding Devens requested that MassDevelopment act as the LRA since this agency had legislative and state agency connections, experience with the redevelopment of the Charlestown Navy Yard and others in 1970s and 1980s, and significant fiscal resources (Frieden & Baxter, 2000). MassDevelopment, a quasi-public agency, became the Devens landowner and directed redevelopment (Lindsay, 2006). A Joint Board of Selectmen was appointed to make recommendations and decisions regarding the impact of redevelopment on the four adjacent towns (Sasaki Associates, 2006). From the onset, this significant redevelopment effort was designed to incorporate the views of the many constituencies affected by the closure of Fort Devens. In fact, Chapter 498 directed that a stakeholder listening process take place (Chapter 498, 2006). Table 5.4 summarizes the redevelopment timeline of the former Fort Devens installation.

**Table 5.4: Fort Devens Redevelopment Timeline**

<u>Date</u>	<u>Milestone Event</u>
July 1991	<i>closure announcement</i>
April 1991	<i>redevelopment charrette</i>
July 1993	<i>first community reuse workshop</i>
January 1994	<i>Devens Enterprise Commission formed by state</i>
January 1994	<i>preliminary reuse plan completed</i>
December 1994	<i>reuse plan final &amp; accepted by towns</i>
March 1996	<i>base closes</i>
September 2006	<i>second (updated) reuse plan published</i>

sources: 1991 BRAC Commission, OEA, Devens Reuse Plans, Garber, Devens

The planning process began with a charrette conducted in April 1991 – only months after the closure announcement and well before the 1996 base closure. A public planning process commenced in 1993 that produced zoning and reuse plans. In

1994 alone, there were approximately 120 meetings concerning Devens' future (Vanasse Hangen Brustlin, 1994). Joint (town) planning boards were convened and strong cooperation existed amongst the Joint Board of Selectmen. Additionally, the DEC hired a consulting firm, Vanasse Hangen Brustlin, to formulate the reuse plan (G. Garber, personal communication, October, 16, 2006). Vanasse Hangen Brustlin published the Devens 40-Year Re-use Plan in 1994. It sought many goals: economic, social, environmental balance; diversity of use and employment opportunities; interdependence; and balance between local, regional, and state interests (Vanasse Hangen Brustlin, 1994). Compromise and consensus was crucial throughout the planning process including the issue of housing on Devens. For instance, the towns lobbied for a reduction in the number of housing units in the redevelopment plan before they would approve it (Susswein, 1997).

The Devens reuse plan was designed to complement economic development with environmental protection and adopted three themes: (1) innovation and technology business; (2) rail and trade-related uses; and (3) open space and recreation resource protection and enhancement. In addition to identifying the opportunities and constraints of the property, required infrastructure improvements were identified including utility, transportation, and storm water management systems. The importance of unified permitting by the Devens Enterprise Commission was also identified to help attract new business construction at the base; unified permitting precludes businesses from securing required permits at multiple governmental

agencies. Finally, the plan outlined a multi-phase redevelopment that would ultimately help to create up to 8,000 new jobs (Vanasse Hangen Brustlin, 1994).

The Commonwealth of Massachusetts purchased 3,040 acres from the Army through an Economic Development Conveyance in 1996 for \$17.9 million (OEA Base Reuse, date unknown). In addition, it secured a \$200 million state bond for the redevelopment effort intended for marketing the site and to make infrastructure improvements (Frieden & Baxter 2000; Vanasse Hangen Brustlin, 1994).

MassDevelopment used \$118 million from this bond for infrastructure improvements including razing 1.2 million square feet of dilapidated Army buildings, constructing a new wastewater treatment plant, and building new roads (Esposito, 2005; Miller, 1999). Finally, the state and the Army each contributed to the \$100 million environmental remediation required since the former post was identified for the EPA National Priorities List (Bushnell, 1999; GAO, 1995).

Ultimately, 68% of the former installation went to federal agencies: 5177 acres to Army for training, 890 acres for wildlife refuge, 245 acres for federal prison medical facility, and 20 acres for a Job Corps Center (GAO, 1995). Of the acreage purchased by the state, 400 acres were sold or transferred and 5.45 million square feet of new buildings were constructed or planned in the first nine years with 2,100 acres of open space remaining. Tenants include warehousing and technology companies, a community college satellite campus, and a Marriott Hotel with conference center – all supported with a business services district, railhead, and intermodal transportation center. The community has replaced the 2,178 civilian jobs lost when the installation



closed with 4,000 new ones (OEA, 2005). Sylvia's Haven, a housing program for unwed mothers, was granted 282 former military housing units (G. Garber, personal communication, October, 16, 2006). In addition, 100 homes have been renovated on the former installation. Nonetheless, the area really looks like an industrial park with a limited number of surrounding former military housing clusters (Lindsay, 2006); the mixed reuse effort is largely commercial and industrial (90%) and disproportionately residential (10%) (Sasaki Associates, 2006).

In 2001 a 5-Year Review of the plan and its implementation was conducted by the Devens Enterprise Commission. Furthermore, they also contracted Sasaki Associates to develop a second reuse plan in 2006 (Sasaki Associates, 2006). The original 40-year plan for reuse certainly occurred much faster than expected (G. Garber, personal communication, October, 16, 2006) as the former Army post's transformation was encouraged by the economic boom being experienced by the greater Boston area.

In November 2006, local voters considered a ballot question on whether to incorporate the 4,400 acre Devens campus into a town (Devens Community, 2006). Five of six stakeholders had to approve the measure for it to take effect (Sasaki Associates, 2006). However, the Towns of Ayer and Harvard voted against incorporating Devens (*Devens Town Plan on Hold, Approvals Fall Short*, 2006). Now the Devens Enterprise Commission must reconsider the future of the industrial parks and limited housing that occupy the former installation. In addition, MassDevelopment sought approval in 2009 to rezone the historic Vicksburg Square on the former post from innovation and technology to housing. This effort was also rebuffed by Ayer voters unsure of the need

to inject the currently depressed housing market with additional housing at the expense of additional business tax revenue (Arsenault, 2009; Rivera, 2009).

The ongoing planning and implementation of the redevelopment effort has been methodical and efficient. Devens serves as a national model for base redevelopment. Its fast permitting process provides a substantial lure for light industry (*Devens Town Plan on Hold, Approvals Fall Short*, 2006). The much sooner-than-expected success can be attributed to several factors including strong state involvement, timing and location (due to the economic boom of the Boston area), and the availability of large parcels of land (G. Garber, personal communication, October, 16, 2006). When the BRAC announcement was made, the commitment was to reuse not fighting the closure; this, the leadership provided by the state, and the cooperation between the towns and all stakeholders facilitated an effective redevelopment (EPA, 2006). William M. Burke, former executive Vice President for Devens and Military Initiatives at MassDevelopment indicated that this partnership, consolidated leadership, the \$200 million bond, and single agency expedited permitting through the Devens Enterprise Commission all secured Gillette as one of the first and the anchor tenant. In addition, competitive utility rates, highway and rail access, no personal property tax, and low real estate taxes have contributed to a successful redevelopment (Esposito, 2005). Incidentally, the Devens Enterprise Commission responds to all permitting requests within only seventy-five days (Owens, 2006). In the last decade, Devens has also embraced sustainability efforts by encouraging ecosystem preservation, recycling and other waste management

programs, and information exchange between its resident businesses (Devens Eco-Efficiency Center, 2011).

MassDevelopment has offered an advantage for Devens; in addition to financial tools like low interest bonds for developers, the decision-making is consolidated in one agency. “The [Devens Enterprise] commission acts as planning board, zoning board of appeals, board of health, conservation commission and historic district commission.” In exchange for not having to manage the arduous redevelopment efforts, local residents have foregone elective leadership, land revenues, and the ability to select companies for the industrial park (Manning, 2009b). Of course, there was friction between MassDevelopment and the towns during the initial stages of the state-backed reuse effort; the quasi-public agency was accused of not listening to the Joint Board of Selectmen and there were disagreements regarding who should manage the redevelopment (Nugent, 1993; Telegram & Gazette, 1992).

There are criticisms of the base reuse, however. Some believe the redevelopment was too slow, that it should have included more residential development, and that the federal prison medical facility has deterred some businesses from moving to Devens (EPA, 2006). Many of the companies that moved to the former base were already local; however, they have been growing and many have added ten to twelve jobs each since coming to the industrial park (Henderson, 2006). Nevertheless, there are still some outstanding issues for the former Army post with regards to self-governance, the preservation of buildings including those in historical Vicksburg Square (G. Garber, personal communication, October, 16, 2006), and the reuse of Moore Army

Airfield which stands relatively dormant (Sasaki Associates, 2006). Finally, there is speculation that the vast redevelopment efforts at Devens have stunted any economic development west on Route 2 for the cities of Fitchburg, Leominster, and others (J. Mullin, personal communication, April 6, 2009).

### **5.4.3 Loring Air Force Base**

The Loring Development Authority now manages the former strategic bomber base that once protected the United States around-the-clock from a nuclear attack (Gold, 1988). The former Loring Air Force Base was the closest B-52 bomber installation to Europe, the former Soviet Union, and the Middle East and thus maintained significant strategic significance during the Cold War era (Dorrer, 2005). The 8,880 acre base was able to avert closure in the 1970s by applying strong political and public pressure on the Department of Defense and attempted the same tactics again (and unsuccessfully) after the base made the 1991 BRAC closure list (Dorrer, 2005; Lescaze, 1980; Sund, 1999).

Prior to closure of Loring Air Force Base, Aroostock County was home to 10,000 soldiers and family members with an annual payroll of \$75 million – contributing 20% of the county's economy. Aroostock is the least populated county east of the Mississippi River and boasts a high quality of life, low crime, and a ready workforce (Lamb, 1997). When the installation officially closed in 1994, the county lost 4,500 soldiers and 1,100 civilian jobs, but inherited a facility in great condition due to \$350 million worth of infrastructure investments in the 1980s as well as excellent transportation and information technology networks (Dorrer, 2005; Lamb, 1997; Rice, 2006). While the

county had been experiencing out-migration since the 1970s, it continued to lose 15% of residents from 1990-2000. The nearby town of Limestone lost 75% of its population (including military residents on the base), 88% of its school enrollment, and unemployment reached 24.6% after Loring closed (Dorrer, 2005). Additionally, Limestone experienced a sharp 20-30% decline in property values and a 2000 Census housing vacancy rate of 30.8% even with a 50% reduction of housing in the prior decade (Dorrer, 2005; GAO, 2002). The future for this rural community looked exceedingly grim.

The redevelopment process has taken a considerable amount of time and is still ongoing. The initial planning and public participation process was initiated by the Loring Redevelopment Committee; the public was invited and attended committee and subcommittee meetings. In fact, there was a genuine spirit of cooperation due to the economic threat of the base closing particularly in light of the weakening agriculture and forestry industries (Thompson, 2010). Seven months after the closure announcement, the Loring Redevelopment Committee was established to lead the reuse effort; about eighteen months later, the State of Maine authorized the quasi-public Loring Development Authority which still manages the redevelopment of Loring Air Force Base (Dorrer, 2005). The reuse plan was prepared by RKG Associates and it incorporated several prior studies conducted by the Northern Maine Development Corporation and other entities (RKG Associates, 1995). Public participation throughout the planning process is not well documented; however, public hearings were used to keep the public informed during the redevelopment planning process (Owens, 2006). The current

president and CEO of the Loring Development Authority stated: “While I was not personally involved, it’s my understanding that the Reuse Plan was prepared by a consultant (RKG Associates) with considerable input from the public and the Board members, and was formally adopted by the Board in June 1995 (C. Flora, personal communication, June 23, 2010).” Table 5.5 summarizes the redevelopment timeline of the former Loring Air Force Base.

The Loring Redevelopment Plan included a building inventory and classification, detailed infrastructure assessment, fiscal analysis, and marketing strategy. It also outlined the market conditions for existing available industrial property and out-migration predictions – both of which were dire yet realistic. The need to attract business outside of the county is a prevalent theme in the plan as the local economy was not considered strong enough to absorb the base closure. The land reuse called for an educational core (144 acres), office and commercial uses (601 acres), industrial (1,106 acres), aviation (1,388 – converted to industrial if not viable), residential (121 acres), recreation (441 acres), and conservation (4,666 acres). Prior studies had correctly identified the limited reuse potential of the existing runway on the base (this is still one of the redevelopment challenges today). Finally, a public hearing on the reuse plan was held on April 12, 1995 (RKG Associates, 1995). Subsequent consultant studies (Target Industry Market Study and Aviation Task Force Study) for the Loring Development Authority identified several potential industries for the Loring Commerce Centre: light manufacturing, agriculture, food processing, transportation, and

distribution. These studies identified the excellent existing telecommunications infrastructure and availability of educated and low cost labor (Owens, 2006).

**Table 5.5: Loring Air Force Base Redevelopment Timeline**

<u>Date</u>	<u>Milestone Event</u>
July 1991	<i>closure announcement</i>
February 1992	<i>Loring Redevelopment Committee formed</i>
June 1993	<i>Loring Development Authority formed by state</i>
January 1994	<i>LDA moves on base</i>
spring 1994	<i>Loring designated a Job Corps site with 150 jobs, DFAS with 550 jobs</i>
September 1994	<i>base closes</i>
May 1995	<i>first interim lease (golf course &amp; clubhouse), many follow</i>
June 1995	<i>reuse plan final and submitted to USAF</i>
November 1995	<i>USAF environmental statement</i>
January 1996	<i>USAF decided to transfer 3700 acres</i>
June 1996	<i>marketing begins</i>
October 1996	<i>agreement to transfer Loring at no cost, \$3M max to maintenance thru 2004</i>
April 1997	<i>property transfer, first long term lease signed to Championship Sports Flooring</i>
April 2001	<i>2805 acres free from USAF to Loring Development Authority for LCC</i>
December 2004	<i>another 918 acres transferred</i>

sources: Bronstien, Dorrer, OEA

The Loring Development Authority has secured substantial federal grants, negotiated a caretaker agreement with the Air Force, targeted marketing efforts, and explored a vast variety of business opportunities for the former base. While state funding has been limited to \$300,000 annually, federal funding from the EDA, HUD, OEA, and DOL have been substantial. Federal and state funding has been used for building renovations, marketing, salaries, and expenses. In addition, the Air Force spent \$130 million on the environmental remediation of the former Superfund site (Dorrer, 2005; Owens, 2006). The Air Force also agreed to a novel 10-year building and infrastructure maintenance plan at no cost to Loring (Dorrer, 2005).

Executives from the Loring Redevelopment Authority attended numerous business trade shows to secure new tenants for the Loring Commerce Centre (Sund, 1999). Brian N. Hamel, former president of the Loring Development Authority, stated “if a company can come in and show us that [it] can create jobs...we can give [it] free rent to come in and do that” (Bronstien, 1997). Loring also hosted three outdoor concerts for the rockband Phish which infused millions of dollars into the local economy and provided an opportunity to introduce and market the Loring Commerce Centre to attendees (Banville, 2003; Miller, 1999). With an annual budget of \$250,000, Hamel has also led exhaustive targeted marketing efforts through mail and telephone to encourage potential tenants to consider Loring for new company expansions – trips to the Centre occasionally were paid by the Hamel’s organization (Sund, 1999). To help attract tenants, it offers a business incubator funded by the state and tax incentives through Maine Pine Tree Zone and federal Rural Empowerment Zone designations (Dorrer, 2005; Loring, 2010; Owens, 2006).

Many in Maine and in the federal government consider the redevelopment at Loring Air Force Base to be successful. Using the metric often used to measure recovery, civilian employment now exceeds the number of federal civilian jobs on the former base. Loring Commerce Centre now boasts almost 1,400 jobs and approximately 80% of those are public sector positions (Dorrer, 2005; Martin, 2010). With over twenty tenant businesses and significant parcels of land still available for development (about one-third of the total area), the Centre is the largest industrial business park in the state (Owens, 2006; Rice, 2006). Major tenants include the Defense Finance and Accounting



Service, a federal Job Corps training program, the Maine Military Authority (a National Guard vehicle repair facility), and a Sitel Insurance Services call center (Loring, 2010; Martin, 2010; OEA Base Reuse, date unknown).

The facility dodged another negative BRAC impact when the 2005 commission elected to expand rather than close the Defense Finance and Accounting Service with another 250 jobs (*Portland Press Herald*, 2005a). In concert with the lengthy redevelopment process, out-migration has slowed as well; after losing 15% of the population in the prior decade, the loss was only 0.9% during the first five years of the new century. Unfortunately, Aroostock County's underemployment problem still prevails (Wickenheiser, 2007). Lastly, the Loring Development Agency has still not found a solution to the reuse of the longest runway on the East Coast. The LRA's strategy has consistently been to not take jobs from the surrounding area (nearby Presque Isle has a commercial airport) and no major aviation-related tenant has been lured to revitalize the available aircraft space (Sund, 1998, 1999). Only Telford Aviation Services, Inc. maintains a permanent presence on Loring and unmanned aerial vehicle testing is currently ongoing – there are other aviation related projects under consideration for Loring (Loring, 2010; Martin, 2010).

Although the majority of newly created jobs are government jobs, the redevelopment of Loring Air Force Base is considered a success – particularly given its economic conditions before and after the closure as well as its rural location. From my perspective, leadership has played the most significant positive role in this regard. While there were initial disagreements about who should control development – state

law stated Limestone, Caswell, and Caribou should, but the Loring Development Authority wanted control in order to stay flexible and competitive (Gagnon, 1995) – these concerns were alleviated once tenants began to arrive. The former president and CEO of the Loring Commerce Centre, Brian Hamel, arrived in 1994 via the Pease Air Force Base redevelopment and certainly brought some base closure experience with him (Kesseli, 2004). Hamel commented that early planning and a talented team of “...competent advisors, passionate volunteers, creative thinkers, collaborative public officials, and a supportive community ...” make the difference in successful base recoveries (Hamel, 2005, p. 3).

The Loring Development Authority has been consistently entrepreneurial and savvy throughout the redevelopment process. Hamel’s team mitigated the massive cleanup effort by orchestrating a partnership between the U.S. Environmental Protection Agency, Maine’s Department of Environmental Protection, and the U.S. Air Force – a process which can ensue for much longer like the ongoing over decade-long effort at the closed Stratford Army Engine Plant in Connecticut. Cooperation is essential to complete this inherently bureaucratic effort (Owens, 2006). While awaiting the delayed property transfer process, the Loring Development Authority was able to negotiate long-term leases for the land and infrastructure it needed for redevelopment (Sund, 1999). Finally, the leadership team explored and pursued numerous business opportunities as well as federal grants.

#### **5.4.4 South Weymouth Naval Air Station**

The United States Navy acquired the South Weymouth Naval Air Station property in 1941 when the base served to patrol the north Atlantic during World War II. The approximately 1,400 square acre installation was comprised of land formerly owned by the towns of Weymouth (50% of the base), Abington (41%), and Rockland (9%) and later provided aviation training and served as a base for Navy and Marine reserves, subchasers, and radar research; it was closed on September 30, 1997 (Global Security, 2007; Lee, 1997e; Plymouth County Business Review, 1996). Only twelve miles from Boston, the base interjected \$60 million annually into the local economy before the closure announcement (Adams, 1999a; SSTTDC, 2005). The installation had fought off closure twice before and it vowed to fight the 1995 BRAC announcement (Weber, 1995).

The initial planning and public participation stage of the redevelopment process was lively and continues today. In 1996, the Naval Air Station Planning Committee consisted of thirty-three members – five per town, six appointed by the governor, seven politicians, and the air station commander. The committee's monthly meetings included several public workshops and the public was invited to participate on the following subcommittees: land use, transportation, environmental impact, business and economic development, fiscal and economic impact, worker adjustment and public outreach (Plymouth County Business Review, 1996). Consensus was built through an open process and attendance was strong at town meetings including approximately 1,000 at a Rockland meeting and 900 in Weymouth (Knapp, 1998). The South Shore Tri-Town Development Corporation (SSTTDC) was formed in 1998 and in addition to a small

staff, it has a five member volunteer board and a twelve member volunteer advisory board (Crowley, 1998b). There have been some leadership changes at the SSTTDC over the past decade.

“Three Executive Directors had been hired in the past 10 years. Over a year ago the position changed to Chief Executive Officer and Kevin Donovan was hired. The Board of Directors (5 members) are appointed by the Host Towns to 5 year terms. One Director represents Abington & has served 12 years so far. Two Directors represent Rockland, one position changed twice and the current Director has served 9 years so far and the other position changed 3 times. Two Directors represent Weymouth, one position changed 5 times and the other position 3 times. Up until 2008 all Directors were unpaid volunteers putting in an extraordinary number of hours. The commitment got too heavy for some, but each Director had a goal and when the Corporation reached their milestone they stepped down (M. Cordeiro, personal communication, July 28, 2010).”

The extent of leadership turnover at South Weymouth has not been witnessed by the other New England LRAs, but this has also been a demanding and contentious redevelopment effort. Furthermore, as subsequent plans evolved, public meetings (and participation) continued – particularly from January 2003 – May 2004 and in 2005 (Fontecchio, 2005a; SSTTDC, 2005). Table 5.6 summarizes the redevelopment timeline of the former South Weymouth Naval Air Station.

Many reuse proposals were (and continue to be) offered. Consultants from Vanasse Hangen Brustlin determined that there was strong residential but limited commercial and industrial demand in the region (Lee, 1997a). And while there was support for an elderly housing reuse proposal, particularly from the housing authority, Rockland residents have consistently opposed residential development (Lee, 1997a; Martin, 1995). The planning committee sought and received proposals from local

homeless agencies as required by the McKinney Homeless Assistance Act of 1987; this act was later amended in 1994 to consider homeless housing based on local severity (Lee, 1997c). The Daylor Consulting Group recommended a large-scale youth sports complex and wooded areas (Adams, 1999b) and the SSTDTC later rejected a proposal for an off-track betting center (Adams, 2000).

**Table 5.6: South Weymouth Naval Air Station Redevelopment Timeline**

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<u>Date</u>	<u>Milestone Event</u>
July 1995	<i>closure announcement</i>
September 1995	<i>Naval Air Station Planning Committee formed by state</i>
September 1997	<i>base closes</i>
August 1998	<i>South Shore Tri-Town Development Corporation formed by state</i>
December 2000	<i>mega mall plan scraped</i>
October 2002	<i>LNR Property selected as developer</i>
June 1998	<i>reuse plan final and submitted to USN</i>
May 2003	<i>initial property transfer</i>
September 2004	<i>LNR proposes Village Center Plan</i>
June-July 2005	<i>towns approve zoning for LNR plan</i>
November 2006	<i>LNR starts work at base entrance</i>

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sources: MA Executive Order 378, Associated Press, The Patriot Ledger

Since there is a runway available on the installation, an airport reuse concept was debated, considered, yet adamantly rejected by the public in 1996 (Lunt, 1996b). The airport debate continued in 1997 when a 1996 consultant study suggested that a regional airport at South Weymouth was the fastest way to recapture jobs (Lelii & Lee, 1997). While access from nearby Route 3 was considered essential to any redevelopment plan (Lee, 1997d), four initial options were developed: (1) mixed residential and commercial use, (2) recreation and open space, (3) business development, and (4) small municipal airport (Patriot Ledger, 1996).

The first reuse plan was adopted by the Naval Air Station Planning Committee in January 1998 and later approved by the three surrounding towns. The document represented eighteen months of planning and over 150 public meetings (SSTTDC, 1998). "It reflects a strong commitment to economic development, job creation and expansion of the local tax base while preserving and enhancing the site's environment and recreational resources (SSTTDC, 1998, p. 8)." The highlights of the reuse were 1.4 million square feet of research and development as well as office space, 2.1 million square feet of retail, a roadway connector between Routes 3 and 18, 758 acres of open space, 500-700 elderly housing units, a golf course, and land for future expansion of commuter rail parking. The relatively short document, only thirty-two pages, includes a concise market analysis, fiscal impact including tax revenue estimates, traffic mitigation, utilities impacts, job estimates (6,000 construction and 9,000 permanent), and a list of next steps (SSTTDC, 1998). While the plan is succinct, it lacks the detail of other reuse plans.

To implement the 1998 plan, a development company from Virginia was selected to build a 1.1 million square foot mega-mall with a mix of office and commercial space. SSTTDC later cancelled the agreement due to low wage and traffic concerns (Archambeault, 2002; Preer, 2002). Citing changing conditions, SSTTDC worked to develop a revised reuse plan (SSTTDC, 2005). The revised 2005 plan includes ten goals including revenue generation for towns, smart growth principles, job creation, open space preservation, and traffic reduction. The document, even shorter than the previous plan, includes commercial, residential, golf course, open space and recreation,

and homeless housing land uses. It also identifies needed infrastructure improvements (transportation, water, wastewater, wetlands). Job creation estimates are included (6,000-12,000 construction and 2,000-3,000 permanent); however, the short tax revenue section does not include detailed revenue estimates (SSTTDC, 2005). Overall, both plans are not nearly as comprehensive as the others I reviewed.

SSTTDC selected Miami-based LNR Properties for the 2005 development plan. Heated public debate ensued for the proposed mixed use housing development (Preer, 2005a). The \$1 billion project is planned for completion by 2017 and includes almost 3,000 homes, 2 million square feet of commercial space, twenty-four athletic fields, a Boy Scout camp, and open space covering about two-thirds of the closed base; with an estimated population increase of 7,000, there are serious concerns over traffic and the tax impact of adding hundreds of public school students (Fontecchio, 2005c; Jette, 2005; Preer, 2005b). Twenty percent of the housing is planned equally for low- and moderate-income families (Encarnacao, 2006). As part of the agreement, LNR has assumed management of the Navy's \$50 million environmental remediation effort (Adams, 2004); LNR is also the development company for Mare and Hunter's Point Naval Island shipyards and March Air Force Base – all closed military installations in California (Adams, 2002). Weymouth, Abington, and Rockland approved the plan in the summer of 2005 (Fontecchio, 2005d).

The SSTTDC has spent years managing expectations and overseeing updates to reuse plans for South Weymouth Naval Air Station. The LDA also has a significant role with the current planned housing development, named SouthField by LNR. While

SSTTDC controls the Central Redevelopment Area, the adjoining towns control the Perimeter Areas and although SouthField is not really a town, it does control zoning, design, and environmental regulations for the development (Encarnacao, 2006). LNR has been working with a marketing firm and the state Office of Economic Development to attract commercial tenants (Adams 2006); with the exception of ongoing road construction projects discussed below, there is no active role for state in this reuse plan (Jette, 2005).

The relationship between SSTTDC and LNR has not always been amicable. Even though LNR invested \$12 million for SSTTDC operational costs during the last six years, and each has blamed the other for the LDA's dire financial situation; SSTTDC almost went bankrupt and both LNR and the Navy have grown impatient with the redevelopment agency (Encarnacao, 2009b). There have also been criticisms of the deal between SSTTDC and LNR for the SouthField development as it appears to favor LNR over the towns. Under the agreement, LNR pays \$16 million in administrative expenses, \$5 million to clean the base landfill, and a portion of \$151 million infrastructure bill; the company receives the land at no cost and an expected \$170 million from land sales (Associated Press 2004). While much of the criticism and financial issues stem from the ambiguity of the deal, an alternative was to ask MassDevelopment to manage the redevelopment of South Weymouth (Encarnacao, 2009b). In fact, MassDevelopment representatives served on the on initial planning committee for the redevelopment of the base (Lunt, 1996b). In 2002, the SSTTDC was actually working on a development agreement with MassDevelopment as the support for the \$250 million mega-mall



concept dissipated (Archambeault, 2002). Again in 2005, the LRA was close to an agreement with MassDevelopment, but it was never completed as towns would lose control of the redevelopment (Fontecchio, 2005b).

The Navy completed the first transfer of 557 acres in April 2003 and the SSTITDC is still awaiting the base's remaining property (Associated Press, 2003). The Navy wanted compensation for the remaining acreage due to the major changes to the reuse plan since the original 1998 plan created 9,000 permanent jobs while the current planned neighborhood project will not create that many (Adams & White, 2004). "The transfer of the remaining 836 acres is an ongoing negotiation issue between [the] Navy and SSTITDC. A National Defense Authorization Act recently passed legislation giving the Secretary of the Navy the discretion to assign a no cost or low cost value to the base, factoring in the investment already made to improve its infrastructure. Prior to that, the Navy wanted \$43 million for the land (M. Cordeiro, personal communication, July 28, 2010)." To make matters worse, the SSTITDC bond rating was downgraded in 2009 which makes financing any land redevelopment costs challenging (Manning, 2009c). Furthermore, a new appraisal of the land was due in March 2010, but has not been completed (Reardon, 2010).

Federal and state financial support for the South Weymouth Naval Air Station has not been as strong as some of the previously discussed New England base closures (a comparison is provided in the last section of this chapter). The most notable exceptions are the state grants and bonds for road construction. A state legislative committee allocated \$25 million in 1997 for several projects (Lee, 1997b) and in June

2010, \$30 million in state bonds were approved for parkway and multi-modal improvements to the commuter rail station (Martinez, 2010). The groundbreaking for the parkway took place on July 26, 2010 with the initial phase of home construction on the base started in fall 2010 and is ongoing (M. Cordeiro, personal communication, May 24, 2011; Martinez, 2010). The Massachusetts Office of Business Development, MassHighway, and other state agencies have provided nearly \$8.5 million in grants from 1999-2009 (SSTDC, 2010). Additionally, Governor Deval Patrick designated SouthField a municipal growth district enabling the state to target economic development resources for the reuse (States News Service, 2008a). While some federal stimulus funding was allocated to assist in the parkway construction, the OEA and HUD have provided moderate reuse planning grants in the past (Boit, 1996; Encarnacao, 2009a; Tatz, 1996).

The redevelopment results to date have been slow and discouraging. A casual visitor will notice "...empty hangers and boarded-up buildings...(Manning, 2009a)." "The progress has been limited to some roadwork, land clearing and construction of a small building used for marketing (Manning, 2009a)." The United States Coast Guard now occupies 165 former officer quarters and there has been limited use of the closed installation: car shows, driving practice for the state police, motorcycle training on the runway, and an antique dealer has leased an aircraft hanger for storage (Preer, 2002). These are not results one would expect more than a decade after closure. While the planning process has been exhaustive and has sought to fully represent the public interest, it has seen many iterations and the political capital expended has been

significant. As noted above, the SSTDTC leadership has lacked continuity and there are unresolved land transfers. The failure, at least so far, of this base reuse stands as an outlier amongst the other installations studied and will be contrasted with them in the last section of this chapter.

#### **5.4.5 Brunswick Naval Air Station**

In existence since 1943, Brunswick Naval Air Station served both training and strategic purposes for the U.S. Navy. The installation was commissioned during World War II to train pilots from England and Canada (Associated Press, 2005). The P-3 Orion planes once stationed at the base patrolled the shipping lanes in North Atlantic and conducted long-range surveillance of the Middle East, South America, and Africa. At the time of the BRAC closure announcement in 2005, the installation employed 4,000 military and civilians; by the end of 2009, no planes and less than 700 positions remained as the base continued to wind down operations (Associated Press, 2009; Brattleboro Reformer, 2009). As summarized in Table 5.7 below, the planning process for the redevelopment of Brunswick Naval Air Station has been ongoing for several years (Hoey, 2007d).

While local officials were concerned with closure possibility during previous BRAC rounds, the Navy invested \$150 million in construction and other improvements since 2001 including a 500-bed hotel for pilots (*Portland Press Herald*, 2006). The local economy benefited by \$211 million annually through the contracts and payroll generated by Brunswick Naval Air Station; in 2005 (before the nationwide recession),

the closure was anticipated to have minimal impact on the strong local economy except for a temporary glut of housing (Wickenheiser, 2005). A report by RKG Associates predicted it will take up to twenty years to fill all the industrial and commercial space on the installation while the housing market will be severely impacted when at least 1500 units of base housing becomes available (*Portland Press Herald*, 2006). In addition, a state report identified impacts to the retail, construction, and service industries – particularly to the job impacts of the surrounding communities of Brunswick, Bath, and Topsham (Renski & Reilly, 2007). Regardless, the redevelopment forecast was promising since the 3,200 acre waterfront installation has excellent highway access and it is situated in a community that was growing – at least before the recession (Sharp, 2005).

**Table 5.7: Brunswick Naval Air Station Redevelopment Timeline**

<u>Date</u>	<u>Milestone Event</u>
August 2005	<i>BRAC announcement</i>
November 2005	<i>first meeting of Brunswick LRA</i>
December 2005	<i>DOD recognizes Brunswick LRA</i>
May 2006	<i>MRRA formed</i>
summer 2006	<i>formal planning begins</i>
December 2007	<i>reuse plan complete</i>
January 2008	<i>MRRA moves to air base</i>
March 2008	<i>first tenant announced</i>
November 2009	<i>last plane departs</i>
May 2011	<i>official base closure</i>
September 2011	<i>initial land transfer agreement signed</i>

sources: Associated Press, Portland Press Herald, Matrix Design Group, C. Tosto

Thus far, the leadership for the redevelopment has been swift and strong. Initially, two local redevelopment authorities were formed because 80 acres of Brunswick Naval Air Station is situated in the Town of Topsham (Canfield, 2005). The

larger, Brunswick LRA, consisted of a mix of politicians and local business and community leaders; this organization met for the first time only months after the closure announcement by the BRAC Commission and during the same month that the closure became official (Associated Press, 2005; *Portland Press Herald*, 2005b; *State News Service*, 2005). The State of Maine also assumed a proactive role through its experience in managing the Loring Air Force Base redevelopment. Governor John Baldacci appointed an Advisory Council Group designed to facilitate progress in four areas: retraining workers, supporting incumbent local businesses, recruiting new industry, and assisting in other general development actions; the group consists of business, union, political, education, and tribal leaders (Associated Press, 2005). In addition, the Midcoast Regional Redevelopment Authority was formed through a legislative act and is currently managing the reuse plan developed through the efforts of the Brunswick LRA (Associated Press, 2006; Matrix Design Group, 2007).

Although a public letter-writing campaign to the BRAC Commission failed to overturn the closure decision, the public has remained engaged in a transparent redevelopment planning effort (Associated Press, 2007b; Hoey, 2005b). The Brunswick LRA chose to conduct its planning through a concerted public participation effort and by following “smart growth” principles. During the 18-month planning process, the LRA hosted four official public planning meetings, public tours of the installation, four seminars in the spring of 2007, several workshops (public visioning, smart growth, and aviation), a random 400-person telephonic community survey, and other forms of outreach including press releases, articles, and presentations. In addition, a

considerable effort to reach 164 homeless providers in the area helped to integrate the needs of this population into the reuse plan (Matrix Design Group, 2007). These efforts ensured that the reuse plan reflected the community's input and helped to solicit seventeen proposals from a variety of local and state agencies including a college campus and Navy museum (Hoey, 2007c).

The reuse plan was completed two years after the closure announcement was official. "The Reuse Master Plan for the Brunswick Naval Air Station represents a unique opportunity to establish a vibrant live, work, play and educate environment and centers of excellence for technology innovation, environmental sustainability, and "green" community development (Matrix Design Group, 2007, p. 1)." The mixed-use redevelopment calls for an airport (500 acres), aviation-related industry (230 acres), office space (120 acres), pedestrian friendly and higher density mixed use (175 acres), business and technology space (190 acres), education areas (200 acres), residential space (215 acres), and recreation and open space (1570 acres) encompassing almost one-half of the installation. The planning document considered the target industries identified in a January 2007 Economics Research Associates consultant report and an Aviation Feasibility Study by consulting firm Edwards and Kelcey. It also includes an economic and infrastructure assessment, considers environmental and property transfer phasing and contingency plans, and offers an outline of required marketing efforts to attract future business and other tenants (Matrix Design Group, 2007).

Since the plan was published, Embry-Riddle Aeronautical University has announced that it will maintain its presence on the base after the closure (Sharp, 2008).

In addition, the Marine Advanced Technology and Engineering Center is planned to encourage research and development in the precision manufacturing and advanced energy industries as well as growth of composites sector. A business incubator will also be integrated into this center representing an agreement between University of Maine and Southern Maine Community College (MRRRA, 2010). Currently there are sixteen businesses open on the former installation with an expected employment of 700 and investment of \$150 million over the next three years (C. Tosto, personal communication, January 6, 2012).

Brunswick redevelopment leaders from both the Brunswick LRA and MRRRA have leveraged federal grants and state incentives to foster planning and marketing efforts. The OEA has awarded over four million dollars in redevelopment assistance grants to support transportation, environmental remediation, marketing, and master planning (State News Service, 2007a 2007b, 2008c; C. Tosto, personal communication, July 22, 2010; US Fed News, 2006). In addition, DOT funded an aviation use study and DOL awarded two million dollars to encourage development of an information technology industry cluster in support of job creation and to provide worker retraining programs (State News Service, 2006, 2008b). Agencies within Maine have awarded almost \$800,000 in funding to encourage redevelopment of the naval station (C. Tosto, personal communication, July 22, 2010). Maine also designated (1) the Midcoast region as a Pine Tree Zone which ensures that Brunswick qualifies for business tax incentives, (2) the naval air station as a Military Redevelopment Zone, and (3) the base as a member of the North Star Alliance which offers marine trade incentives to companies

(Associated Press, 2006; Matrix Design Group, 2007). The MRRRA can also “...issue and sell notes, bonds, certificates of indebtedness and other obligations to achieve its public or corporate purpose (Matrix Design Group 2007, p. 220).” These financial programs should help to generate tenant interest in Brunswick well after the May 2011 base closure (Bridgers, 2011).

Irrespective of the excellent progress by the MRRRA to date, there are three major (and familiar) issues to resolve: (1) disposition of base housing and its impact on the local housing market, (2) land transfer method and timing, and (3) environmental remediation impacts. Clare Tosto (personal communication, July 14, 2010) of the MRRRA identified base housing the “stickiest issue” affecting the redevelopment. While MRRRA now owns the land, 650 former base housing units are privately owned by Affordable Mid-Coast Housing (AMH). After several years of negotiations between MRRRA, AMH, and the Towns of Brunswick and Topsham, a disposition plan outlining the sale of the units and the timing is near completion (C. Tosto, personal communication, January 6, 2012).

The base officially closed in May 2011 and in September 2011, the Navy and MRRRA signed the first purchase and sale agreement for 1,100 acres and several more economic development conveyances are expected in the next year. In addition, a public benefit transfer agreement was reached for the Brunswick Naval Air Station airport and the transfer of property has since begun (C. Tosto, personal communication, January 6, 2012). Finally, an exact timeline for environmental remediation is not known. Cleanup has started and is the full responsibility of the Navy (C. Tosto, personal communication,



July 14, 2010). To address both the housing and environmental issues, the MRRRA hosted a series of panels to explore possible resolutions; panelists included Brian Hamel of the Pease and Loring redevelopments and William Burke from the Devens redevelopment (Hoey, 2007a, 2007b). In terms of planning, the redevelopment is off to strong start; the Brunswick community received ample notice of the closure and has taken advantage of this time to conduct a comprehensive and inclusive planning process.

## **5.5 Analysis**

After coding the qualitative data uncovered in the historical studies above, several themes emerge; they are public participation, redevelopment planning, leadership, fiscal resources, and redevelopment location. By public participation, I mean the level of community involvement in the military installation reuse planning process; as outlined in each of the historical studies, there is a varying amount of meetings, hearings, committees, and other mechanisms to engage the public in the planning process. Redevelopment planning considers the thoroughness of the initial plan and its refinement in subsequent years. Leadership implies the type of centralized or decentralized structure, its continuity, and the authority of the LRA and redevelopment authority to implement the plan. The availability of federal, state, and other fiscal resources as well as the redevelopment location are self-explanatory.

Several of these themes are consistent with the “principles” listed in the first section of this chapter and are reiterated below. The following section summarizes and

contrasts these themes for the New England BRAC closures. While some themes are prevalent among each of the five historical studies, some are not. The South Weymouth Naval Air Station redevelopment effort stands out as the least successful; its reuse has essentially stalled for over a decade. The lack of strong leadership, a clear vision, and financial resources have contributed to an unproductive reuse effort to date.

Public participation is evident in each of the historical studies – albeit to varying degrees. Evidently each of the reuse planning committees were well aware of the benefits of each rung in Arnstein’s (1969) “ladder of citizen participation” as well as the BRAC requirement that their reuse plan reflect community consensus. While collaborative planning and consensus-building existed in each case, it has not differentiated the successful recoveries from the most unsuccessful one in New England – South Weymouth Naval Air Station. As a final note regarding collaborative process, it is impressive that at least two towns (and typically three) adopted their respective base redevelopment plan.

A second consistent theme amongst all five reuse efforts, successful and not, is the development of planning documents. All redevelopment authorities hired consultants to draft their plans. Each of these plans is extensive and reflects numerous hours of data collection, analysis, and meetings. Although the South Weymouth plan is not nearly as comprehensive as the others, the reuse plans are professional products which typically cannot be completed with the limited staff available in most planning departments. While Pease did not have the advantage of reviewing lessons learned from previous BRAC closings, Brunswick and others took the time to study issues faced

by other installations (environmental remediation and land transfer timelines for instance) and then mitigated them. The planning efforts are also indicative of extensive preparation and in a few cases (notably Pease and Devens) were augmented with successive reviews of the original reuse plans. While the land development of Pease and Devens can be characterized as incremental and cooperative, both LDAs undertook comprehensive (and multiple) planning efforts to facilitate the economic transformation of the former bases. Although not the only factor, the results of proper planning for these two installations speak for themselves. The major redevelopment themes for each base are summarized in Table 5.8.

**Table 5.8: Comparison of Selected Redevelopment Themes for Historical Study**

<u>BRAC installation</u>	<u>public participation</u>	<u>leadership</u>	<u>reuse plan</u>
Pease AFB	strong	state LRA	1.5 year process; comprehensive; 5-year review
Fort Devens	strong	state LRA	3.5 year process; comprehensive; 5&10-year reviews
Loring AFB	strong	state LRA	4 year process; comprehensive
South Weymouth NAS	strong	local LRA	3 year process, revamped plan after 9 years; lacks detail
Brunswick NAS	strong	state LRA	2.5 year process; comprehensive

The discriminating factors between the successful and unsuccessful recovery efforts are leadership, fiscal resources, and to a lesser extent, redevelopment location. Leadership is not a popularity contest – it requires decisiveness, flexibility, and patience. There are examples of strong leadership for the Pease, Devens, and Loring redevelopment efforts; the same is not true at South Weymouth primarily due to the lack of continuity. As mentioned previously, the SSTDTC has had three executive directors in ten years – such unfortunate turnover hindered the strategic vision and tenacity required to steer a long reuse process through completion. In fact, the

redevelopment in South Weymouth is far from complete whereas the outlook is much more promising at Brunswick.

Additionally, in all cases except South Weymouth, a quasi-state redevelopment agency navigated the base reuse process. This is important for two major reasons: access to capital and political influence with the state legislature. The communities of Weymouth, Abington, and Rockingham rejected MassDevelopment’s bid to become the LDA in the interest of ensuring local control of the redevelopment. Although the Commonwealth of Massachusetts has taken proactive steps in the redevelopment efforts of South Weymouth, the results at Pease, Devens, and Loring tower those achieved so far as the former naval air station. The quasi-state LDAs were able to access state bonding capacity and loans which were critical to infrastructure improvement on their respective installations. They were also able to lobby state legislators and congressional delegations to support and solicit the federal grants highlighted in Table 5.9. While Pease and Loring received a disproportionate share of federal redevelopment grants, all monies were crucial to the continued planning, marketing, and infrastructure work of all installations.

**Table 5.9: Federal Funding for Redevelopment of New England Military Bases**

<u>BRAC installation</u>	<u>BRAC year</u>	<u>acres</u>	<u>OEA</u>	<u>FAA</u>	<u>EDA</u>	<u>DOL</u>	<u>total</u>
Pease AFB	1988	4,272	859,790	59,400,000	11,000,000	0	71,259,790
Fort Devens	1991	9,380	3,059,526	0	6,814,320	2,000,000	11,873,846
Loring AFB	1991	11,116	2,051,779	17,300,000	6,986,871	2,100,000	28,438,650
South Weymouth NAS	1995	2,250	422,000	0	3,603,350	925,000	4,950,350
Brunswick NAS	2005	3,363	4,650,803	5,000,000	1,900,000	2,000,000	13,550,803

Source: GAO 1998, Brunswick source: States News Service, MassDevelopment, LCC, PDA, SSTDC

In addition to federal financial support through programs like the FAA's Military Airport Program, states have offered business development incentives to attract companies to former bases. Maine has designated Brunswick as a Military Redevelopment Zone which offers full income tax credit for select business as an enticement to move to the naval station property (Carahasen, 2006). These incentives are location-based as they clearly vary across state boundaries. Location, however, has played a varied factor in New England base redevelopment. The sole rural base at Loring has had moderate success due to the current heavy proportion of public jobs. In addition, three bases are within commuting distance of the metro-Boston area – one of the epicenters of the economic boom of the 1990's. Both Pease and Devens have succeeded while South Weymouth has not – at least not yet.

As a final note, the number of civilian jobs on former installations seem to be the measuring stick for a successful conversion; however, this statistic does not tell the whole story. There are clearly base closure impacts, identified in chapter two, that have lasting effects on communities and regions. "While the 1,100 civilian jobs lost at Loring have been replaced, Limestone has not come close to replacing the buying power of the 4,000 military personnel who left, said Charles Cogan, an economist at the University of Southern Maine's Muskie Institute (Sharp, 2005)." Loring is no longer the economic engine it was during its military peak (*Portland Press Herald*, 2008). Table 5.10 summarizes the civilian employment levels before and after closure. In reality, the impact on retail, housing, and social capital is only mitigated through the migration and other neoclassical adjustments discussed earlier in this paper.

**Table 5.10: Civilian Employment on Former New England Military Bases**

<u>BRAC installation</u>	<u>BRAC year</u>	<u>closure date</u>	<u>federal civilians in 1988</u>	<u>federal civilians in 2003</u>	<u>private civilians in 2003</u>	<u>total civilian in 2003</u>	<u>increase from 1988-2003</u>
Pease AFB	1988	3/1991	656	328	5,124	5,452	4,796
Fort Devens	1991	3/1996	1,681	131	2,288	2,419	738
Loring AFB	1991	9/1994	526	316	1,048	1,364	838
South Weymouth NAS	1995	9/1997	216	0	unknown	unknown	unknown
Brunswick NAS	2005	N/A	452	278	0	278	174

Source: GAO 2005, Base Status Reports

There will certainly be base closures in the future. The remaining air base, naval college, and two shipyards in New England escaped the BRAC closures, but they will certainly be reconsidered again. Furthermore, there are social consequences of a region largely devoid of military presence. While manufacturing moved south and west (and now overseas), so has the military. New England’s historical roots originating from the War of 1812 are founded in an anti-military and anti-war sentiment still prevalent today. The region’s role in the nation’s defense is more of a passive, research-based one through its abundance of military contractors and associated industries like the precision machining cluster in Western Massachusetts that supports the military aviation industry. More importantly, military personnel are less likely to enlist from this region; the northeast represents 21% of population, but only 7.4% of active duty military force (Kane, 2005). Although there is ardent speculation that politics has had a major hand in base closure decisions (it is widely believed that President Nixon intended to punish Massachusetts – the only state not to support for his reelection bid – by taking away the active duty mission from Westover Air Force Base in Chicopee (M. Zawidowski,

personal communication, October 11, 2006), the political and social implications are the topic of papers more aptly written by sociologists and political scientists.

## CHAPTER 6

### CONCLUSION

When beginning the research for this dissertation, I anticipated that I would be able to develop a regression model that would predict the economic effects of military base closures and determine the pre-closure indicators most likely to spur a successful recovery. I expected that planners could use this model to mitigate the effects of closure and seek strategies that would counter potential negative impacts. This research did not progress as planned, but the lessons are still relevant to the planning community – let me explain how.

The following six objectives were identified in the first chapter of this dissertation:

- 1) Determine appropriate economic and social measures of successful recovery after a military base closure.
- 2) Understand the characteristics of communities facing military base closures and those recovering from them in order to better assess the resultant impacts.
- 3) Develop a regression model to predict the economic impacts of future military base closures across the nation.
- 4) Apply this model to bases closed by the 2005 BRAC commission; understand probable impacts and recovery timeline.
- 5) Investigate five base closures in New England in order to understand the economic and social impacts on local communities and determine those redevelopment actions indicative of successful recovery.
- 6) Provide policy guidance to federal, state, and local base redevelopment authorities to facilitate quick and efficient recovery following a base closure announcement.



First, economic and social measures were determined through a literature review of economic development theory and empirical studies of base closures. These sources suggested variables ranging from per capita income to educational attainment to airport proximity. I then collected data covering the almost twenty year BRAC closure period and analyzed these variables. Although I consider the model results inconclusive (objectives three and four were thus not completed), the lesson was clear – that each base closure had its unique consequences and opportunities. The historical studies of five New England base closures then facilitated the understanding of community characteristics (objectives two and five) and offer lessons for planners and policy makers through the often arduous base redevelopment process. These include the need for strong and swift leadership as well as strong financial support from federal and state governments.

Through my research I have gleaned several insights that are instrumental to the successful recovery of military base closures. The first concerns the location of base closures: BRAC commissions must avoid closing rural bases. Economic redevelopment options are limited and it is extremely difficult to replace the military and civilians jobs on a rural installation. In the case of rural closures, land is not scarce so the demand for industrial park land or other major employment centers typically does not exist. While reuse opportunities do exist for regional airports or wildlife refuges, most other redevelopment options are limited in scale and do not encourage vast economic benefits to surrounding communities. This is clearly the case in the closing of Loring Air

Force Base in rural Maine. For the other base closures in New England and elsewhere, proximity to urban and economic centers has encouraged recovery.

Secondly, planning is instrumental in base redevelopment. Active community and state-level involvement early in the process is crucial in building consensus and the team that will implement the plan. Through the planning process, redevelopment authorities can identify opportunities for reuse that encourage job creation and other priorities. While the circumstances for each military base closure are unique, the careful selection of zoning, infrastructure improvements, and creative reuse of existing military facilities is essential in directing the redevelopment efforts. To help establish the parameters for success, leaders at all levels must pursue funding from state and federal sources as well as incentives that entice business development on the former base.

Lastly, military services must expedite land transfer to local communities following closures. Property transfer can often take years, but is imperative to successful recovery. While there are often environmental remediation and other issues that stall land transfers, LRAs can do little to effect the actual redevelopment plan without acquiring the property of the former base. As such, federal bureaucrats must facilitate land transfers (even incremental ones) before military facilities deteriorate and reuse is delayed.

While these insights are important for future BRAC rounds, this research can be extended to other forms of economic shock including plant closures, natural disasters and even devastation due to humans. One could argue that the shrinking of America's older industrial cities like Detroit and Buffalo or the rebuilding of areas devastated by

Hurricane Katrina necessitate planning similar to military base closures. Plant closures offer the closest parallel, however (Bradshaw, 1993). While the scale may not prompt either a national response or the formation of a LRA-type planning group, some of the theory as well as the results summarized in this dissertation have relevance to the recovery process for plant closures.

The closing of manufacturing companies in many 'company towns' has been particularly devastating for surrounding communities. When the economic base for an area is fully reliant on either one company or industry, the closure of a plant or complex has severe consequences for virtually every element of the area's economy. Company towns in the milling industry originated as the industrial revolution sought to locate and develop a rural workforce that could be trained to produce consumer and other goods. Milling companies built the local schools and hospitals in order to ensure a supply of literate, obedient, and healthy workers (Sampson, 1996). This tight integration of a town with one company has dangerous impacts when unfavorable economic conditions arise and plants close.

In the Blackstone River Valley which spans parts of southeastern Massachusetts and Rhode Island, textile mills were prevalent in the last half of 19<sup>th</sup> century. As the textile industry moved south and overseas in the middle of the 20<sup>th</sup> century, towns and the region endured significant blows to their economies. It is only in recent years, as Boston metropolitan area workers are seeking affordable housing, that developers are revitalizing the abandoned mill buildings into condominiums (Nordell, 1999). Although there have been concerted efforts focusing on job creation and business retention, old

mill towns continue to suffer as populations are well below their 1960 peak (Ahlbrandt, 1991). Redevelopment of old mill sites should include maximizing historic preservation tax credits and state economic development incentive programs, flexible government and community partnerships, phased rehabilitation, and mixed-use rezoning to attract young people and entrepreneurs in search of affordable housing and business space (Mattos & Siciliano, 2003). Nonetheless, the reemergence of our industrial towns is a longstanding problem.

Both plant and base closures have a negative impact – at least temporarily – on the local economy. The biggest impact is the loss of employment, which ultimately affects other aspects of the economy. The issues of worker displacement, increased burdens on social support and networks, implications for the tax base, real estate market, and local businesses are all significant. With the advent of plant layoffs, social services including career counseling and job relocation become quickly overwhelmed depending on the number of layoffs. Howland (1988) suggests that quick and decisive action can lessen the impact on personal finances, social agencies, and the tax base. Companies can mitigate the effects on workers and ultimately the local economy by considering some different options; these include transferring workers to other company locations, striving to make temporary pay cut concessions with employees or unions, and providing early notification to employees that a plant closure is pending. By providing early notification and transition assistance for employees, companies are not only making a positive public relations decision, but they are providing an incentive for employees to stay committed at their jobs until the plant closes. Successful worker

transition programs include early notification, planned and ongoing communication, temporary but intensive services, providing an assistance center on site, pooled resources, comprehensive services, and joint management-labor sponsorship of assistance. These afford transitioning employees the time and resources necessary to help with a successful job or career change at an extremely critical time (Fedrau, 1984).

In addition to the availability of federal resources, probably the most significant difference between base and plant redevelopment is the convening of a LRA. For reasons of scale, a plant closure may not always warrant a similar organization, but the successes of many former bases can be attributed to proper organization, leadership commitment, comprehensive strategy, coalition and consensus building, realistic marketing, patience, and government support (Office of Economic Adjustment, 2005b). Ad hoc committees consisting of local community members can be formed to consider and address all the impacts and offer solutions to address them. Just as LRAs are convened to plan for reuse of military bases, community leaders and planners can assemble similar groups to expedite recovery from other closures or devastation.

Redevelopment authorities, including LRAs, must adapt much of the planning theory that is summarized in this paper. By conducting an analysis of the role of the community within the larger regional economic development framework and seeking opportunities for complementing or enhancing that framework, communities can benefit from the surplus labor and real property that result from a closure. This comes through an understanding of industrial clusters and developing competitive advantage through the strengths that a community, region, or industry offers. Existing

transportation infrastructure, for instance, should be evaluated for maximizing the redevelopment potential of vacated sites. It also implies that the appropriate level of governmental intervention take place to facilitate, rather than hinder, the adjustment process.

State and federal government involvement differs during base and plant closures. While the notification and support structure is fairly elaborate for federal base closings, the federal government cannot be as concerned about individual plant closings. However, in 1988 the Worker Adjustment & Retraining Notification (WARN) Act was passed by the U.S. Congress to ensure workers received advance notice of plant closures and major layoffs (Miller, 1993). In addition, the Job Training Partnership Act and Economic Dislocation Worker Adjustment Assistance Act are intended to help defray the costs of social services and impacts to communities during plant closures (Levin-Waldman, 1998). The 1998 Workforce Investment Act has since replaced the Job Training and Partnership Act.

There are also a variety of federal funding sources available to these communities that are generally not available for plant closures. The Office of Economic Adjustment can provide funding for reuse planning, the Federal Aviation Administration for airport master planning, and the Economic Development Administration and Federal Highway Administration for construction and infrastructure costs. I have shown the vast extent of federal money available and awarded to New England base closures. These resources invariably expedite the reuse of bases with often inadequate infrastructure for intended reuse. In addition, the military services are responsible for any

environmental remediation needed on their former installations. While plant closures are not immune to environmental remediation issues, federal resources are often not available to help eliminate contamination. For bases, environmental cleanup and lengthy property reuse processes also impact the time it takes to revitalize closed facilities. Perseverance is crucial as the paperwork is considerable and environmental site restoration could take two decades to complete (Fouladpour, 1996). For closed plants, this process can presumably be longer (or shorter) depending on the extent of the contamination and the motivation of the owner to remediate the property.

The migration of the manufacturing industry from the Northeast and Midwest to the south and west follows a similar pattern to the BRAC closures of military installations. Ideally, this research will inform communities facing future base closures. As the country seeks cost savings in the future, more bases will close. As businesses seek cost savings, so will plants. Unfortunately while plant closures often occur without notice and can be similar in scale to base closures, there is typically no federal funding for planning. A few actions can help. First of all, swift response to the announcement of a base or plant closure can mitigate the impacts – particularly in slower recovering rural areas (Stenberg & Rowley, 1993). Communities must form LRA-like organizations with strong leadership and competent planners. LRAs have helped to reshape the closed bases in New England and can help with plant closings as well. Community redevelopment groups for any type of closing must consider realistic job replacement alternatives after conducting a thorough market analysis. To encourage recovery from any form of economic shock and promote job growth, communities should also pursue

governmental funding or public-private partnerships to help transform a closed property. Planners can and should play a pivotal role in orchestrating not only the community response, but in exploring and seeking this external funding.



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